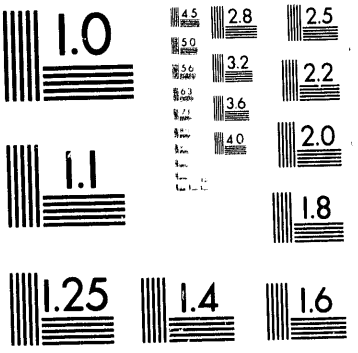

1.0
4.5
2.8
2.5
5.0
3.2
2.2
5.6
3.6
2.0
4.0
1.1
1.8
1.25
1.4
1.6

1 of 4

PNL-8771 Vol. 3
UC-350

Fort Stewart Integrated Resource Assessment

Volume 3: Resource Assessment

G. P. Sullivan
J. M. Keller
D. J. Stucky
R. R. Wahlstrom
L. L. Larson (Project Manager)

October 1993

Prepared for
the U.S. Department of Energy
Federal Energy Management Program
under Contract DE-AC06-76RLO 1830

Pacific Northwest Laboratory
Richland, Washington 99352

MASTER

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

Abstract

The U.S. Army Forces Command (FORSCOM) has tasked the U.S. Department of Energy (DOE) Federal Energy Management Program (FEMP), supported by the Pacific Northwest Laboratory,[a] to identify, evaluate, and assist in acquiring all cost-effective energy projects at Fort Stewart. This is part of a model program that PNL is designing to support energy-use decisions in the federal sector.

This report provides the results of the fossil fuel and electric energy resource opportunity (ERO) assessments performed by PNL at the FORSCOM Fort Stewart facility located approximately 25 miles southwest of Savannah, Georgia. It is a companion report to Volume 1, *Executive Summary*, and Volume 2, *Baseline Detail*.

The results of the analyses of EROs are presented in 11 common energy end-use categories (e.g., boilers and furnaces, service hot water, and building lighting). A narrative description of each ERO is provided, along with a table detailing information on the installed cost, energy and dollar savings; impacts on operations and maintenance (O&M); and, when applicable, a discussion of energy supply and demand, energy security, and environmental issues. A description of the evaluation methodologies and technical and cost assumptions is also provided for each ERO. Summary tables present the cost-effectiveness of energy end-use equipment before and after the implementation of each ERO. The tables also present the results of the life-cycle cost (LCC) analysis indicating the net present value (NPV) and savings to investment ratio (SIR) of each ERO.

(a) Pacific Northwest Laboratory is operated for the U.S. Department of Energy by Battelle Memorial Institute under Contract DE-AC06-76RLO 1830.

Summary

The U.S. Army Forces Command (FORSCOM) has tasked the U.S. Department of Energy (DOE) Federal Energy Management Program (FEMP), supported by the Pacific Northwest Laboratory (PNL), to identify, evaluate, and assist in acquiring all cost-effective energy projects at Fort Stewart. This is part of a model program that PNL is designing to support energy-use decisions in the federal sector. This report describes the methodology used to identify and evaluate the energy resource opportunities (EROs) at Fort Stewart, provides a life-cycle cost (LCC) analysis for each ERO, and prioritizes the EROs based first upon whether or not they have a positive net present value (NPV) and second upon their savings to investment ratio (SIR). The SIR (the ratio of present value of the total savings to the present value of the installed cost) is used to prioritize EROs and is only applied to projects deemed cost-effective by nature of their positive NPV. EROs with negative NPVs, therefore, will not have an associated SIR measurement. Analysis results are presented in 11 common energy end-use categories (e.g., boilers and furnaces, service hot water, and building lighting).

The Fort Stewart analysis made use of the newly developed Facility Energy Decision Screening (FEDS) software. The FEDS software is designed to identify, characterize, and assess individual energy projects. At this point in the software development, the FEDS software analyzes most major building end uses (heating, cooling, lighting, envelope insulation, and service hot water), including their interactive effects (e.g., the effect a lighting technology has on heating and cooling loads), and provides specific installed cost, energy (and demand) charges, and life-cycle cost information, by technology. The remaining EROs (motors, transmission & distribution, vehicles, etc.) are analyzed using manual calculation methods.

The use of two analysis methods complicates reporting of summary results. The FEDS software calculates its own baseline energy consumption based on 30-year average weather data, while the manual calculations use information developed in Volume 2, *Baseline Detail* (Keller et al. 1993). This makes it possible to only summarize the results as "FEDS" and "Manual," and no single grand total for energy or cost savings is available. Further details on the FEDS software and the summary results are provided in Sections 1 and 3.

As illustrated in Table S.1, the present value (PV) of the installed cost of all EROs constituting the minimum LCC efficiency resource (i.e., cost-effective) at Fort Stewart is approximately $14.2 million in 1993 dollars (1993$). The PV of the savings associated with this investment is approximately $47.7 million, for an overall NPV of $33.4 million.

Table S.2 provides a breakdown and summary of the cost-effective energy resource at Fort Stewart. Cost-sharing and rebate incentives from the utility would normally be factored into the analysis. Because the applicability of potential demand-side management (DSM) programs from the electric utility, Georgia Power Company (GPC), is uncertain, Fort Stewart project managers decided that this document would present an economic analysis from the government-funding-only perspective. That way, if no cost-sharing

Table S.1. Total Savings, Cost, and NPV (1993$)

Total Present Value of Installed Cost	Total Present Value of All Savings	Total Net Present Value
14,236,298	47,679,260	33,442,962

Table S.2. Summary of the Cost-Effective Energy Resource at Fort Stewart (1993$)

ERO Category	Present Value of Installed Cost	Present Value of Energy and Demand Savings	Present Value of O&M Savings	Present Value of Replacement Savings	Present Value of Total Savings	Total Net Present Value
Cooling	15,071	111,175	0	(13,957)	97,218	82,147
Ext. Lighting	40,000	933,740	0	(16,203)	917,537	877,537
FEDS Level-2	10,716,690	NA	NA	NA	35,653,362	24,936,672
Motors	2,759,046	7,096,458	(8,811)	1,175,938	8,263,585	5,504,539
Trans. & Dist.	14,440	937,801	(44)	0	937,757	923,317
Transportation	691,051	1,279,193	1,142,653	(612,045)	1,809,801	1,118,750
Totals	14,716,690	NA	NA	NA	47,679,260	33,442,962

with the utility could be arranged, the document would present a conservative estimate of potential savings to Fort Stewart and FORSCOM in their planning for implementation of various EROs. Once details of a cost-sharing agreement with the utility have been reached, the economic analysis can be redone at any time.

The operations and maintenance (O&M) savings are a reflection of the incremental cost difference between the cost of maintaining the existing equipment and that of maintaining new or retrofitted equipment. Because maintenance costs of new or retrofitted equipment are often the same as the costs to maintain the existing equipment, this incremental maintenance cost is often zero.

To accompany Table S.2 is Table S.3, which presents a breakdown and summary of both the energy and demand savings for the first year and full implementation of the cost-effective energy resource at Fort Stewart. The "NAs" in the table reflect the restriction that the current version of the Level-2 software does not report demand savings separately, and that there are no demand charges for fossil fuels.

The cost-effective ERO results have been aggregated by ERO category. Hot water EROs represent the greatest efficiency resource, accounting for 25.5%of the total energy savings. Lighting and heating also represent significant savings; each are approximately 20% of the total 245,244 MBtu savings available. Cost information broken out by ERO category is not available at this time.

Table S.3. Summary of the Energy and Demand Savings

ERO Category	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement Energy Savings (MBtu)	Full Implement Demand Savings (kW-mo)	Annualized Energy and Demand Savings (1993 $)
Cooling (Level-2)	30,953	NA	30,953	NA	NA
Cooling	323	277	323	277	7,117
Heating (Level-2)	51,429	NA	51,429	NA	NA
Hot Water (Level-2)	62,579	NA	62,579	NA	NA
Lights (Level-2)	50,335	NA	50,335	NA	NA
Ext. Lighting	7,953	52	7,953	52	59,771
Motors	32,174	15,329	34,234	17,837	454,258
Trans. & Dist.	4,284	2,457	4,284	2,457	60,030
Transportation	0	0	3,603	0	81,884
Vent (Level-2)	5,215	NA	5,215	NA	NA
Totals	245,244	NA	250,907	NA	NA

Tables S.4 and S.5 present the breakdown and summary of the total fuel balance at Fort Stewart. Table S.4 shows the energy consumption and savings predicted by the Level-2 software, for those EROs currently analyzed by Level-2. Table S.5 shows the energy consumption and savings predicted for the EROs not covered by Level-2. The existing energy consumption in Table S.4 is calculated by Level-2 based on a 30-year average weather file, while the energy data in Table S.5 are for FY90, as reported in the Volume 2, Baseline Detail companion report to this document. Total fuel use after ERO implementation was determined, where possible, by subtracting the total fuel savings from the total existing fuel use. The "NAs" in the table reflect the restriction that the current version of the Level-2 software does not report demand savings separately, and that there are no demand charges for fossil fuels.

Table S.4. Fuel Balance at Fort Stewart: Level-2 EROs

	Existing		Resulting		Net Conservation	
Fuel Type	Energy Use (MBtu)	Demand (kW-mo)	Energy Use (MBtu)	Demand (kW-mo)	Energy Use (MBtu)	Demand (kW-mo)
Chilled Water	112,127	NA	92,204	NA	19,921	NA
District Hot Water	115,595	NA	77,899	NA	37,696	NA
Electricity	471,611	NA	386,663	NA	84,948	NA
Fuel Oil #2	53,377	NA	38,475	NA	14,901	NA
Natural Gas	159,333	NA	138,811	NA	20,523	NA
Propane	36,655	NA	14,133	NA	22,522	NA
Totals	948,698	NA	748,185	NA	200,511	NA

Table S.5. Fuel Balance at Fort Stewart: Manual EROs

	Existing		Conservation		New Load		Resulting		Net Conservation	
Fuel Type	Energy Use (MBtu)	Demand (kW-mo)	Energy Use Reduction (MBtu)	Demand Reduction (kW-mo)	Increased Energy Use (MBtu)	Increased Demand (kW-mo)	Energy Use (MBtu)	Demand (kW-mo)	Energy Use Reduction (MBtu)	Demand Reduction (kW-mo)
Diesel	11,848	NA	6,733	NA	0	NA	5,116	NA	6,733	NA
Electricity	510,244	278,810	46,794	20,622	0	0	463,450	258,188	46,794	20,622
Fuel Oil #2	67,510	NA	0	NA	0	NA	67,510	NA	0	NA
Fuel Oil #5	80,020	NA	0	NA	0	NA	80,020	NA	0	NA
Gasoline	16,774	NA	14,882	NA	0	NA	1,893	NA	14,882	NA
Natural Gas	143,900	NA	0	NA	18,012	NA	161,912	NA	(18,012)	NA
Propane	15,842	NA	0	NA	0	0	15,842	NA	0	NA
Wood Chips	600,300	NA	0	NA	0	0	600,300	NA	0	NA
Totals	1,446,439	278,810	68,408	20,622	18,012	0	1,396,042	258,188	50,396	20,622

For building EROs (analyzed by Level-2), the estimated annual electricity consumption at Fort Stewart is 138,181 MWh. Full implementation of all electric EROs results in a reduction of 24,889 MWh. This represents a reduction of approximately 18.0% over total electricity consumption. The estimated annual fossil fuel consumption (natural gas, #2 fuel oil, and propane) at Fort Stewart is 249,365 MBtu. Full implementation of all fossil fuel EROs results in net conservation of 57,946 MBtu. This represents net conservation of 23.2% of total consumption. The end uses of chilled water and district hot water were not broken out by fuel. The estimated annual chilled water use is 9,271,891 ton-hours. Full implementation of all chilled water EROs results in a reduction of 1,640,154 ton-hours, or 18% of total consumption. The estimated annual district hot water use is 115,595 MBtu. Full implementation of all district hot water EROs results in a reduction of 37,696 MBtu, or 33.0% of total consumption.

For non-building EROs, the estimated annual electricity consumption at Fort Stewart is 149,500 MWh. Full implementation of all electric EROs results in a reduction of 13,700 MWh. This represents a reduction of approximately 9.2% over total electricity consumption. The estimated annual fossil fuel consumption (natural gas, #2 fuel oil, propane, gasoline, and diesel) at Fort Stewart is 255,875 MBtu. This total excludes wood chip and fuel oil #5 use, as well as any diesel and gasoline used for vehicles not addressed through EROs. Full implementation of all fossil fuel EROs results in conservation of 21,614 MBtu and a new load of 18,012 MBtu, for a net reduction of 3,602 MBtu. This represents conservation of 8.4% of total consumption, new load of 7.0%, and an overall decrease of 1.4%.

Acknowledgments

The authors gratefully acknowledge the assistance of numerous Fort Stewart and FORSCOM personnel associated with the development of this Integrated Resource Assessment. The people who worked with Pacific Northwest Laboratory (PNL) staff during site visits as well as over the phone and through the mail were both helpful in delivering us detailed information that increased the value and usefulness of our analysis, and enjoyable to work with.

While it is not possible to identify all by name who provided assistance, we would like to thank the following dedicated individuals: Nathaniel "Country" Adams, Chet Schratzmeier, George Walters and Randy Parks, all of the Central Energy Plant, and Walter Zechman of the National Guard Training Center. The endorsement of this project by the Fort Stewart Directorate of Engineering (DEH), Lieutenant Colonel David Fagan, is also appreciated.

Of invaluable importance to the completion of this study was the significant and conscientious assistance provided by Andy Bhan, Randy Jones, and Denise Kelley, all of Fort Stewart.

We wish to recognize our sponsor, Mr. Adrian Gillespie of the U.S. Army Forces Command, for his progressive attitude towards energy issues and his endorsement of energy efficiency at Fort Stewart.

In addition, the authors thank Joanne Moore, Mary Heid, Debora Schulz, and Darla Kennedy, all of PNL text processing, and David Payson, our editor, for the conscientious, team-oriented, and high-quality assistance they brought to preparing the final manuscript.

Greg P. Sullivan
John M. Keller
Donna J. Stucky
Randy R. Wahlstrom
L. L. (Chip) Larson

Contents

Abstract iii

Summary v

Acknowledgments ix

Abbreviations and Acronyms xix

1.0 Selection of Energy Resource Opportunities 1.1

1.1 Manual ERO Preliminary Selection Criteria 1.2

1.2 Master List of Screened and Selected EROs 1.3

2.0 Energy Resource Opportunity Evaluations 2.1

2.1 FEDS Boiler and Furnace EROs 2.3

2.1.1 Replace Existing HTHW System with (Oil, Natural Gas, or LPG) Boilers 2.3

2.1.2 Replace Existing (Oil, Natural Gas, Coal, LPG) Boilers 2.3

2.1.3 Retrofit Existing Boilers with Automatic Electric Vent Dampers 2.4

2.1.4 Retrofit Existing Boilers with Feedwater Economizers 2.4

2.1.5 Replace Existing (Oil, Natural Gas, Coal, LPG) Furnaces 2.5

2.2 FEDS Building Envelope EROs 2.7

2.2.1 Insulate Ceilings 2.7

2.2.2 Insulate Exterior Walls 2.7

2.3 Manual Building Envelope EROS 2.11

2.3.1 Radiant Barriers 2.11

2.3.2 Reflective Window Film 2.12

2.3.3 Shade Screens 2.13

2.4 FEDS Service Hot Water EROs 2.17

2.4.1 Replace Existing (Electric, Natural Gas, Oil, or LPG) Service Hot Water Systems 2.17

2.4.2 Replace Existing HTHW Heat Exchanger Service Hot Water Systems 2.18

2.4.3 Service Hot Water System Upgrade 2.18

2.5 FEDS Building Interior Lighting EROs 2.21

2.5.1 Interior Lighting EROs 2.21

2.6 Exterior Lighting EROs 2.27

2.6.1 Barracks Exterior Lighting ERO 2.27

2.6.2 Ballfield Lighting ERO 2.28

2.7 Fan, Pump and Compressor Motor EROs (Manual) 2.31

2.7.1 Energy-Efficient Motors 2.31

2.7.2 Variable Speed Drives 2.38

2.7.3 Downsized Energy Efficient Motor ERO 2.41

2.8 Air Conditioning/Chiller EROs 2.83

2.8.1 Replace Existing A/C with High-Efficiency A/C 2.83

2.8.2 Install Liquid Pressure Amplification Device 2.84

2.9 Residential Appliance EROs 2.87

2.9.1 Replace Electric Clothes Dryers with More Efficient Models 2.87

2.9.2 Replace Electric Clothes Dryers with Natural Gas Clothes Dryers 2.88

2.9.3 Replace Existing Dishwashers with Energy Efficient Models 2.88

2.9.4 Refrigeration EROs 2.89

2.10 Transmission and Distribution EROs (Manual) 2.93

2.10.1 Conservation Voltage Reduction 2.93

2.10.2 Power Factor Correction 2.94

2.10.3 Energy-Efficient Transformers 2.96

2.11 Convert Fleet Vehicles to Use Compressed Natural Gas 2.99

3.0 Energy Resource Opportunity Impact Study 3.1

3.1 Economic Analysis Methodology and Assumptions 3.1

3.1.1 Building Sector Analysis Methodology and Assumptions 3.2

3.1.2 Non-Building Sector Analysis Methodology and Assumptions 3.3

3.2 Economic Analysis Metrics Used 3.4

3.2.1 Net Present Value 3.4

3.2.2 Savings to Investment Ratio 3.4

3.2.3 Discounted Payback Period 3.5

3.3 Life-Cycle Cost Evaluation Method 3.5

3.3.1 Life-Cycle Cost Calculation 3.5

3.3.2 Installed Cost 3.6

3.3.3 Energy Cost 3.6

3.3.4 Operations and Maintenance Cost 3.7

3.3.5 Replacement Cost 3.8

3.3.6 Net Present Value Calculation 3.9

3.3.7 Savings to Investment Ratio Calculation 3.10

3.3.8 Discounted Payback Period Calculation 3.10

3.4 Fuel Cost Determination 3.11

3.4.1 Natural Gas Cost Determination 3.11

3.4.2 Electricity Cost Determination 3.12

3.5 Summary of ERO Impact Study 3.13

3.6 Additional Notes 3.21

4.0 References 4.1

Appendix A - Fuel Cost Calculations A.1

Appendix B - Level-2 Input and Output Files B.1

Tables

S.1 Total Savings, Cost, and NPV v

S.2 Summary of the Cost-Effective Energy Resource at Fort Stewart vi

S.3 Summary of the Energy and Demand Savings vii

S.4 Fuel Balance at Fort Stewart: Level-2 EROs vii

S.5 Fuel Balance at Fort Stewart: Manual EROs viii

1.1 Master List of Energy Resource Opportunities at Fort Stewart 1.4

2.1 Boiler and Furnace EROs 2.6

2.2 FEDS Building Envelope EROs 2.9

2.3 Manual Building Envelope EROs 2.15

2.4 FEDS Service Hot Water EROs 2.20

2.5 Interior Lighting EROs 2.24

2.6 Exterior Lighting EROs 2.30

2.7 Assembly Motor EROs 2.43

2.8 Education Building Motor EROs 2.47

2.9 Family Housing Motor EROs 2.51

2.10 Food Sales Motor EROs 2.54

2.11 Food Service Motor EROs 2.55

2.12 Health Care Motor EROs 2.58

2.13 Lodging Motor EROs 2.61

2.14 Office Motor EROs 2.64

2.15 Other Building Motor EROs 2.67

2.16 Public Order Motor EROs 2.74

2.17 Service Motor EROs 2.76

2.18 Warehouse Motor EROs 2.79

2.19 Water Well Motor EROs 2.82

2.20 FEDS Air Conditioning EROs 2.86

2.21 Residential Appliance EROs 2.91

2.22 Transmission and Distribution EROs 2.98

2.23 CNG Vehicle EROs 2.102

3.1 Cost Elements in a Life-Cycle Cost Analysis 3.6

3.2 Assumptions Used in LCC Analysis 3.13

3.3 Description of Column Headings 3.15

3.4 Summary of Expenditure Adjustment Process 3.21

3.5a All Building EROs: Annual Energy and Demand Reductions 3.23

3.5b All Non-Building EROs: Annual Energy and Demand Reductions 3.46

3.6a All Building EROs: Present Values of Costs and Savings 3.64

3.6b All Non-Building EROs: Present Values of Costs and Savings 3.87

3.7a Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annual Energy and Demand Reductions 3.104

3.7b Non-Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annual Energy and Demand Reductions 3.116

3.8a Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Present Values of Costs and Savings 3.121

3.8b Non-Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Present Values of Costs and Savings 3.133

3.9a Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annualized Values of Costs and Savings 3.138

3.9b Non-Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annualized Values of Costs and Savings 3.150

3.10 Non-Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Cumulative Annual Energy and Demand Reductions 3.155

3.11 Non-Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Cumulative Present Values of Costs and Savings 3.160

3.12a Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Present Values Aggregated By Category 3.165

3.12b Non-Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Present Values Aggregated By Category 3.165

3.13 Non-Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annualized Values Aggregated By Category 3.166

3.14a Summary of Total Minimum Life-Cycle Cost Efficiency Resource: Building EROs 3.167

3.14b Summary of Total Minimum Life-Cycle Cost Efficiency Resource: Non-Building EROs 3.167

3.15a Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Fuel Balance Table 3.168

3.15b Non-Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Fuel Balance Table 3.168

3.16 Weather Data Comparison 3.169

3.17 Annual Facility Energy Use by Fuel Type 3.169

3.18 Annual Facility Energy Use by Fuel Type and End Use Technology 3.170

Abbreviations and Acronyms

AAF	Army Air Field
AAFES	Army/Air Force Exchange Service
A/C	air conditioning
AFB	Air Force Base
AGL	Atlanta Gas Light Company
AHU	air-handling unit
ASD	adjustable speed drive
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc.
BLCC	Building Life-Cycle Cost Program
Btu	British thermal unit
CBECS	Commercial Building Energy Consumption Survey
CEP	Central Energy Plant
CF	compact fluorescent
CFC	chlorofluorocarbon
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CNG	compressed natural gas
COP	coefficient of performance
CVR	conservation voltage reduction
d	day
DEH	Directorate of Engineering and Housing
DEIS	Defense Energy Information System
DHW	domestic hot water
DOE	Department of Energy
DoD	Department of Defense
DOS	disk operating system
DSM	demand-side management
EE	energy efficient
EEF	energy efficient ballast
EEM	energy efficient motor
EIA	Energy Information Administration
ELC	electronic ballast
EMCS	energy management control system
EPA	Environmental Protection Agency
ERO	energy resource opportunity
ESCO	energy services contractor
EUI	end-use intensity
FEDS	Facility Energy Decision Screening
FEMP	Federal Energy Management Program
FO2 (#2FO)	fuel oil No. 2
FORSCOM	Forces Command
gal	gallon
GPC	Georgia Power Company
h	hour
hp	horsepower
HPS	high pressure sodium

HTHW	high temperature hot water
HVAC	heating, ventilation, and air conditioning
Hz	Hertz
IES	Illuminating Engineering Society of North America
IRA	Integrated Resource Assessment
kBtu	thousand British thermal units
kcf	thousand cubic feet
kVA	kilovolt-amperes
KVAR	reactive demand, kilovolt-amperes
kW	kilowatt
kWh	kilowatt-hour
lb	pound
LCC	life-cycle cost
LED	light emitting diode
Level-1	Facility Energy Decision Screening Level-1 software
Level-2	Facility Energy Decision Screening Level-2 software
LPA	liquid pressure amplification
LPS	low pressure sodium
LST	local standard time
LTSM	Lighting Technology Screening Matrix
M	million
mo	month
MBtu	million British thermal units
MBtu/h	MBtu's per hour
MH	metal halide
MW	megawatt
MWh	megawatt-hour
NBS	National Bureau of Standards
NG	natural gas or National Guard
NIST	National Institute of Standards and Technology
NPV	net present value
O&M	operations and maintenance
°F	degrees Fahrenheit
PCBs	polychlorinated biphenyls
PCF	permanent compact fluorescent
PF	power factor
PNL	Pacific Northwest Laboratory
psi	pounds per square inch
PV	present value
RI	replace-immediately
PX	post exchange
RECS	Residential Energy Consumption Survey
REF	parabolic reflector
ROF	replace-on-failure
ROI	return on investment
RPL	real property list
rpm	revolutions per minute
SIR	savings to investment ratio
T&D	transmission and distribution

V	volt
VAV	variable air volume
VSD	variable speed drive
W	watt
WSEO	Washington State Energy Office
yr	year

1.0 Selection of Energy Resource Opportunities

The number of conceivable energy conservation measures, fuel-switching opportunities, and renewable energy projects at a federal site is very large. PNL uses two methods to select, evaluate, and prioritize these energy resource opportunities (EROs). The first method PNL uses is the Facility Energy Decision Screening (FEDS) System. FEDS is a multi-level software tool designed to provide a comprehensive approach to fuel-neutral, technology-independent integrated (energy) resource planning and acquisition. There are currently two levels of FEDS: Level-1 and Level-2. Level-1 is a menu-driven, DOS-based software program designed for installation energy managers as a screening tool. Level-1 assesses the likelihood of cost-effective energy projects based on high-level facility inputs and numerous assumptions. The output of Level-1 is used to assess an installation's overall energy conservation potential from the perspectives of potential energy savings, potential cost savings, and estimated investment requirement.

Level-2 is also a DOS-based software program that can be used by installation energy managers to identify, characterize, and assess individual energy projects. However, Level-2 goes to the next level of detail, providing detailed information on energy and cost savings, as well as the estimated investment requirement for specific technology retrofits. Level-2 is the appropriate analysis to follow positive Level-1 results, and typically a Level-2 input file can be initiated from a Level-1 input file. Level-2 allows the user to enter installation-specific data inputs to replace the inferred default values from Level-1. These inputs form "building sets," which are groups of buildings similar in use, age, construction type, fuel use, fuel availability, or other definable characteristics. By developing building sets based on detailed facility data, Level-2 tailors the analysis to the installation and provides more accurate and detailed economic findings.

At this point in the software development, Level-1 and Level-2 analyze most major building end uses (heating, cooling, lighting, envelope insulation, and service hot water), including their interactive effects (e.g., the effect a lighting technology has on heating and cooling loads) providing specific installed cost, energy (and demand) charges, and life-cycle cost information, by technology.

The Level-2 input and output files for Fort Stewart are included (on disk) in Appendix B. See this appendix for a more detailed description of the contents of these files.

The second method PNL uses addresses those EROs not analyzed by the FEDS software. This analytical approach is a three-step manual-calculation (hereafter referred to as "manual") process that has been developed by PNL to make ERO selection, evaluation, and prioritization manageable. The steps are the following:

- Preliminary Screening. Select promising EROs from a master list, considering the site's mission, building stock, end-use equipment characteristics, utility characteristics, climate, energy costs, and other local conditions that affect ERO viability, and recommendations from site staff.

- Cost and Performance Analysis. Establish, with a reasonable degree of accuracy, the technical and economic feasibility of each ERO that passed the preliminary screening. An analysis is performed comparing the operating and economic performance of the existing equipment and the ERO. Where applicable, impacts on energy security and the environment are included in the analysis.

- Life-Cycle Cost Analysis and Prioritization. Perform a life-cycle cost analysis and rank EROs by net present value (NPV), so that a package with the optimal return on investment can be defined. If any utility cost-sharing or rebate programs exist, they can be included within this evaluation step.

The life-cycle cost (LCC) analysis and prioritization step used in both the Level-2 and manual methods is required by and complies with federal law (CFR 436, Part 10). All federal agencies are required to evaluate the LCC of alternative technologies when making energy investments. An LCC evaluation computes the total long-run costs of alternative actions, and identifies the action that maximizes the NPV of the energy investment. Section 3.1 details the process by which LCCs are calculated, explains how these calculations are used in the identification of projects, and introduces a method for prioritizing a list of alternative actions.

The remainder of Section 1 describes the process used for preliminary selection of EROs and presents a master list of screened and selected EROs. Section 2 covers the technical characteristics of each ERO considered and analyzes its cost and performance. Section 3 provides the results of the LCC analysis and ERO prioritization process. Section 4 lists the references used. Appendix A contains the fuel cost calculations, and Appendix B provides the Level-2 input and output files.

1.1 Manual ERO Preliminary Selection Criteria

The manual ERO selection process tests the applicability of a long list of EROs (see the master list of EROs in Table 1.1) using criteria that can be applied with relatively little "hard data." This step filters out EROs that are unlikely to be economically feasible and are unlikely to have significant, persistent energy impact at the site. The 11 screening criteria used to characterize and select possible EROs are listed below.

- **Low Incidence.** EROs that apply to end-use equipment representing a very small fraction of site energy use may be eliminated. However, such EROs may be retained in cases where the end use is concentrated rather than diffuse, or where it has been previously identified in a detailed audit, and the ERO passes the other criteria without difficulty.

- **Economic Feasibility.** A preliminary assessment of economic feasibility can often be made if the utility will commit to an incentive or cost-sharing level in advance. EROs whose costs and performance are well established and fairly uniform across applications can then be screened with respect to the utility's marginal cost of energy and/or capacity.

- **Technical Feasibility.** In some cases, conditions at the site will preclude implementation of a certain ERO. Conditions that make retrofit difficult or use patterns that complicate operations or maintenance of the end-use equipment in question may result in elimination of an ERO prior to formal analysis.

- **Primarily Operations and Maintenance (O&M).** A measure that is little more than a no- or low-cost change in O&M activity will generally be rejected as inappropriate to the integrated resource acquisition program. The measures of interest to the program are capital-intensive measures that are difficult, programmatically, for the site personnel to implement on their own. Cases where there is a significant cost to develop new O&M procedures or to procure special instruments and tools may be considered.

- **Mission-Critical.** End-use equipment that serves critical mission functions may not be accessible for retrofit or replacement, or its operation may be so important to critical mission objectives that any modification in the service is not tolerable.

- **Site Preference.** The site may have particular objections to certain EROs, based on O&M or other infrastructure support requirements, or based on unfavorable past experience with similar measures. In

cases where the ERO appears to be very attractive in other respects, it may be analyzed in the belief that the savings might support a reevaluation of the measure.

- **Insufficient Data.** In some cases, the performance or operational characteristics of existing end-use equipment is unknown, and the cost to determine these characteristics cannot be justified. This is not a technical- or implementation-cost grounded rejection and should not deter the site energy manager and/or contractor from further analysis and, if appropriate, implementation of the ERO concerned.

- **Complexity.** In some cases, the complexity of the analysis precludes the analysis of an ERO as part of a high-level, comprehensive site assessment program.

- **Immature Technology.** Some retrofits require equipment that has not achieved sufficient market acceptance or penetration in the federal sector to be considered reliable and effective. The persistence of savings and the sensitivity of savings to O&M, and the propensity for equipment to degrade in energy performance while continuing to provide service, are factors that could disqualify a technology. Such measures will usually not be considered.

- **Other ERO-dependent Measures.** A measure may be rejected because it depends on one or more other EROs that have been rejected or whose feasibility is too uncertain. It may also be rejected because it has already been implemented in most or all of the existing end-use opportunities.

- **EROs Handled by FEDS Level-2.** The Level-2 software is used to analyze groups of related building-level EROs. Since Level-2 takes into account interactive effects between the EROs, it is difficult to analyze (without compromising the Level-2 results) other building EROs that Level-2 does not currently consider.

1.2 Master List of Screened and Selected EROs

A master list of generic conservation measures, aggregated from a variety of sources, was used as an origination point in the identification of energy resource opportunities at Fort Stewart. This master list is presented in Table 1.1. For each ERO listed there is an indication of whether or not it passed the preliminary screening process and whether it was analyzed by Level-2 or by manual calculation. If the ERO did not pass, a brief explanation is provided.

Table 1.1. Master List of Energy Resource Opportunities at Fort Stewart

ERO Name	ERO Description	Passed Preliminary Screening (Y/N)	Comment
FANS AND FAN MOTORS			
Align sheaves	Align sheaves and shafts; replace belt with high-efficiency belt(s).	N	This is primarily an O&M measure
Reduce hours	Install clock, EMCS switch or other control means to reduce operating hours.	N	Insufficient data
Reduce speed	Reduce fan speed by adjusting sheave diameter and reduce motor size accordingly.	N	Insufficient data
Efficient motor	Replace existing motor with high-efficiency model.	Y	
Two-speed motor	Replace existing motor with two-speed motor and controller.	N	Use alternate ERO - variable-speed drive
Variable inlet vane	Install variable inlet vanes and control to provide reduced air flow when appropriate.	N	Most fans are single zone
Variable-speed drive	Install variable frequency motor drive and control to modulate airflow; also reduce motor size if appropriate.	Y	
Variable-speed electronically commutated motor	Replace existing motor with variable-speed electronically commutated permanent magnet motor and control; also reduce motor size if appropriate.	N	Use alternate ERO - variable-speed drive
CO_2 sensor	Install CO_2 sensors for ventilation Control reduce heating of outside air and average (over time) air volume moved by fans.	N	Intermittent application due to non-human critical loads in many facilities
Duct transitions	Redesign duct transitions to reduce friction loss by using turning vanes, long radius turns and gradual changes in cross-sectional area.	N	No high SP systems; insufficient data on low SP systems
Duct cross-section	Increase duct cross-section to reduce friction loss.	N	No high SP systems; insufficient data on low SP systems
Face velocity	Redesign filters, coils, etc., to reduce friction loss by operating at lower face velocities.	N	No high SP systems; insufficient data on low SP systems
Once-through air systems	Develop strategy to minimize use of once-through air systems in aircraft painting/paint stripping hangars.	N	Not Applicable
Downsize motors	Replace existing motor with energy efficient motor properly sized for the load.	Y	Discussion only
PUMPS AND PUMP MOTORS			
Align shafts	Align shafts and replace coupling with high-efficiency coupling.	N	This is primarily an O&M measure
Reduce hours	Install clock, EMCS switch or other control means to reduce operating hours.	N	Most pumps operate on demand
Efficient motor	Replace motor with high-efficiency model.	Y	
Trim impeller	Replace (or trim) impeller and reduce motor size to match actual load.	N	Insufficient data

Table 1.1. (contd)

ERO Name	ERO Description	Passed Preliminary Screening (Y/N)	Comment
Two-speed motor	Replace existing motor with two-speed motor and controller.	N	Use alternate ERO - variable speed drive
Variable-speed drive	Install variable frequency motor drive and control to modulate fluid flow; also reduce motor size if appropriate.	Y	
Variable-speed, electronically commutated motor	Replace existing motor with variable-speed electronically commutated permanent magnet (VS ECM) motor and control; also reduce motor size if appropriate.	N	Use alternate ERO - variable speed drive
Adjust VSD setpoint	Adjust VSD control setpoint for lower speed operation.	N	
Pipe transitions	Redesign system with long radius elbows and other low-loss type fittings to reduce friction loss.	N	Insufficient data
Pipe size	Redesign system with increased pipe diameter to reduce friction loss.	N	Insufficient data
Fittings	Redesign filters, heat exchangers, valves, etc., to reduce friction loss by operating at lower velocity.	N	Insufficient data
Circulating pump control	Check, repair, and/or install automatic control systems to control parallel circulating pumps so that only one pump operates at a time.	N	Insufficient data
REFRIGERATION (residential/barracks)			
Efficient refrigerator	Replace existing residential and barracks refrigerators with high-efficiency model meeting DOE 1993 Appliance Efficiency Standard.	Y	
AIR-CONDITIONING (window or package units)			
Efficient air-conditioner	Replace window or package air-conditioner with high-efficiency model.	Y	FEDS Level-2
Reduce A/C hours	Install clock, EMCS switch or other control means to reduce operating hours and peak coincident load of air-conditioner.	N	Insufficient data
LIFT STATION (heating/ventilation)			
Thermostat	Replace on/off control of electric resistance heater control with thermostatic control.	N	Not applicable
Ventilation heat recovery	Install air-to-air heat exchanger to preheat ventilation air by recovering sensible and latent heat from exhaust.	N	Immature technology
Methane sensor control	Provide methane sensor to operate ventilation fan only when needed to prevent excess methane concentrations.	N	Immature technology

Table 1.1. (contd)

ERO Name	ERO Description	Passed Preliminary Screening (Y/N)	Comment
Insulate walls	Install moisture-resistant insulation to above-grade walls and roof (consider this ERO only after thermostat and ventilation heat recovery or methane sensor).	N	Must be preceded by ventilation control ERO
RESIDENTIAL LIGHTING (interior and exterior)			
Upgrade incandescent to permanent compact fluorescent (PCF) fixture	Upgrade incandescent fixture to permanent compact fluorescent fixture.	Y	FEDS Level-2
Replace incandescent with PCF fixture	Replace incandescent fixture with new compact fluorescent fixture.	Y	FEDS Level-2
Upgrade fluorescent to T8	Upgrade fluorescent to high-efficiency T8 or similar system.	Y	FEDS Level-2
Replace fluorescent with new fixture	Replace fluorescent fixture with new high-efficiency T8 (or comparable) fixture.	Y	FEDS Level-2
COMMERCIAL LIGHTING			
Upgrade fluorescent to T8	Upgrade fluorescent fixture to high-efficiency T8 or similar system.	Y	FEDS Level-2
Replace fluorescent with new fixture	Replace fluorescent fixture with new high-efficiency T8 (or comparable) fixture.	Y	FEDS Level-2
De-lamp	Replace, modify or move/remove fixtures to reduce lighting density to level that provides correct illumination.	Y	FEDS Level-2
Upgrade incandescent to PCF fixture	Upgrade incandescent fixture to permanent compact fluorescent fixture.	Y	FEDS Level-2
Replace incandescent with PCF fixture	Replace incandescent fixture with new compact fluorescent fixture.	Y	FEDS Level-2
Upgrade mercury to high-pressure sodium (HPS)	Replace mercury vapor lamps and ballasts with high-pressure sodium lamp and ballast (or replace entire fixture).	Y	FEDS Level-2
Upgrade incandescent exit signs	Upgrade incandescent exit signs with light emitting diode (LED) or fluorescent exit signs.	Y	FEDS Level-2
Replace incandescent exit signs	Replace incandescent exit signs with LED or fluorescent exit signs.	Y	FEDS Level-2
Occupancy sensors	Install occupancy sensors to control lights.	N	Few permanent applications
Time clocks or photocells	Install time clocks or photocells to control lights.	N	Few lighted areas not in use or not otherwise controlled
EMCS control	Install EMCS or add field panel and necessary relays to control lights via EMCS system.	N	Local control preferred

Table 1.1. (contd)

ERO Name	ERO Description	Passed Preliminary Screening (Y/N)	Comment
EXTERIOR LIGHTING			
De-lamp	Remove or disconnect bulbs or ballasts to reduce lighting density to level that provides reduced but satisfactory illumination.	N	Few overlit areas
Zoned security lamp circuits	Rewire building exterior light circuits into zones so that night work lights and security lights are under separate control.	N	No application
Motion detectors	Install motion detectors in series with security light time clock switch so that selected zones are off except when activated by motion detectors.	N	No application
Reprogram time clocks	Reprogram existing time clock to turn off or reduce light level at low traffic hours.	N	Primarily an operation and maintenance (O&M) measure
Install time clocks	Install programmable time clock to turn off or reduce light level at low traffic hours.	Y	Ballfield lighting only
Zoned streetlamp circuits	Rewire streetlight circuits into zones and provide programmable time clock to turn off or reduce light level at low traffic hours.	N	No application
Mercury to HPS	Replace mercury vapor lamps and ballasts with high-pressure sodium lamp and ballast (or replace entire fixture).	N	Most streetlighting is already HPS
Incandescent to compact fluorescent	Replace incandescent light fixture with compact fluorescent fixture	Y	Barracks stairwells only
Incandescent to HP sodium	Replace incandescent fixture with high-pressure sodium fixture.	N	Most streetlighting is already HPS
OCCUPANCY-BASED CONTROLS (see also FAN, HVAC)			
Occupancy sensor, restroom	Install occupancy sensor to control lights and exhaust fan in restroom.	N	Insufficient resource
Occupancy sensor, other	Install occupancy sensor to control lights in hallway, lunchroom, office, conference room, or other intermittently occupied area.	N	Insufficient data
Daylight sensor	Install daylight sensor to control lights in hall, foyer, or other area that has windows and low ambient light requirement.	N	Insufficient data
Daylight sensor, security	Install daylight sensor to control security light(s) in area that has windows.	N	Insufficient resource
Night setback	Install time clock to schedule fan, thermostat set point, and air-conditioner operation.	N	Not applicable
CO_2 sensor control	Install CO_2 sensor to control air-handler and ventilation fans.	N	Not applicable
Countdown timer	Install countdown timer to control air-handler and ventilation fans during normally unoccupied hours.	N	Not applicable

Table 1.1. (contd)

ERO Name	ERO Description	Passed Preliminary Screening (Y/N)	Comment
Occupied mode via EMCS	Implement unoccupied schedules for fans and air-conditioning via EMCS; override during normally unoccupied hours.	N	Not applicable
ELECTRIC DEMAND CONTROL			
Water heater control	Install controls to shed electric water heater loads in rotating blocks during peak demand periods.	N	Insufficient resource
Shed A/C loads	Install controls to shed air-conditioning loads in rotating blocks during peak demand periods.	N	Insufficient data
Well pump control	Transfer lift station and well pumps to emergency generators during peak.	N	Insufficient data
Run motors at low speed	Install controls to operate existing variable speed pumps and fans at low speed during peak demand periods.	N	Insufficient data
Peak shave generator loads	Install controls to automatically transfer existing diesel generator loads to generator power during peak demand periods.	N	Use alternate ERO - feed grid from generators
Feed grid from generators	Install controls and switches to feed existing generator output to grid; operate during high demand periods to reduce peak demand.	N	Insufficient data
SERVICE HOT WATER			
New Conventional Gas Water Heater (76%, 80%, 85% efficient)	Replace existing gas water heater with a new conventional gas water heater model.	Y	FEDS Level-2
High Efficiency Gas Water Heater (94% efficient)	Replace existing gas water heater with high-efficiency (well-insulated) model.	Y	FEDS Level-2
Tank insulation with R-11 wrap	Add insulating blanket to provide addiuonal tank insulation.	Y	FEDS Level-2
Tankless heater	Replace tank type water heaters with instant/tankless unit.	N	Not cost-effective
Low-flow shower heads	Low-flow shower head restricts the volume of water passing through.	Y	FEDS Level-2
Lower hot water temperature	Reduced water temperature reduces energy lost in various hot water-consuming processes including showers, dishwashers, laundries, etc.	Y	FEDS Level-2
Insulate service hot water pipes	Typically, service hot water pipes are copper. Insulation is usually 1/2-inch glass fiber, and the temperature of the water is usually 140°F.	Y	FEDS Level-2
Fuel switch to electric	Fuel switch from thermal distribution loop to electric water heater.	Y	FEDS Level-2
Fuel switch from electric	Install boiler to switch from electric to natural gas water heating.	Y	FEDS Level-2
A/C desuperheater	Recover heat from air-conditioner by installing water-cooled desuperheater and controls.	N	Insufficient data

Table 1.1. (contd)

ERO Name	ERO Description	Passed Preliminary Screening (Y/N)	Comment
Refrigeration desuperheater	Recover heat from refrigerators by installing water-cooled desuperheater and controls.	N	Insufficient data
TRANSMISSION & DISTRIBUTION			
Phase balance	Improve phase balance of feeders and main transformers by moving loads among phases.	N	Phase balance is satisfactory
Efficient transformers	Replace transformers with high-efficiency models.	Y	Insufficient data - discussion only
Reduce transformer size	Reduce transformer size to match load, thus reducing standby loss and reactive power consumption.	N	Insufficient data
Conservation voltage reduction	Reduce set point on auto-tap-changing transformer to maintain minimum acceptable voltage at end of feeder.	Y	
Passive power factor correction	Install capacitor banks to provide passive power factor correction.	Y	
Switched power factor correction	Install capacitor banks, power factor transducers and automatic switches to provide active power factor correction.	N	Use alternate ERO - Passive PF correction
RESIDENTIAL HVAC			
Whole house fan	Install whole house fans to reduce or eliminate the use of window air-conditioning.	N	Many already installed
Efficient furnace motor	Replace furnace fan motor with high-efficiency motor.	Y	
2-speed furnace motor	Replace furnace fan motor with 2-speed motor.	N	Insufficient data
Ventilation heat recovery	Install air-to-air heat exchanger to reduce infiltration and recover heat from ventilation air.	N	Insufficient data
Efficient air-conditioner	Replace air-conditioner with high-efficiency unit.	Y	FEDS Level-2
Efficient heat pump	Replace heat pump with high-efficiency unit.	N	A/C EROs calculated by FEDS Level-2
Heat pump	Replace nat. gas furnace and DX A/C system with heat pump.	N	A/C EROs calculated by FEDS Level-2
Fuel switch from electric	Switch from electric heat to natural gas by installing fuel burning furnace or I.C. engine-driven heat pump.	N	Insufficient resource
RESIDENTIAL APPLIANCES			
Efficient washer	Replace clothes washer with high-efficiency (water miser) unit.	N	Tenant-owned
Efficient dryer	Replace clothes dryer with high-efficiency unit.	Y	Tenant-owned
Fuel switch dryer	Replace electric clothes dryer with natural gas unit.	Y	Tenant-owned
Efficient dishwasher	Replace dishwasher with high-efficiency (water miser) dishwasher.	Y	

Table 1.1. (contd)

ERO Name	ERO Description	Passed Preliminary Screening (Y/N)	Comment
Microwave oven	Provide microwave oven to reduce use of convection oven.	N	Insufficient data on cooking end use
FREEZE PROTECTION			
Thermostat	Provide thermostatic control (especially water storage tanks) of resistance heaters to eliminate continuous operation.	N	Not applicable
Cooling towers	Install thermostatically controlled resistance heaters to cooling tower catch basins to eliminate use of circ. pumps for freeze protection.	N	Insufficient Data
Insulate	Add insulation to pipes and tanks that have thermostatically controlled resistance heaters.	N	Not applicable
BOILERS			
Preheat combustion air	A gas-to-air heat exchanger, or a heat pipe, used for transferring heat of exhaust gases to the primary combustion air.	N	Cost-effective for boilers >60 MBtu/hr capacity; insufficient resource
Feedwater economizer	A gas-to-water heat exchanger consisting of feedwater tubes located in the path of the exhaust stream. Economizer can also be employed to heat domestic hot water, space heating water, or process hot water.	N	Cost-effective for boilers >3 MBtu/hr capacity
Provide maintenance of economizers	Both gas side and water side deposits can reduce the effectiveness of the heat transfer surfaces. Periodic cleaning of the economizer will assist in maintaining high heat recovery efficiencies.	N	Too few boilers currently have economizers; insufficient resource.
Air atomizing burner	Proper atomization of fuel oil is critical to ensure complete combustion with minimum excess air. Air-atomizing burners use steam or air for atomization, minimizing excess air and unburnt combustibles, and improving boiler efficiency.	N	Insufficient resource
Low Excess Air Burners for Oil Burners	Burners provide optimal fuel spray and air flow patterns to achieve both complete combustion and a stable flame	N	Insufficient resource
Boiler tune-up	An annual tune-up is simple, can be generally accomplished within a day, and basically involves adjusting fuel-air ratios at optimal levels at various load conditions.	N	Boiler EROs calculated by FEDS Level-2
Flue gas analyzer	A combination of flue gas analyzers and regular tuning can assist in maintaining optimal boiler efficiency. A typical analyzer will monitor O_2, CO_2, CO, and exhaust temperature.	N	Cost-effective for boilers >10 MBtu/hr capacity; insufficient resource.
Barometric damper	Installing an automatic damper will reduce the standby loss in a boiler or a furnace. When the burner is off, the damper closes to minimize heat loss through the stack.	N	Only cost-effective for boilers that cycle diurnally

Table 1.1. (contd)

ERO Name	ERO Description	Passed Preliminary Screening (Y/N)	Comment
Automatic electric damper	Installing an automatic damper will reduce the standby loss in a boiler. When the burner is off, the damper closes to minimize heat loss through the stack.	Y	FEDS Level-2
Outside/supply air temperature reset controller	Install controller to reset the steam or hot water supply temperature based on a predetermined schedule. Operating at lower temperature reduces heat (and leaking steam) losses.	N	Insufficient data
New conventional boiler	When the retrofit cost of an existing boiler is uneconomical, boiler replacement may be considered.	Y	FEDS Level-2
Pulse-condensing boiler	Pulse or condensing boilers have an instantaneous efficiency of over 90% and a seasonal efficiency that is 8% points higher than conventional units.	Y	FEDS Level-2
Fire-tube turbulators	Turbulators improve overall combustion efficiency in fire-tube boilers. Efficiency increases due to better heat transfer and lower stack temperature.	N	Not generally cost-effective; insufficient resource
Continuous boiler blowdown system with heat recovery	Continuous boiler blowdown has the potential to reduce blowdown losses through control of blowdown rate.	N	Considered for boilers >6 MBtu/hr capacity
Fuel switch from propane to natural gas	Switch boiler fuel from propane use to natural gas	Y	FEDS Level-2
Fuel switch from fuel oil to natural gas	Switch boiler fuel from oil use to natural gas	Y	FEDS Level-2
BOILER AUXILIARIES & CENTRAL DISTRIBUTION SYSTEMS			
Periodic inspection of steam traps	Steam traps need to be inspected at least once a year. The inspection program would 1) identify the types, location and number of various steam traps, 2) maintain some spare parts and spare traps of each kind, and 3) repair and replace traps on a routine basis.	N	Insufficient data
Pipe insulation	Insulation could be applied to all hot and cold pipes which are either uninsulated, or whose insulation is deteriorated and is currently ineffective.	N	Insufficient data
Heating of fuel oil	Depending on the viscosity of fuel oil at ambient temperature, oil may need to be heated.	N	Insufficient resource
Insulate hot fuel-oil pipes	Lines leading the fuel oil from the heater to the burner may be insulated to (i) minimize energy loss, and (ii) ensure that the oil viscosity is maintained within acceptable limits at the burner.	N	Insufficient resource
Repair leaking HTHW or steam lines	Leaking HTHW or steam lines are a major source of energy loss. The leak rate in lb/h is a function of the steam (HTHW) pressure and diameter and shape of the orifice through which it leaks.	N	Insufficient data
Heat recovery heat exchanger	Various forms of waste heat can be recovered through appropriately sized heat exchanger systems.	N	Not applicable

Table 1.1. (contd)

ERO Name	ERO Description	Passed Preliminary Screening (Y/N)	Comment
Insulate condensate storage tanks	Tanks need to be insulated to prevent heat loss. Since condensate tank temperatures can be as high as 180°F, proper insulation is critical for minimizing heat loss.	N	Not applicable
VSD feedwater pump	Install variable-speed drive to feedwater pump controlled by steam drum water level.	Y	
VSD combustion fan	Install variable-speed drives for combustion air and stack fans controlled by firing rate and static pressure at firebox.	Y	
Check valves	Repair leaking condensate return check valves.	N	Insufficient data
CHILLERS			
Repair check valves	Repair leaking check valves in lead-lag pumps.	N	Insufficient data
Condenser water reset	Add controls to reset condenser water temperature on outdoor temperature.	N	Insufficient data
Chilled water reset	Add controls to reset chilled water temperature on chiller load.	N	Insufficient data
Parallel compressors	Add smaller, efficient compressor to obtain efficient operation under light-to-moderate load.	N	Insufficient data
Efficient chiller	Replace chiller with high-efficiency unit.	Y	FEDS Level-2
Fuel switch to natural gas engine driven chiller	Replace electric chiller with natural gas engine driven chiller to utilize low gas rates and eliminate demand charges.	N	A/C EROs calculated by FEDS Level-2
Thermal energy storage system	Install thermal energy storage system for peak shaving/shifting to avoid high demand charges.	N	Insufficient data
PACKAGE HVAC (including split units)			
Expansion valve control	Install improved expansion valve control; Replace capillary tube if necessary.	N	Insufficient resource
Improve liquid return	Replace liquid return with larger line or install pump ("liquid pressure amplification").	Y	Discussion only
Parallel compressors	Add smaller, efficient compressor to obtain efficient operation under light-to-moderate load.	N	Insufficient data
Efficient new unit	Replace package or split unit with high-efficiency unit.	Y	FEDS Level-2
Precooling/reheating heat pipe for latent load	Install heat pipe to reduce coil load while maintaining latent capacity by precooling mixed air and reheating supply air.	N	Insufficient data
SWIMMING POOLS			
Direct fired make-up air	Install direct-fired make-up air heater in air-supported pool enclosures.	N	No application at site

Table 1.1. (contd)

ERO Name	ERO Description	Passed Preliminary Screening (Y/N)	Comment
Heat pump dehumidification	Install dehumidifying heat pump to reduce ventilation load of enclosed pool.	N	Insufficient data
ENVELOPE			
Insulate attic ceilings in Family Housing units only	Batt-type fiberglass insulation and blown-in fiberglass or cellulose are most frequently used as ceiling insulation.	Y	FEDS Level-2
Insulate walls in Family Housing units only	Insulate with rigid, non-rigid, poured-in, or blown-in insulation. For a wood frame wall or a cavity wall, remove top strip of siding or drill holes in sheathing or inside gyp-board and completely fill each stud space with blown-in insulation.	Y	FEDS Level-2
Insulate slab-on-grade perimeter	To insulate the slab, it will be necessary to dig around the building up to the depth of the frost line or the footing, whichever is shallower.	N	Not applicable
Insulate floor above crawl space	Fiberglass batt or blanket insulation is ideally suited for insulating floors above crawl spaces. Typically, the insulation is hung using a wire mesh, nails, and staples. Vapor barrier is installed against the floor surface prior to installation of the insulation.	N	Insufficient resource
Storm windows/doors and multi-glazed windows	Storm windows create a "dead-air" space for insulation and also reduce infiltration. Multi-glazed windows replace existing windows.	N	Envelope EROs calculated by FEDS Level-2
Movable Window Insulation	Install insulated roller-shade with edge seals in all large windows.	N	Not applicable
Tinted/reflective window film or screen	Window tinting or micro-louver screens can be applied to an existing window to reduce solar heat gain.	Y	
Insulate supply and return ducts	Add fiberglass insulation to supply and return ducts.	N	Not applicable
Weatherstripping	Install weatherstripping to door and window perimeters to provide a tight seal limiting or eliminating infiltration.	N	Envelope EROs calculated by FEDS Level-2
Caulking	A bead of caulk could be applied to seams in building structures where air can infiltrate.	N	Envelope EROs calculated by FEDS Level-2
Sandwich glass	Install sandwich glass panels with integral insulation over existing windows.	N	Insufficient resource
Radiant barrier	Install radiant barrier in attic.	Y	Family housing units only
SPACE HEATING			
New conventional furnace (76% efficient)	Replacement is cost effective if existing furnaces are old and inefficient.	Y	FEDS Level-2
Pulse-condensing furnace (93% efficient)	Replacement is cost effective if existing furnaces are old and inefficient.	Y	FEDS Level-2

Table 1.1. (con'd)

ERO Name	ERO Description	Passed Preliminary Screening (Y/N)	Comment
Infrared (radiant) heaters	Provide spot or space heating by overhead infrared heating system to provide comfort with lower air temperature and corresponding lower envelope conduction and infiltration loss; also reduces energy used to power fans and pumps.	N	Insufficient resource
Space unit heaters	Replace old space heater with a new space heater.	N	Use alternate ERO - infrared heaters
Electric baseboard heaters	Baseboard unit provides more uniform heating due to placement at base of exterior walls where heat loss occurs.	N	Not applicable
Install programmable thermostat with setback controls	Electronic thermostats provide the means to set back temperature when the space is unoccupied or a greater deviation from normal set point temperature can be tolerated	N	Insufficient data
Fuel switch from propane to natural gas	Switch space heating fuel use from propane to natural gas	Y	FEDS Level-2
Fuel switch from fuel oil to natural gas	Switch space heating fuel use from fuel oil to natural gas	Y	FEDS Level-2
TRANSPORTATION			
Conversion of fleet vehicles to CNG	Replacement of gas and diesel FORSCOM and GSA fleet with CNG models to reduce fuel costs and emissions	Y	

2.0 Energy Resource Opportunity Evaluations

The results of the analysis of energy resource opportunities (EROs) are presented within 11 common energy end-use categories. Boilers and furnaces are analyzed in Section 2.1, building envelope (Manual) in Section 2.2, building envelope (Level-2) in Section 2.3, service hot water in Section 2.4, interior lighting in Section 2.5, exterior lighting in Section 2.6, motors in Section 2.7, air conditioning in Section 2.8, residential appliances in Section 2.9, transmission and distribution in Section 2.10, and base vehicles in Section 2.11. A brief narrative description of each ERO is provided and, when applicable, a discussion of energy supply and demand, energy security, and environmental issues.

At the end of each section, a summary table presents the operational performance and energy savings information. For the Level-2 EROs these tables report existing and retrofit equipment efficiencies, energy savings, and retrofit installed cost. The manual results tables are presented in three parts: existing operating parameters, energy-efficient operating parameters, and energy-efficient economic parameters. All results tables report the net present value (NPV) and the savings to investment ratio (SIR). The NPV is defined as the difference between the life-cycle cost of the existing technology and that of the proposed alternative. The SIR is defined as the present value (PV) of total savings divided by the PV of the installed cost. As a first-cut selection criteria, EROs with positive NPVs are selected for further consideration and reported in the Energy Efficient Economic Parameter section, while EROs with negative NPVs are discarded. For the installation of new or retrofit equipment to be economically attractive, their NPV would have to be greater than zero. The NPV of the option of doing nothing to the existing equipment is zero. The SIR is used to prioritize EROs and is only applied to projects deemed cost-effective by nature of their positive NPV.

Individual EROs were evaluated as mutually exclusive measures. This approach allows individual EROs to be ranked or rated based on parameters such as installed cost, NPV, energy savings, and changes in operations and maintenance (O&M) requirements. In addition, this evaluation approach permits direct economic comparison of competing EROs (e.g., retrofitting an old gas furnace with a new standard-efficiency or a new high-efficiency furnace). When competing EROs have positive NPVs, the ERO with the higher positive NPV will be considered further while the ERO with the lower NPV will no longer be considered.

In the Energy Efficient Economic Parameter section of the manual tables, in cases where there are multiple positive NPV retrofit options, the highest positive NPV option is "boxed." At the bottom of this section all highest positive NPV options are summed and presented as totals for the following column headings: Installed cost (1993$), Annual Savings (MBtu), Annualized Net Energy Savings (1993$), Annualized O&M Savings (1993$), and Net Present Value (1993$). These totals represent the summation of the available resource (in energy and dollars) for the winning retrofit technologies.

In the manual EROs, replacement or retrofit of existing technologies were evaluated on a replace-immediately (RI) or a replace-on-failure (ROF) basis or both depending on the average approximate age of the existing equipment, the remaining useful life of the existing equipment, and the life expectancy of new equipment. All EROs can be evaluated on an RI basis. EROs that affect existing equipment with remaining useful lives greater than 25 years can only be evaluated on an RI basis because the existing equipment would not be expected to fail during the 25-year analysis period (as mandated by 10 CFR Part 436, which requires all federal energy decisions to use LCC analysis methodology). If, however, the existing

equipment is expected to fail during the 25-year analysis period, the EROs associated with this equipment can be evaluated on an ROF basis. In addition, existing equipment that has exceeded the average life expectancy of comparable new equipment is assumed in this analysis to have zero remaining useful life left.

The Level-2 approach to RI and ROF is a bit different; Level-2 assumes that an ROF piece of equipment will, by law (10 CFR Part 436), be replaced with the most life-cycle cost-effective piece of equipment. This assumption rules out the need to examine the ROF option for any piece of equipment.

The maintenance cost given for new or retrofit EROs is the incremental cost difference between the cost of maintaining the existing equipment and that of maintaining new or retrofitted equipment. Because maintenance costs of new or retrofitted equipment are often the same as the cost to maintain the existing equipment, this incremental maintenance cost is often zero.

Electricity demand savings were included in this analysis for the following ERO equipment types where relevant: lighting, air conditioning, fans, pumps, motors, and transmission and distribution (T&D). Essentially, if EROs associated with these equipment types contributed to peak demand reduction (as measured in reduced peak kW load), then demand savings were included in the economic analysis.

The 1993 discount rate of 4.0% (NIST 1992) was used in this analysis. This rate is a reflection of the discount rate for U.S. Treasury Bonds and varies slightly from year-to-year. The relative ranking of EROs with positive NPVs (see Table 3.5) should not be affected to a large extent from this variable discount rate. For consistency in this analysis, installed costs are in 1993 dollars (1993$) and the fuel escalation rates are determined with the appropriate 1993 index by fuel type (NIST 1992).

Appendix B includes the Level-2 input and output files, as well as a spreadsheet file with all of the ERO results (files are on attached disks). Information concerning existing conditions for the Level-2 building EROs and ERO results by building set, which are not reported in the tables following each ERO description, can be found in the Level-2 input file. See Appendix B for a more detailed description of these files.

2.1 FEDS Boiler and Furnace EROs

2.1.1 Replace Existing HTHW System with (Oil, Natural Gas, or LPG) Boilers

Description

This section pertains to replacing an existing HTHW heating configuration (HTHW distribution and heat exchanger) with new conventional or high-efficiency boilers fueled by oil, natural gas, or LPG. Fuel-switching alternatives are only considered when the fuel is available to the building set. This analysis assumes the building's existing secondary-distribution loop will be used by the retrofit boilers.

Assumptions

The technical assumptions are as follows:

- FEDS calculates existing heat exchanger size, age, efficiency, and fuel consumption based on information developed in the Level-2 input file for the building set. These calculated (default) values can be changed if the actual information is known.

- Retrofit boiler fuel availability, fuel consumption, efficiency, size, and installed cost are also determined based on information developed in the Level-2 input file for the building set.

- Retrofit boiler efficiencies are given by the following equations:

conventional gas boiler efficiency = $0.871-1.83^{-3} * (\text{Boiler Cap.})$
pulse-condensing gas boiler efficiency = $0.871-1.83^{-3} * (\text{Boiler Cap.})+0.08$
conventional LPG boiler efficiency = $0.871-1.83^{-3} * (\text{Boiler Cap.})$
pulse-condensing LPG boiler efficiency = $0.871-1.83^{-3} * (\text{Boiler Cap.})+0.08$
conventional oil boiler efficiency = $0.891-1.83^{-3} * (\text{Boiler Cap.})$

Results

The complete quantitative results including energy, installed cost, and NPV can be found in Table 2.1.

2.1.2 Replace Existing (Oil, Natural Gas, Coal, LPG) Boilers

Description

This ERO pertains to replacing existing boilers (oil, natural gas, coal, or LPG) with new conventional or high-efficiency boilers fueled by oil, natural gas, or LPG. Fuel-switching alternatives are only considered when the fuel is available to the building set.

Assumptions

The technical assumptions are as follows:

- FEDS calculates existing boiler size, age, efficiency, and fuel consumption based on information developed in the Level-2 input file for the building set. These calculated (default) values can be changed if the actual information is known.

- Retrofit boiler fuel availability, fuel consumption, size, and installed cost are also determined based on information developed in the input file for the building set.

- Retrofit boiler efficiencies are given by the following equations:

conventional gas boiler efficiency	=	$0.871-1.83^{-3} * (\text{Boiler Cap.})$
pulse-condensing gas boiler efficiency	=	$0.871-1.83^{-3} * (\text{Boiler Cap.})+0.08$
conventional LPG boiler efficiency	=	$0.871-1.83^{-3} * (\text{Boiler Cap.})$
pulse-condensing LPG boiler efficiency	=	$0.871-1.83^{-3} * (\text{Boiler Cap.})+0.08$
conventional oil boiler efficiency	=	$0.891-1.83^{-3} * (\text{Boiler Cap.})$

Results

The complete quantitative results including energy, installed cost, and NPV can be found in Table 2.1.

2.1.3 Retrofit Existing Boilers with Automatic Electric Vent Dampers

Description

Installing automatic electric vent dampers will reduce standby losses in a boiler and therefore improve efficiency. When the burner is off, the damper closes to minimize heat loss through the stack. This ERO is typically considered for boilers of all capacities.

Assumptions

The technical assumptions are as follows:

- Automatic electric vent damper installed cost and resulting boiler efficiency increase is be determined by FEDS based on age, size, and fuel type of the existing boiler as developed in the Level-2 input file for the building set. These calculated (default) values can be changed if the actual information is known.

- The automatic damper will improve thermal efficiency by an average of 3% over the existing case.

Results

The complete quantitative results including energy, installed cost, and NPV can be found in Table 2.1.

2.1.4 Retrofit Existing Boilers with Feedwater Economizers

Description

Feedwater economizers increase boiler efficiency by transferring heat from the exiting combustion gases to the feedwater, via a heat exchanger. This ERO is considered for boilers between 3-80 MBtu/h.

Assumptions

The technical assumptions are as follows:

- Feedwater economizer size, installed cost, and resulting boiler efficiency is determined by FEDS based on age, size, and fuel type of the existing boiler as developed in the Level-2 input file for the building set.

Results

The complete quantitative results including energy, installed cost, and NPV can be found in Table 2.1.

2.1.5 Replace Existing (Oil, Natural Gas, Coal, LPG) Furnaces

Description

This ERO pertains to replacing existing furnaces (oil, natural gas, or LPG) with new conventional or high-efficiency furnaces fueled by oil, natural gas, or LPG. Fuel-switching alternatives are only considered when the fuel is available to the building set.

Assumptions

The technical assumptions are as follows:

- FEDS calculates existing furnace size, age, efficiency, and fuel consumption based on information developed in the Level-2 input file for the building set. These calculated (default) values can be changed if the actual information is known.

- Retrofit furnace fuel availability, fuel consumption, size, and installed cost are also determined based on information developed in the Level-2 input file for the building set.

- Retrofit furnace efficiencies are as follows:

conventional gas furnace	- 78.0%
conventional oil furnace	- 78.0%
conventional electric furnace	- 98.0%
high-efficiency gas furnace	- 93.0%
high-efficiency LPG furnace	- 93.0%

Results

The complete quantitative results including energy, installed cost, and NPV can be found in Table 2.1.

Table 2.1. Boiler and Furnace EROs

Bldg Type	Existing Technology	Retrofit Technology	Retro Number	Exist Eff, COP or Lamp Wattage	Retro Eff, COP or Lamp Wattage	Existing Fuel (MBtu)	Retrofit Fuel (MBtu)	First Year Energy Savings (MBtu)	Present Value of Installed Cost (1993 $)	Annualized O&M Savings (1993 $)	Annualized Energy & Demand Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio
6 Bldg Sets	gas conv boiler	Add Automatic Electric Damper	8	83.0%	86.0%	Nat Gas	Nat Gas	162	1,166	0	888	8,348	9.45
Health Care-97	hot water fan coil	New Conventional Individual Building Gas Boiler	1	98.0%	86.7%	HTHW	Nat Gas	(135)	5,174	0	616	4,481	1.87
24 Bldg Sets	oil conv boiler	Add Automatic Electric Damper	45	83.1%	86.1%	Oil	Oil	321	4,529	24,340	1,664	350,827	80.27
2 Bldg Sets	oil conv boiler	Gas Pulse Condensing Boiler	2	80.7%	95.8%	Oil	Nat Gas	92	8,813	1,882	731	15,170	81.38
9 Bldg Sets	oil conv furn	Conventional Gas Furnace	25	73.4%	78.0%	Oil	Nat Gas	72	9,730	0	915	4,570	126.65
2 Bldg Sets	other conv boiler	Gas Pulse Condensing Boiler	3	81.3%	95.8%	Oth Fuels	Nat Gas	180	22,838	0	4,786	52,425	114.80
23 Bldg Sets	other conv furn	Conventional Gas Furnace	74	72.0%	78.0%	Oth Fuels	Nat Gas	425	33,277	0	10,384	127,884	80.33
6 Bldg Sets	other conv furn	Conventional Oil Furnace	163	70.2%	78.0%	Oth Fuels	Oil	558	93,106	0	7,885	17,724	30.70
Education-15	other conv furn	High Efficiency LPG Furnace	2	67.6%	93.0%	Oth Fuels	Oth Fuels	67	1,129	0	75	45	1.04

2.2 FEDS Building Envelope EROs

Level-2 considers two building envelope retrofit options: adding or installing wall and ceiling insulation.

2.2.1 Insulate Ceilings

Description

Ceilings can be insulated with either blown-in or batt-type fiberglass insulation. This ERO examines the options of increasing ceiling insulation in buildings which have either attic space or suspended ceilings.

Assumptions

The technical assumptions are as follows:

- FEDS calculates existing insulation R-value based on building type and age information developed in the Level-2 input file for the building set. These calculated (default) values can be changed if the actual information is known.

- Retrofit R-values, fuel consumption, and installed cost are also determined based on information developed in the Level-2 input file for the building set.

- Retrofit insulation R-values are as follows:

  Increase insulation by - R-8
  Increase insulation by - R-11
  Increase insulation by - R-19
  Increase insulation by - R-30
  Increase insulation by - R-38

Results

The complete quantitative results including energy, installed cost, and NPV can be found in Table 2.2.

2.2.2 Insulate Exterior Walls

Description

There are two wall insulation options depending on the construction of the building. Exterior masonry walls can be insulated by affixing exterior insulation and exterior hard coat to the masonry surface. Wood frame buildings can have insulation blown into the spaces between the framing studs. The resulting wall has a high R-value and a tighter envelope.

Assumptions

The technical assumptions are as follows:

- FEDS calculates existing insulation R-value based on building type and age information developed in the Level-2 input file for the building set. These calculated (default) values can be changed if the actual information is known.

- Retrofit R-values, fuel consumption, and installed cost are also determined based on information developed in the Level-2 input file for the building set.

- Retrofit insulation R-values are as follows:

  Increase insulation by - R-4.3
  Increase insulation by - R-7.0
  Increase insulation by - R-10.9
  Increase insulation by - R-13

Results

The complete quantitative results including energy, installed cost, and NPV can be found in Table 2.2.

Table 2.2. FEDS Building Envelope EROs

Bldg Type	Existing Technology	Retrofit Technology	Retro Number	Exist Eff, COP or Lamp Wattage	Retro Eff, COP or Lamp Wattage	Existing Fuel (MBtu)	Retrofit Fuel (MBtu)	First Year Energy Savings (MBtu)	Present Value of Installed Cost (1993 $)	Value of Energy & Demand Savings (1993 $)	Annualized Energy & Demand Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio
Roof Insulation													
5 Bldg Sets	roof insulation R-value 0 00	Attic Ceiling Increase insulation by R-11	5	NA	NA	NA	NA	NA	38,943	71,396	4,570	32,453	1 83
12 Bldg Sets	roof insulation R-value 0 00	Attic Ceiling Increase insulation by R-19	12	NA	NA	NA	NA	NA	371,907	3,254,062	208,299	2,882,153	8 75
Assembly 02	roof insulation R-value 0 00	Attic Ceiling Increase insulation by R 30	1	NA	NA	NA	NA	NA	2,501	16,237	1,039	13,737	6 49
7 Bldg Sets	roof insulation R value 0 00	Attic Ceiling Increase Insulation by R-8	7	NA	NA	NA	NA	NA	116,273	138,000	8,834	21,728	1 19
3 Bldg Sets	roof insulation R-value 0 00	Suspended Ceiling Increase insulation by R-11	3	NA	NA	NA	NA	NA	15,735	17,547	1,123	1,812	1 12
3 Bldg Sets	roof insulation R-value 0 00	Suspended Ceiling Increase insulation by R-19	3	NA	NA	NA	NA	NA	30,662	71,176	4,556	40,514	2 32
Health Care 01	roof insulation R-value 0 00	Suspended Ceiling Increase insulation by R-30	1	NA	NA	NA	NA	NA	486	1,397	89	911	2 87
4 Bldg Sets	roof insulation R-value 11 00	Attic Ceiling Increase insulation by R-11	4	NA	NA	NA	NA	NA	397,373	587,089	37,581	189,715	1 48
6 Bldg Sets	roof insulation R value 11 00	Attic Ceiling Increase Insulation by R-8	6	NA	NA	NA	NA	NA	262,028	375,278	24,022	113,251	1 43
2 Bldg Sets	roof insulation R-value 13 00	Suspended Ceiling Increase insulation by R-11	2	NA	NA	NA	NA	NA	30,850	43,159	2,763	12,307	1 40
2 Bldg Sets	roof insulation R value 13 00	Suspended Ceiling Increase Insulation by R-8	2	NA	NA	NA	NA	NA	11,502	12,783	818	1,281	1 11
FH 2 to 4-01	roof insulation R value 5 00	Attic Ceiling Increase insulation by R-19	1	NA	NA	NA	NA	NA	120,604	431,017	27,590	310,413	3 57
2 Bldg Sets	roof insulation R value 5 00	Attic Ceiling Increase Insulation by R-8	2	NA	NA	NA	NA	NA	22,825	43,211	2,766	20,386	1 89
Office-10	roof insulation R-value 5 00	Suspended Ceiling Increase insulation by R-19	1	NA	NA	NA	NA	NA	8,877	33,227	2,127	24,350	3 74
Office 03	roof insulation R-value 8 00	Attic Ceiling Increase insulation by R-11	1	NA	NA	NA	NA	NA	25,236	55,507	3,553	30,271	2 20
2 Bldg Sets	roof insulation R value 8 00	Attic Ceiling Increase Insulation by R-8	2	NA	NA	NA	NA	NA	121,280	127,666	8,172	6,385	1 05
Lodging-05	roof insulation R-value 8 90	Suspended Ceiling Increase insulation by R-19	1	NA	NA	NA	NA	NA	31,112	63,012	4,034	31,900	2 03
5 Bldg Sets	roof insulation R-value 8 90	Suspended Ceiling Increase Insulation by R-8	5	NA	NA	NA	NA	NA	157,491	317,564	20,328	160,071	2 02
Wall Insulation													
Assembly-07	wall insulation R-value 0 00	Blow-in Insulation Increase Insulation by R-13	1	NA	NA	NA	NA	NA	4,044	4,314	276	270	1 07
Health Care 01	wall insulation R-value 0 00	Blow-in Insulation Increase Insulation by R-13	1	NA	NA	NA	NA	NA	1,427	3,993	256	2,565	2 80
Public Order-03	wall insulation R-value 0 00	Blow-in Insulation Increase Insulation by R-13	1	NA	NA	NA	NA	NA	3,839	3,899	250	60	1 02
FH Detached-04	wall insulation R value 0 00	Blow-in Insulation Increase Insulation by R-6 5	1	NA	NA	NA	NA	NA	22,880	41,085	2,630	18,205	1 80

2.3 Manual Building Envelope EROS

This section discusses three envelope EROs that the Level-2 software does not currently analyze. Radiant barriers are installed in the attic to intercept and reflect incoming solar radiation. Reflective films and shade screens are window retrofits to reduce incoming solar radiation through windows.

2.3.1 Radiant Barriers

Description

Radiant barriers are reinforced aluminum foil sheets installed in the attic of a structure to reduce radiative heat gain, and thus reduce cooling load, of the structure. The material must be properly installed to be effective, either horizontally above the insulation or on the bottom side of the rafters. Although radiant barriers would decrease the cooling load in building types such as administration and dormitories, the cost of installing the material above the existing ceilings would be prohibitively expensive. For this reason, this ERO is considered only for the family housing units.

Assumptions

The technical assumptions are as follows:

- The life of the radiant barriers was estimated to be 15 years (before being rendered ineffective by dust, dirt, age, etc.).
- The total roof area was assumed to be the same as the square footage of the facilities in which the radiant barriers were installed since the pitches of the various roofs were unknown.

The cost estimates are as follows:

- The installed cost of the radiant barrier is \$0.50/ft^2. However, it should be noted that the range for the installed cost of radiant barriers is quite large. Costs of ~\$0.20/ft^2 to ~\$1.05/ft^2 have been witnessed. While the film itself has a low cost, the cost for installation labor is quite variable depending on the building characteristics.

Results

This ERO has no positive ERO options, and is therefore not included in Table 2.3. While radiant barriers are not a viable option for retrofitting family housing due to the high installation labor costs, they should be reconsidered for future housing construction plans or housing renovation work that includes roof replacement.

2.3.2 Reflective Window Film

Description

By applying reflective window film at Fort Stewart, buildings such as administration and family housing could reduce solar heat gain. By reducing the amount of sunlight that enters through the windows, cooling load can be substantially reduced. However, as part of the analysis, one must remember that the heating load in the winter will increase somewhat as a result of this measure. The reflective film will block out the incoming solar radiation in the winter that would help offset the load to the facilities heating system. Therefore, the interactive effects of reducing the cooling load, as well as increasing the heating load, have been taken into account in the analysis.

Assumptions

The technical assumptions are as follows:

- Family housing is the only area for which this ERO was analyzed due to the variable nature of the cooling and heating systems in other building types. There are 808 family housing units with heat pumps and 1,632 units with natural gas furnaces and DX central A/C systems considered in this analysis.

- There are 4,632 ft^2 of window area in the heat pump units and 7,424 ft^2 of window area in the furnace and A/C units.

- 25% of all windows face each of north, south, east and west.

- Solar heat gain is calculated from Solar Heat Gain Factors in Chapter 27, ASHRAE (1989). The east-west and north-south windows are considered to have the same heat gain from radiation for purposes of this analysis. Since north-south windows have heat gain that varies seasonally (and which tends to cancel out each others savings), only east-west windows were considered for window film installation.

- 50% of the family housing area is considered adequately shaded by trees or other buildings; therefore only 1,158 ft^2 of window area in the heat pump units and 1,856 ft^2 of window area in the furnace and A/C units is analyzed for the reflective window film.

- A/C and heat pump coefficient of performance (COP) is 2.19 for the family housing areas.

- All existing windows are double pane and have a shading coefficient of 0.88. This ERO calls for installing a reflective film that will increase the shading coefficient to 0.30. (A lower shading coefficient results in less sunlight being transmitted through the window.)

- The reflective window films will increase the heating load in the winter. The family housing heating efficiency is estimated to be approximately 77%.

The cost assumptions are as follows:

- The estimated installed cost for window films is $3.95/ft^2. This cost includes both materials and labor and is based on estimates by several material vendors, manufacturers, and contractors.

Results

The complete quantitative analysis of this ERO appears in Table 2.3. There are no positive NPV options for this ERO, so there are no lines in the economic section of the table.

2.3.3 Shade Screens

Description

By installing shade screens at Fort Stewart, buildings such as family housing could reduce radiative heat gain. Shade screens are designed to replace existing insect screens, but instead of a metal or fabric mesh, the shade screens are made with rows of miniature louvers that block the sun when it gets above a certain angle. The higher the sun, the less light is transmitted. By reducing the amount of sunlight that enters through the windows in the summer (when the sun is the highest), cooling load can be substantially reduced. Further, the design of the shade screens is such that the solar gain in the winter will not be affected since the sun is lower in the sky. Thus, shade screens will not block out the radiative heat in the winter that would help offset the load to the facilities heating system, as in other options such as reflective window films.

The shade screens may also provide additional security since they are nearly opaque from the outside, while allowing clear viewing from the inside.

Assumptions

- All of the assumptions concerning existing and retrofit conditions are the same as Section 2.3.2 above, with the following exceptions:

- The shade screens will not increase the heating load in the winter.

- The shade screens cost $5/ft^2 installed.

Results

The complete quantitative analysis of this ERO appears in Table 2.3.

Budget Implications

The estimated initial cost of implementing this ERO is $15,071.

Energy and Cost Savings

It is estimated that this ERO will save 94,600 kWh and 535 kW-mo per year of billable demand for family housing, which corresponds to a savings of $2,363 per year.

Table 2.3. Manual Building Envelope EROs

Existing Window Operating Parameters

ID	Facility Description	Number of Houses	Window Area (sqft)	Shading Coeff.	Annual Electric Consumption (kWh)	Annual Demand (kW-mo)	Annual O&M Costs (1993 $)
1	Hsg-fam (Heat Pump)	808	4,632	0.88	55,143	312	0
2	Hsg-fam (Nat Gas)	1,632	7,424	0.88	88,380	500	0

Energy-Efficient Window Operating Parameters

ID	Description of ERO	Number of Houses	Affected Window Area (sqft)	Shading Coeff.	Addtn'l Natural Gas Consumption (MBtu)	Annual Electric Consumption (kWh)	Annual Demand (kW-mo)	Annual Maint. Cost (1993 $)
1a	Reflect Win Film	808	1,158	0.3	NA	18,794	103	0
2a	Reflect Win Film	1,632	1,856	0.3	377	30,129	174	0
1b	Shade Screen	808	1,158	0.3	NA	18,794	103	0
2b	Shade Screen	1,632	1,856	0.3	NA	30,129	174	0

Energy-Efficient Window ERO Economic Parameters

ID	Description of ERO	Installed Cost (1993 $)	Life Expectancy (Years)	Energy Savings (kWh)	Demand Savings (kW-mo)	Annualized Energy Savings (1993 $)	Annualized Demand Savings (1993 $)	Annualized O&M Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio
1a	Shade Screen	5,791	10	36,349	209	926	1,837	0	32,009	6.53
2a	Shade Screen	9,280	10	58,251	326	1,483	2,870	0	50,139	6.40

2.4 FEDS Service Hot Water EROs

Level-2 analyzes a wide range of possible service hot water heating options. Many of these are variations of similar EROs with different existing and retrofit fuel possibilities. Therefore, the EROs are grouped together by major option to avoid repetitive descriptions and assumptions. The Level-2 software analyzes all possible combinations of replacements and equipment/efficiency upgrades and chooses the most life-cycle cost-effective combination of options for each building set.

2.4.1 Replace Existing (Electric, Natural Gas, Oil, or LPG) Service Hot Water Systems

Description

This ERO pertains to replacing existing (electric, natural gas, oil, or LPG) service hot water systems with a new efficient or high-efficiency service hot water system fueled by electricity, natural gas, oil, or LPG. Fuel-switching alternatives are only considered when the fuel is available to the building set. This ERO also evaluates adding a heat trap to the retrofit for further energy savings.

Assumptions

The technical assumptions are as follows:

- FEDS calculates existing hot water system size, age, efficiency, and fuel consumption based on information developed in the Level-2 input file for the building set. These calculated (default) values can be changed if the actual information is known.

- Retrofit hot water system fuel availability, fuel consumption, size, and installed cost are also determined based on information developed in the Level-2 input file for the building set.

- Retrofit service hot water efficiencies are as follows:

electric service hot water	- 98.0%
electric service hot water	- 98.0%
oil service hot water heater	- 80.0%
natural gas service hot water heater	- 76.0%
natural gas service hot water heater	- 80.0%
natural gas service hot water heater	- 85.0%
natural gas service hot water heater	- 94.0%
LPG service hot water heater	- 76.0%
LPG service hot water heater	- 80.0%
LPG service hot water heater	- 85.0%
LPG service hot water heater	- 94.0%

Results

The complete quantitative results including energy, installed cost, and NPV can be found in Table 2.4.

2.4.2 Replace Existing HTHW Heat Exchanger Service Hot Water Systems

Description

This ERO pertains to replacing existing HTHW service hot water systems (HTHW distribution and heat exchanger) with new conventional or high-efficiency boilers fueled by oil, natural gas, or LPG. Fuel-switching alternatives are only considered when the fuel is available to the building set.

Assumptions

The technical assumptions are as follows:

- FEDS calculates existing heat exchanger size, age, efficiency, and fuel consumption based on information developed in the Level-2 input file for the building set. These calculated (default) values can be changed if the actual information is known.

- Retrofit boiler fuel availability, fuel consumption, efficiency, size, and installed cost are also determined based on information developed in the Level-2 input file for the building set.

- Retrofit boiler efficiencies are given by the following equations:

conventional gas boiler efficiency	=	$0.871-1.83^{-3} * (\text{Boiler Cap.})$
pulse-condensing gas boiler efficiency	=	$0.871-1.83^{-3} * (\text{Boiler Cap.})+0.08$
conventional LPG boiler efficiency	=	$0.871-1.83^{-3} * (\text{Boiler Cap.})$
pulse-condensing LPG boiler efficiency	=	$0.871-1.83^{-3} * (\text{Boiler Cap.})+0.08$
conventional oil boiler efficiency	=	$0.891-1.83^{-3} * (\text{Boiler Cap.})$

Results

The complete quantitative results including energy, installed cost, and NPV can be found in Table 2.4.

2.4.3 Service Hot Water System Upgrade

Description

Depending on existing equipment condition, equipment upgrade rather than replacement may be more cost-effective. This ERO evaluates the following upgrades: insulate existing hot water tank, insulate piping near water heater, decrease water heater temperature (only examined for certain building types), and install low-flow shower heads and faucet aerators where applicable. All of these possible upgrades can be combined with any of the water heater replacement options above. The Level-2 software analyzes each possible replacement and upgrade and chooses the most life-cycle cost-effective combination of options for each building set.

Assumptions

The technical assumptions are as follows:

- FEDS calculates existing hot water system size, age, efficiency, and fuel consumption based on information developed in the Level-2 input file for the building set. These calculated (default) values can be changed if the actual information is known.

- Hot water system upgrade fuel consumption, equipment size, and installed cost are also determined based on information developed in the Level-2 input file for the building set.

Results

The complete quantitative results including energy, installed cost, and NPV can be found in Table 2.4.

Table 2.4. FEDS Service Hot Water EROs

Bldg Type	Existing Technology	Retrofit Technology	Retro Number	Exist Eff, COP or Lamp Wattage	Retro Eff, COP or Lamp Wattage	Existing Fuel (MBtu)	Retrofit Fuel (MBtu)	First Year Energy Savings (MBtu)	Present Value of Installed Cost (1993 $)	Value of Energy & Demand Savings (1993 $)	Annualized Energy & Demand Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio
FH-attached-01	electric shw heater	0.76 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	320	98.0%	76.0%	Electricity	Nat. Gas	(97)	14,624	71,303	4,564	56,678	4.88
4 Bldg. Sets	electric shw heater	0.85 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	60	98.0%	85.0%	Electricity	Nat. Gas	1,017	4,474	55,102	3,527	50,627	12.32
4 Bldg. Sets	electric shw heater	Better Elec. WH (RES), Ins. Pipe, LFSHs, Aer., Lower Tank Temp	177	98.0%	98.0%	Electricity	Electricity	6,284	24,298	154,891	9,915	130,594	6.37
3 Bldg. Sets	electric shw heater	Wrap Old Electric Tank w/ Ins., Ins. Pipe, LFSHs, Aerators	147	98.0%	98.0%	Electricity	Electricity	1,182	15,893	83,139	5,322	67,247	5.23
2 Bldg. Sets	gas central boiler	Gas Pulse Cond. Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	3	84.7%	95.8%	Nat. Gas	Nat. Gas	563	4,802	38,378	2,457	33,576	7.98
Food Service-17	gas central boiler	Gas Wrap Tank w/ Insulation, LFSHs, Aerators	3	82.9%	82.9%	Nat. Gas	Nat. Gas	1,826	2,631	124,625	7,977	121,994	47.37
3 Bldg. Sets	gas shw heater	0.85 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	129	75.0%	85.0%	Nat. Gas	Nat. Gas	5,168	9,878	13,914	891	4,036	1.41
4 Bldg. Sets	gas shw heater	Wrap Old Gas Tank w/ Ins., Ins. Pipe, LFSHs, Aerators	207	75.0%	75.0%	Nat. Gas	Nat. Gas	8,707	43,354	122,495	7,841	79,141	2.83
24 Bldg. Sets	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	76	75.0%	75.0%	Nat. Gas	Nat. Gas	1,095	7,258	15,430	988	8,175	2.13
Health Care-07	hot water central hwr	Conventional Gas Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	10	98.0%	87.7%	HTHW	Nat. Gas	10,622	104,453	1,047,232	67,035	942,779	10.03
18 Bldg. Sets	hot water central hwr	Gas Pulse Cond. Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	53	98.0%	95.8%	HTHW	Nat. Gas	6,509	67,440	684,981	43,847	617,543	10.16
15 Bldg. Sets	oil central boiler	Gas Pulse Cond. Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	37	82.6%	95.8%	Oil	Nat. Gas	1,282	10,806	163,249	10,450	152,443	15.11
19 Bldg. Sets	oil central boiler	Oil Wrap Tank w/ Insulation, LFSHs, Aerators	43	83.2%	83.2%	Oil	Oil	2,564	3,828	215,603	13,881	211,779	56.32
2 Bldg. Sets	oil shw heater	0.80 Oil WH (COM), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	2	75.0%	80.0%	Oil	Oil	10,083	41,718	215,490	13,794	173,771	5.17
4 Bldg. Sets	oil shw heater	Wrap Old Oil Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	16	75.0%	75.0%	Oil	Oil	151	1,475	251	219	1,942	0.17
4 Bldg. Sets	other shw heater	0.76 Gas WH (COM), Insulate Pipe, Low Flow SHs, Aerators	20	75.0%	76.0%	Oth. Fuels	Nat. Gas	414	10,556	23,394	1,497	12,837	2.22
FH-Detached-03	other shw heater	0.85 LPG WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	1	70.0%	85.0%	Oth. Fuels	Oth. Fuels	21	65	147	9	82	2.26
2 Bldg. Sets	other shw heater	Better Elec. WH (COM), Ins. Pipe, LFSHs, Aer., Lower Tank Temp	7	75.0%	98.0%	Oth. Fuels	Electricity	136	3,193	3,542	227	349	1.11
19 Bldg. Sets	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	386	75.0%	75.0%	Oth. Fuels	Oth. Fuels	4,425	33,496	142,121	9,097	108,625	4.24

2.5 FEDS Building Interior Lighting EROs

About 24% of the electrical energy supplied to Fort Stewart is used for lighting in and around buildings. Few of the existing lamps, ballasts, and light fixtures are as efficient as currently available cost-effective lamps, ballasts, and fixtures. A number of fixture retrofit and fixture replacement EROs are therefore evaluated in this section.

2.5.1 Interior Lighting EROs

Data and Assumptions for all Lighting EROs

- FEMP Lighting Matrix. The first costs of fixture upgrades (either replacement or retrofit) that are feasible for a given type of existing fixture are determined using data from the FEMP *Lighting Technology Screening Matrix* (LTSM) computer program (Dirks et al. 1992). The per-fixture wattage and maintenance requirements for each existing and post-retrofit configuration are also determined using the LTSM database. The LTSM database has been incorporated into the Level-2 software.

- Fixture Modification versus Fixture Replacement. Fixtures can be upgraded by replacing selected parts (ballast, lamp, reflector, or lens) or by replacing the entire fixture. The best route for a given upgrade is generally determined by the relative costs in the LTSM except when site-specific (usually implementation labor or maintenance related) conditions dictate otherwise.

- Fixture Type and Quantity. The existing fixture inventory was estimated for each building type. The lighting in the majority of the buildings could not be rigorously established within the scope of this project. Estimates of the existing lighting quantity (in the form of fixtures per square foot) are defaults in the Level-2 software. Changes were made to the default values where site-specific information was available.

  This approach assumes that all of the buildings of a given type have the same fixture types, distribution, and use. Thus, the fixture types and counts are not exact but are believed to reasonably characterize existing lighting on the site and the potential for efficiency improvements with available technologies.

- Existing Ballasts. The ballasts used in all existing fluorescent fixtures are standard 60-Hz inductive ballasts.

- Lighting Levels. Existing lighting levels are adequate or more than adequate for the visual activities conducted in a space unless otherwise noted. The retrofit fixtures will provide the same lighting level, or slightly less, and are, in all cases, intended to meet or exceed minimum applicable federal standards. The lumen equivalence of replacement fixtures or retrofit packages cannot be determined exactly from the nominal fixture characteristics due to variations in fixture design and the lighting environment and task requirements. The ability of a given upgrade to provide adequate level and quality of light should be field-checked in typical applications before proceeding with a large-scale retrofit.

- Salvage Value. The salvage value for used fixtures is small at best and has been assumed to be zero. Actual salvage value will be reflected in the cost proposals of competitive energy services contractor (ESCO) bidders. It is essential to the project's long-term success that the old fixtures be removed

from the site to prevent their being re-installed for any reason and the inefficient use of electric power that would result.

- Maintenance Costs. Maintenance cost savings are expressed as annualized values. Revamping costs that might occur every 5 years in the 25-year life of an ERO are converted to a present value, and the present value is then converted to a uniform series of yearly costs. Maintenance savings are due chiefly to longer lamp lives (e.g., HPS and fluorescent lamps have a much longer life than standard incandescent) that result in lower annual lamp replacement costs. In cases where the retrofit maintenance cost is only slightly less than the existing maintenance cost, the savings are taken to be zero. This results in a slightly conservative assessment of NPV and resource potential.

- Penetration of EROs. With the exception of incandescent fixtures, all lighting EROs are assumed to have a 100% penetration rate. The reduced penetration rate for incandescent fixtures takes into account that not every fixture can be replaced for one reason or another (e.g., space limitations, aesthetics, etc.). For family housing a 70% penetration rate is assumed; for commercial buildings, a 90% penetration rate is assumed.

Non-Energy Effects Common to All Lighting ERO Implementations

- Operations and Maintenance. The replacement or retrofit of incandescent fixtures results in reduced maintenance. All other fixture upgrades result in post-retrofit maintenance requirements that are identical or nearly identical to the existing maintenance requirements. All non-energy O&M costs are reported as annualized values based on all expected maintenance costs over the analysis period of 25 years.

  The operation of lighting systems generally will not be affected in any way by implementation of any of the EROs.

  An additional unmeasured benefit of the fixture replacement and retrofit EROs is that conversion to standard lighting systems over the entire site eliminates the need to have multiple types of tubes, ballasts, etc., on hand for repair or replacement. For example, it is recommended that T-8 retrofit parts and replacement fixtures be stocked in sufficient quantity to replace the existing fixtures of the type covered in this ERO—but not upgraded in this implementation—as their lamps, ballasts or other hardware fail. This will eliminate the need to stock the variety of lamps and ballasts used in the older systems and will result in all fixtures eventually being upgraded with minimal administrative effort.

- Annualized O&M costs as reported in tables are dependent on the operating characteristics (hours of operation) of the lights being impacted. Therefore, the same fixture type may have a different annualized O&M cost from one table to the next, based on its hours of operation.

- Energy Security. None of the lighting EROs have significant impact on energy security.

- Environmental Impact. There are no negative environmental impacts associated with any of the lighting EROs, with the possible exception of the fluorescent fixture upgrades that will involve ballast disposal. In general, implementing lighting EROs will decrease the need for electricity that may be produced from sources that have environmental impacts. All lighting EROs are environmentally beneficial in this respect.

The disposal of PCB-bearing ballasts may have to be addressed. It is not known how many, if any, PCB-bearing ballasts exist at Fort Stewart. If virtually all fluorescent ballasts are targeted for replacement as recommended in this ERO, a beneficial side effect will be that proper disposal of ballasts can be assured as part of the implementation program.

Results

The quantitative results of the lighting ERO assessments appear in Table 2.5. This table summarizes the energy, cost, maintenance and economic results of the Level-2 lighting analysis. Factors such as low yearly usage, existing efficient products, and lack of practical retrofit or replacement options render some existing fixture types cost-effective and not subject to change. The notes following the table describe the lighting fixture codes used by Level-2, and provide a simplified description of the appropriate action required to complete each ERO group.

It is recommended that a supply of the recommended replacement lamps and ballasts be kept on hand for any fixtures not upgraded as part of these EROs as their lamps, ballasts or other hardware fail. This will eliminate the need to stock the variety of lamps and ballasts used in the older systems and will result in all fixtures eventually being upgraded with a minimal administrative effort.

Table 2.5. Interior Lighting EROs

Bldg Type	Existing Technology	Retrofit Technology	Retro Number	Exist Eff. COP or Lamp Wattage	Retro Eff. COP or Lamp Wattage	Existing Fuel (MBtu)	Retrofit Fuel (MBtu)	First Year Energy Savings (MBtu)	Present Value of Installed Cost (1993 $)	Value of Energy & Demand Savings (1993 $)	Annualized Energy & Demand Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio
156 Bldg Sets	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5,788	40	5	Electricity	Electricity	6,060	939,005	1,633,069	104,536	1,946,788	1 83
17 Bldg Sets	FL1 FL 2X4 4F 40T12 STD2	FL237 FL 2X4 3F 32T8 ELC3 REF	2,639	196	88	Electricity	Electricity	2,681	459,481	876,110	56,082	536,753	2 40
19 Bldg Sets	FL1 FL 2X4 4F 40T12 STD2	FL244 FL 2X4 4F 32T8 ELC4	2,807	196	110	Electricity	Electricity	1,657	291,280	493,019	31,559	331,458	2 83
30 Bldg Sets	FL116 FL 1X8 2F 96T12ES STD2	FL128 FL 1X8 2F 96T12ES ELC2	2,658	140	105	Electricity	Electricity	732	249,469	212,979	13,633	37,080	1 10
14 Bldg Sets	FL3 FL 2X4 2F 40T12 STD2	FL51 FL 2X4 2F 32T8 ELC2	160	98	62	Electricity	Electricity	49	11,444	15,639	1,001	7,150	8 87
2 Bldg Sets	FL4 FL 1X4 2F 40T12 STD2	FL52 FL 1X4 2F 32T8 ELC2	406	98	62	Electricity	Electricity	71	29,339	21,613	1,383	5,687	8 94
FH attached-05	FL4 FL 1X4 2F 40T12 STD2	FL52 FL 1X4 2F 32T8 ELC2	142	98	62	Electricity	Electricity	25	10,263	9,169	587	3,588	1 35
Lodging-15	FL5 FL 1X4 1F 40T12 STD1	FL29 FL 1X4 1F 40T12 ELC1	35	49	35	Electricity	Electricity	4	2,072	1,158	74	156	1 08
Food Sales-01	FL62 FL 1X8 2F 96T12 STD2	FL131 FL 1X8 2F 96T12F ELC2 REF	543	175	105	Electricity	Electricity	543	104,776	219,031	14,021	130,975	2 25
31 Bldg Sets	FL62 FL 1X8 2F 96T12 STD2	FL74 FL 1X8 2F 96T12 ELC2	1,761	175	134	Electricity	Electricity	499	164,808	131,092	8,391	27,585	1 18
74 Bldg Sets	FL79 FL 2X4 4F 40T12ES STD2	FL232 FL 2X4 3F 40T12 ELC3	20,516	158	105	Electricity	Electricity	11,157	1,883,529	3,472,444	222,278	3,083,124	2 08
52 Bldg Sets	FL82 FL 1X4 2F 40T12ES STD2	FL106 FL 1X4 2F 40T12ES ELC2	4,915	79	60	Electricity	Electricity	1,157	289,491	367,636	23,533	242,085	1 31
Food Sales-01	HS17 HPS 250 PEND	LS5 LPS 135 PEND	84	300	173	Electricity	Electricity	152	32,053	61,707	3,950	22,823	1 71
46 Bldg Sets	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	2,997	100	40	Electricity	Electricity	960	273,289	384,841	24,634	287,278	1 45
10 Bldg Sets	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	1,695	60	23	Electricity	Electricity	344	41,071	96,649	8,187	88,686	3 82
2 Bldg Sets	IN15 INC 60 TABLE LAMP	FL181 CFL 13 + BLST UNIT	103	60	18	Electricity	Electricity	29	5,594	8,947	573	7,276	23 81
5 Bldg Sets	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	379	80	23	Electricity	Electricity	105	11,813	46,907	3,003	40,788	26 79
11 Bldg Sets	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	1,682	60	23	Electricity	Electricity	342	40,752	93,079	5,958	85,832	15 40
Lodging-15	IN23 INC 60 WALL	FL181 CFL 13 + BLST UNIT	14	60	18	Electricity	Electricity	5	807	1,460	93	1,274	2 75
7 Bldg Sets	IN39 INC 150 FLD	HS31 HPS 70 FLD	4,093	150	94	Electricity	Electricity	2,770	801,707	1,023,475	65,515	1,641,275	4 34
15 Bldg Sets	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	5,536	60	23	Electricity	Electricity	1,234	153,765	447,660	28,656	362,290	30 36
22 Bldg Sets	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	18,218	60	18	Electricity	Electricity	10,045	1,022,349	3,702,537	237,007	3,668,456	9 17
35 Bldg Sets	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	10,712	120	36	Electricity	Electricity	5,450	1,020,981	2,227,992	142,618	1,966,485	3 18
13 Bldg Sets	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	12,710	75	27	Electricity	Electricity	4,263	273,074	1,531,964	98,064	1,858,550	13 35

Table 2.5. (contd)

Lighting ERO Fixture Description Notes

Existing Fixture Code	Existing Fixture Description	Retrofit Fixture Code	Retrofit Fixture Description	Action
EX1 EXIT - INC (2x20)	Incandescent exit sign w/ 2 20 W lamps	EX6 EXIT - LED	Light emitting diode exit sign	Replace fixture
FL1 FL 2X4 4F40T12 STD2	2x4 ft fixture w/ 4 40 W T-12 fluor lamps & 2 std ballasts	FL237 FL 2X4 3F32T8 ELC3 REF	2x4 ft fixture w/ 3 32 W T- 8 fluor lamps, 1 elec ballast, & reflector	Delamp 1, replace 3 w/T-8s, replace ballast, add reflector
FL1 FL 2X4 4F40T12 STD2	2x4 ft fixture w/ 4 40 W T-12 fluor lamps & 2 std ballasts	FL244 FL 2X4 4F32T8 ELC4	2x4 ft fixture w/ 4 32 W T- 8 fluor lamps & 1 elec ballast	Replace 4 w/T-8s, replace ballast (2 for 1)
FL116 FL 1X8 2F96T12ES STD2	1x8 ft fixture w/ 2 60 W T-12 fluor lamps & 1 std ballast	FL128 FL 1X8 2F96T12ES ELC2	1x8 ft fixture w/ 2 60 W T-12 fluor lamps & 1 elec ballast	Replace ballast
FL3 FL 2X4 2F40T12 STD2	2x4 ft fixture w/ 2 40 W T-12 fluor lamps & 1 std ballast	FL51 FL 2X4 2F32T8 ELC2	2x4 ft fixture w/ 2 32 W T- 8 fluor lamps & 1 elec ballast	Replace 2 w/T-8 and replace ballast
FL62 FL 1X8 2F96T12 STD2	1x8 ft fixture w/ 2 75 W T-12 fluor lamps & 1 std ballast	FL131 FL 1X8 2F96T12ES ELC2 REF	1x8 ft fixture w/ 2 60 W T-12 fluor lamps, 1 elec ballast, & reflector	Replace 2 w/energy saving, replace ballast, add reflector
FL62 FL 1X8 2F96T12 STD2	1x8 ft fixture w/ 2 75 W T-12 fluor lamps & 1 std ballast	FL74 FL 1X8 2F96T12 ELC2	1x8 ft fixture w/ 2 75 W T-12 fluor lamps & 1 elec ballast	Replace ballast
FL79 FL 2X4 4F40T12ES STD2	2x4 ft fixture w/ 4 34 W T-12 fluor lamps & 2 std ballasts	FL232 FL 2X4 3F40T12 ELC3	2x4 ft fixture w/3 40 W T-12 fluor lamps and 1 elec ballast	Delamp 1, replace 3 w/T-12s, replace ballast (2 for 1)
FL81 FL 2X4 2F40T12ES STD2	2x4 ft fixture w/ 2 34 W T-12 fluor lamps & 1 std ballast	FL105 FL 2X4 2F40T12ES ELC2	2x4 ft fixture w/ 2 34 W T-12 fluor lamps & 1 elec ballast	Replace ballast
FL82 FL 1X4 2F40T12ES STD2	1x4 ft fixture w/ 2 34 W T-12 fluor lamps & 1 std ballast	FL106 FL 1X4 2F40T12ES ELC2	1x4 ft fixture w/ 2 34 W T-12 fluor lamps & 1 elec ballast	Replace Ballast
HS17 HPS 250 PEND	pendant mounted 250 W high pressure sodium	LS5 LPS 135 PEND	pendant mounted 135 W low pressure sodium	Replace fixture
IN11 INC 100 CEIL	Ceiling mounted 100 W incandescent	FL189 CFL 2-15 CEIL FIXT	2 15 W compact fluor ceiling fixture	Replace fixture
IN15 INC 60 TABLE LAMP	60 W incandescent table lamp	FL174 CFL 18 GLOBE UNIT	18 W compact fluor globe style lamp	Replace lamp
IN15 INC 60 TABLE LAMP	60 W incandescent table lamp	FL181 CFL 13 + BLST UNIT	13 W compact fluor lamp	Replace lamp
IN20 INC 2-40 WALL	2 wall mounted 40 W incandescent lamps	FL174 CFL 18 GLOBE UNIT	18 W compact fluor globe style lamp	Replace fixture
IN23 INC 60 WALL	Wall mounted 60 W incandescent	FL174 CFL 18 GLOBE UNIT	18 W compact fluor globe style lamp	Replace fixture
IN23 INC 60 WALL	Wall mounted 60 W incandescent	FL181 CFL 13 + BLST UNIT	13 W compact fluor lamp	Replace fixture
IN39 INC 150 FLD	150 W flood lamp	HS31 HPS 70 FLD	70 W high pressure sodium floodlight fixture	Replace fixture
IN5 INC 60 CEIL	Ceiling mounted 60 W incandescent	FL174 CFL 18 GLOBE UNIT	18 W compact fluor globe style lamp	Replace fixture
IN5 INC 60 CEIL	Ceiling mounted 60 W incandescent	FL181 CFL 13 + BLST UNIT	13 W compact fluor lamp	Replace lamp
IN6 INC 2-60 CEIL	Ceiling mounted 2 60 W incandescents	FL182 CFL 2-13 + BLST UNIT	2 13 W compact fluor lamps	Replace lamp
IN8 INC 75 CEIL	Ceiling mounted 75 W incandescent	FL175 CFL 27 INTEGRAL UNIT	27 W screw-in lamp and ballast combination	Replace lamp

2.6 Exterior Lighting EROs

There are a large number and type of exterior lighting fixtures in use at Fort Stewart. Since there was little information available, and it was impossible to get an accurate count given the limited time available during on-site inspections, only two relatively small exterior lighting options were analyzed. A detailed survey of the exterior lighting is recommended, and will result in additional opportunities.

2.6.1 Barracks Exterior Lighting ERO

Most of the three-story barracks buildings (Building 501 and similar) have incandescent lighting in the exterior stairwells. This ERO proposes replacement of these fixtures with compact fluorescent fixtures to provide better light and to save energy. This ERO was originally proposed by the Tennessee Valley Authority, working for the Corps of Engineers in late 1991, but was not implemented at that time.

Description

Each exterior stairwell currently has five 60-W incandescent light fixtures. These are wall-mounted fixtures that are poorly located and easily damaged. Two of the fixtures are not required due to adequate light from exterior lighting placed around the buildings. Replacement fixtures would be ceiling-mounted 2 x 13 W compact fluorescents in the center of each stairwell landing. The new fixtures will be approved for exterior use and vandal-resistant.

Assumptions

The technical assumptions are as follows:

- Exterior lighting is assumed to operate an average of 12 hours per day (longer in winter, shorter in summer), 365 days per year, for a total of 4,380 annual operating hours.
- Exterior lighting does not contribute to the peak demand since it operates at night only. No credit is taken for demand reduction.
- There are 214 stairwells in the 31 three-story barracks that currently have incandescent lighting. Each stairwell has five 60-W incandescent fixtures, for a total of 1,070 fixtures to be removed. There are a total of 642 compact fluorescent fixtures to be installed.
- There is adequate light for safety and security from the exterior lighting around the buildings to warrant removal of two light fixtures from each stairwell.
- The replacement fixtures have a total of 36 W with ballasts.

The cost assumptions are as follows:

- The replacement costs per stairwell are as follows:

Item	Cost Each	Units of Measure	Total Material	Total Labor
3 fixtures	$60.00	Each	$180.00	$225
30' conduit	$0.08	Foot	$2.40	$247
Misc. fittings	$27.00		$27.00	NA
160' #12 wire	$5.90	100 feet	$9.44	$55
Total per stairwell:			$218.84	$527

This makes a total installed cost of approximately $746 per stairwell. Fixture costs are an average of several manufacturers' data. All other costs are from Means Electrical, 1992b. Average labor cost of $26/hour has been modified by the Savannah cost index of 0.693, for a local labor rate of $18/hour.

- Annualized existing O&M costs are $6.93 per fixture. Annualized O&M costs for the replacement fixture are $9.73. These costs are for lamp replacement only, no replacement labor is included. While the replacement O&M is higher than the existing, there are fewer fixtures, which results in a net O&M savings.

Results

The complete quantitative results of the ERO appear in Table 2.6. This table contains specific energy, cost, and economic parameters. The results are discussed below.

Budget Implications. The total initial installed cost of this ERO is $159,607.

Energy, Demand, and Cost Savings. The electric energy savings that will result from implementation of this ERO are estimated to be 179,965 kWh per year at a cost savings of $4,582 per year, for an NPV of $-69,769. Accordingly, it is not cost-effective to implement the ERO at this time.

2.6.2 Ballfield Lighting ERO

Description

This ERO evaluates adding timer controls to existing ballfield/physical training lighting systems. These controls allow for a predetermined amount of time to elapse before turning off the lights. The controls do allow for a timed reset if necessary.

Assumptions

The technical assumptions are as follows:

- From discussions with Fort Stewart electrical-shop personnel and PNL site visits, it was determined that eight ballfields would be affected by this ERO.

- Existing lighting is a combination of 1,000- and 1,500-W metal halide fixtures.

- Installed cost was derived through discussions with equipment manufacturers and electrical-shop personnel. An installed cost of $5,000 per ballfield was used.

Results

The complete quantitative results including energy, installed cost, and NPV can be found in Table 2.6.

Table 2.6. Exterior Lighting EROs

Existing Exterior Lighting Operating Parameters

ID	Facility	Number of Units	Avg. Load (kW/Unit)	Annual Run Hrs (Hours)	Peak Factor	Number of Months On Peak (Months)	Annual Energy Consumption (kWh)	Annual Demand (kW-mo)	O&M Cost per Fixture (1993 $)
Ext-Lgt-1	Ball Field Lighting	8	199.5	2,920	0.0027	12	4,660,320	50	NA
Ext-Lgt-2	Stairwells - BRK/ADM-2	1070	0.06	4,380	NA	0	281,196	0	6.93

Energy-Efficient Exterior Lighting Operating Parameters

ID	Replacement Equipment	Number of Units	Avg. Load (kW/Unit)	Annual Run Hrs. (Hours)	Peak Factor	Number of Months On Peak (Months)	Annual Energy Consumption (kWh)	Annual Demand (kW-mo)	O&M Cost per Fixture (1993 $)
Ext-Lgt-1	Lighting Controls	8	199.500	1,460	0	12	2,330,160	0	NA
Ext-Lgt-2	CFL 2-13 CEIL	642	0.036	4,380	NA	0	101,231	0	9.73

Energy-Efficient Exterior Lighting ERO Economic Parameters

ID	Replacement Equipment	Installed Cost (1993 $)	Life Expectancy (Years)	Annual Energy Savings (kWh)	Annual Demand Savings (kW-mo)	Annualized Energy Savings (1993)	Annualized Demand Savings (1993)	Annualized O&M Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio
Ext-Lgt-1	Lighting Controls	40,000	15	2,330,160	50	59,331	440	0	877,537	22.94
Ext-Lgt-2	CFL 2-13 CEIL	159,608	NA	179,965	0	4,582	0	1,168	(69,769)	0.56

2.7 Fan, Pump and Compressor Motor EROs (Manual)

Motor ERO analysis at Fort Stewart considered two primary efficiency options. The first involves the replacement of a single-speed standard-efficiency motor with a high-efficiency model. The second considers the addition of variable speed drive (VSD) controls where applicable. A discussion of the potential savings due to down-sizing motors follows the VSD ERO analysis.

This section addresses the fan, pump and air compressor motors associated with HVAC and compressed air systems, as well as drive motors for water wells, lift stations, and central HTHW and chilled-water distribution.

The replacement of currently installed standard efficiency motors with high-efficiency models was evaluated on both a replace-immediately (RI) and replace-on-failure (ROF) basis. A variable-speed drive was considered in any application where reduced pump or fan flow rate is acceptable for a significant fraction of the motor's operating time. There are two possibilities for variable speed drives: 1) add the VSD to the existing motor, and 2) install a new energy-efficient motor (EEM) with the VSD. This makes a total of three mutually exclusive motor ERO options.

An inventory of motors was developed using the real property list (RPL) and estimates of connected load based on building area. Motor sizes, functions, and quantities were catalogued by building type.

2.7.1 Energy-Efficient Motors

Energy-efficient, three-phase motors are manufactured with predominantly open drip proof (ODP) or total enclosed fan cooled (TEFC) enclosures. Motors up to 200 hp can be obtained in either 1200, 1800, or 3600 rpm. They are particularly attractive in duty-cycling applications because they suffer less thermal stress than standard efficient motors due to lower losses overall. There are some applications, however, in which EEMs would not be a good alternative; namely, in situations where high starting torque is needed. This is because EEMs are optimized for low slip operation, which generally results in lower starting torque than for standard efficiency motors. For most HVAC fan and pump applications the starting torque is not an issue. However, the starting characteristics should be kept in mind in preparing retrofit specifications for such things as the compressor motors.

Description

This ERO considers the replacement of existing single-speed motors by the best currently available energy-efficient models. The majority of motors analyzed in this study fell under the duty-cycling or air-handling applications in which EEMs are clearly a viable option.

Assumptions

The technical assumptions are as follows:

- There are 13 different types of equipment with electric motors considered in this ERO. Motor type and size range are detailed in the following table:

Motor Type	Size Range (hp)
Air Handling Unit (AH)	0.25 - 50
Air Compressor	1 - 200
Chilled Water Pump	7.5 - 350
Circulating Pump	3 - 15
Commercial Refrigeration	1 - 50
Condensate Pump	1 - 7.5
Condenser Fan	0.25 - 50
Condenser Water Pump	7.5 - 150
Cooling Tower Fan	7.5 - 200
Draft Fans	60 - 100
HAW Circ. Pump	3 - 125
Vacuum Systems	7.5
Water Wells	3 - 200

- The motor inventory was developed using the RPL and estimates of connected load based on building area or chiller tonnage. The estimated connected load per ft^2 by motor type is shown in the following table, along with a column denoting whether the motor type is listed in the RPL. For some motor types, only the motors listed in the RPL were used. These are denoted by NA in the connected load factor column. In addition, several motor types that were found during site visits were added to the motor listing. Nameplate data were collected as part of the inspections and are included for these motors.

Motor Type	Listed in RPL?	Connected Load Factor (hp/ton or hp/ft^2)
Air Handling Unit (AH)	Y	0.3 hp/ton
Air Compressor	Y	NA
Chilled Water Pump	N	0.12 hp/ton
Condenser Fan	N	0.15 hp/ton
Condenser Water Pump	N	0.1 hp/ton
Cooling Tower Fan	N	0.1 hp/ton
Furnace Fans	N	0.0002 hp/ft^2

Only the AH motor type appeared in the RPL (as mechanical ventilation) and also has a connected load factor. The calculated connected load was compared with the RPL to determine the estimated total AH motor capacity. The higher of the two values was assumed to be the correct connected load for AHUs.

Buildings without air conditioners listed in the RPL were assumed to be heated with warm air systems. Supply fans were added to the motor lists using the connected load factor based on building area.

Both the RPL and the calculated connected loads were often not in standard motor sizes. The total load was broken down into standard sizes by rounding the calculated/listed size to standard motor sizes. This results in fewer, larger motors than may actually be installed in a building. Without additional information, it is impossible to accurately determine the actual size and number of motors in each building.

- The operation schedules for each building type were estimated based on reconciliation with the Fan/ Vent EUI in Volume 2 (Keller et al. 1993). The building types in Volume 2 were assigned to 11 general building types (corresponding to the FEDS software) to simplify the analysis. This assignment is shown in the following table.

FEDS Bldg. Type	Volume 2 Bldg. Types
Assembly	CHAPEL, CHAPEL-1, CHAPEL-2, CHAPEL-3, CHAPEL-6, MWR, MWR-1, MWR-3, MWR-5, MWR-6, REC, REC-1, REC-2, REC-3
Education	SCHOOL, SCHOOL-3, SCHOOL-6, TRAING, TRAING-2, TRAING-3, TRAING-5, TRAING-6
Family Housing	HSG-FAM, HSG-FAM-4, HSG-FAM-6
Food Sales	GROCERY
Food Service	CLUB, CLUB-3, DINING, DINING-2, DINING-3, DINING-6, KITCHEN, RESTRNT, RESTRNT-3
Health Care	CLINIC, CLINIC-2, CLINIC-6, HOSPITL, HOSPITL-1, HOSPITL-2, HOSPITL-6
Lodging	2BRK/ADM, BRK/ADM-2, BRK/ADM-3, BRK/ADM-6, HOTEL
Office	ADMIN, ADMIN-1, ADMIN-2, ADMIN-3, ADMIN-4, ADMIN-5, ADMIN-6, COMCATN, COMCATN-3, COMCATN-5, COMCATN-6, TERMINL
Other	DET-RR, DET-RR-3, DET-RR-5, DET-RR-6, FUELDSP, FUELDSP-5, HANGAR, HANGAR-3, HUT, HUT-5, LAB-MED, LAB-MED-1, LAB-MED-3, LAB-MED-6, MTRPOOL, MTRPOOL-1, MTRPOOL-3, MTRPOOL-5, OTHER, OTHER-5, OTHER-6, PLT-BLDG, PLT-BLDG-3, PLT-BLDG-5, PRDCTN, PUMP, PUMP-5, PUMP-6, SHOP, SHOP-3, SHOP-AIR-3, SHOP-ELC, SHOP-ELC-3, SHOP-HVY, SHOP-WPN-3, SIMULTR, SIMULTR-3
Public Order	CONFMT, SECURTY, SECURTY-3, SECURTY-6
Service	DGR, DGR-2, DGR-3, DGR-6, LAUNDRY, LAUNDRY-1, LAUNDRY-6
Warehouse	STOR-UH, STOR-UH-1, STOR-UH-5, WHS, WHS-1, WHS-3, WHS-5, WHS-6, WHS-CLD, WHS-CLD-5

Some equipment types with sharply different operating hours were assigned appropriate schedules.

- Existing motors were considered to be sized correctly for current operations. However, significant additional savings can probably be obtained by evaluating the size of each motor in relation to its load at the time of replacement. It is particularly important to check for fans and pumps that are producing higher flow rates than necessary and pumps that have been throttled with valves or flow regulators.

- Existing, new standard, and new energy efficient motor efficiencies, based on data from *Motor Master* (Washington State Energy Office, 1992) for hp > 1 and Grainger (1992) for hp < 1 are shown in the following table. Existing motors were assumed to have an average 2% efficiency loss over new standard replacements to account for age and wear.

	Efficiency		
hp	Existing	New Std.	EEM
1/4	0.65	0.67	0.77
1/3	0.67	0.69	0.78
1/2	0.74	0.76	0.81
3/4	0.73	0.75	0.82
1	0.754	0.774	0.86
2	0.778	0.798	0.863
3	0.808	0.828	0.902
5	0.818	0.838	0.90
7.5	0.831	0.851	0.92
10	0.839	0.859	0.917
15	0.861	0.881	0.93
20	0.862	0.882	0.936
30	0.875	0.895	0.941
40	0.883	0.903	0.95
50	0.886	0.906	0.95
75	0.898	0.918	0.954
100	0.90	0.92	0.954
125	0.903	0.923	0.956
150	0.907	0.927	0.962
200	0.911	0.931	0.965
300	0.916	0.936	0.962
350	0.913	0.933	0.962

Cost estimating data are as follows:

- Maintenance costs for standard and high-efficiency motors are the same.

- Motor costs are based on the energy-efficient ODP motor costs reported in *Motor Master* (Washington State Energy Office, 1992) for hp > 1, and Grainger (1992) for hp < 1, as shown in the following table. The list price is shown; substantial (~25-50%) discounts should be available for volume purchases.

Motor Rating (hp)	High Efficiency Motor Cost
1/4	$138
1/3	$144
1/2	$163
3/4	$174
1	$211
2	$254
3	$316
5	$370
7.5	$538
10	$633
15	$864
20	$1,005
30	$1,425
40	$1,772
50	$2,066
75	$3,084
100	$3,933
125	$4,709
150	$6,801
200	$8,592
300	$13,329
350	$15,525

- The cost of installation labor, based on data from *Electrical Cost Data* (Means 1992b), is given below. The labor cost is double what is reported in Means to account for removal of the existing motor.

Motor Rating (hp)	Installation Cost
≤5	$64
7.5	$69
10	$72
15	$90
20	$111
30	$121
40	$146
50	$180
75	$243
100	$319
125	$416
150	$485
200	$582
300	$776
350	$873

- Motor life expectancy is 15 years.
- Salvage value of still-functional motors is 20% of a standard single-speed motor's new cost.

Results

Detailed quantitative results of the energy-efficient motor ERO analysis are presented in Tables 2.7 through 2.19. The results are discussed in general terms below.

Budget Implications. The first cost of all cost-effective energy-efficient motor retrofits is $1,497,611, consisting of the replace-immediately implementations at $303,218 and the replace-on-failure measures at $1,194,393. The following table shows the first costs by building type. ROF costs are the present value of the installed cost from the estimated time until failure (see the tables).

Building Type	First Cost, RI ($1993 $)	First Cost, ROF (1993 $)
Assembly	22,734	16,532
Education	28,451	18,289
Family Housing	380	1,002,311
Food Sales	8,181	0
Food Service	17,009	17,752
Health Care	5,791	687
Lodging	14,347	53,264
Office	64,942	41,304
Other	73,356	18,164
Public Order	3,189	458
Service	14,134	4,466
Warehouse	18,439	21,166
Water Wells	32,265	0
Totals:	303,218	1,194,393

Energy, Demand, and Cost Savings. The electric energy savings associated with all cost-effective implementations of this ERO are estimated to be 1,591,864 kWh per year at a cost savings of $32,199 per year. Demand savings are estimated to be 5,609 kW-months per year with a cost savings of $47,898 per year. The total NPV for all cost-effective EEM motor replacements is $1,183,351. The following table details the energy and demand savings, and NPV by building type:

Building Type	Energy Savings (kWh/yr)	Energy Savings (1993 $/yr)	Demand Savings (kW-mo/yr)	Demand Savings (1993 $/yr)	Net Present Value (1993 $)
Assembly	28,144	549	301	2,260	41,014
Education	66,739	1,297	343	2,416	54,792
Family Housing	472,500	10,414	2,037	22,041	506,482
Food Sales	38,169	696	98	711	21,269
Food Service	63,011	1,263	225	1,588	42,680
Health Care	34,429	699	69	464	16,615
Lodging	48,679	1,045	174	1,661	40,626
Office	208,643	4,189	713	5,159	135,612
Other	35,1115	6,573	879	5,986	176,314
Public Order	9,551	208	27	239	5,297
Service	27,169	482	184	1,111	23,667
Warehouse	61,809	1,194	170	1,479	38,962
Water Wells	181,670	3,590	389	2,783	80,021
Totals:	1,591,628	32,199	5,609	47,898	1,183,351

The results are reported by building type in the tables. The energy and demand numbers for the existing equipment are tabulated in the first sub-table of the table associated with each building type. A pair of sub-tables follow for each ERO considered for the building type. The energy and demand numbers for the replacement technology appear in the first sub-table of each pair, and the savings numbers appear in the second.

Energy or Operations Security. This ERO has no impact on energy or operations security. The recommended motor replacements are one-for-one retrofits that do not inhibit operations or energy supply.

Operations and Maintenance. The impact of this ERO on maintenance is considered to be negligible. Newer, higher-efficiency motors should have no increased maintenance costs. In practice they may even require less maintenance.

Environmental Implications. This ERO has no direct environmental impacts.

2.7.2 Variable Speed Drives

Variable speed drives (VSD) can be added to many HVAC motor applications to reduce energy consumption without compromising system performance. Fans and pumps are sized to meet the maximum load, even though this may occur only a few hours a year. In addition, motors are generally oversized to account for uncertainties in duct, coil and register pressure losses, as well as to provide additional capacity in the event of future remodeling. The VSD varies motor speed to just meet the load, practically eliminating the energy waste that results from oversizing. In fixed-speed applications, the VSD-controlled motor is not as efficient as a correctly sized line-powered motor, but the VSD-controlled motor is often easier to implement because of uncertainty in existing and future conditions.

The VSD offers several other advantages over the line-powered single-speed motor. The VSD provides "soft-starting," ramping up to speed rather than an abrupt step-up to full power. This will decrease wear on the motor, drive train, and fan, as well as allow for instant restart in the event of momentary power interruption. Longer equipment life and lower noise levels will occur due to lower average operating speed.

Description

Single-speed motors larger than 1 hp used in air handling units, chilled and condenser water pumps, and cooling tower fans have been considered for replacement. Because of their relatively low energy consumption and high per-hp cost, application of VSDs to motors of less than 1 hp are not considered in this analysis.

Assumptions

The technical assumptions are as follows:

- The operation schedules are the same as those for the single-speed motor ERO.
- The highest savings for VSDs in AHUs is achieved when the system is converted to variable air volume (VAV). For this analysis, 1/3 of the existing systems were assumed to be constant volume and easily converted to VAV, 1/3 were assumed to be VAV inlet-vane systems, and the remaining 1/3 not applicable for VSDs. The VSD will save approximately 71% of the existing constant volume

fan motor energy, and 58% of existing inlet vane VAV motor energy (Moses, Scott A., et al., 1989). These are general estimates, since individual motor load profile data are required to fully analyze the savings for each VSD application.

- Chilled water pumps were considered to be directly related to the air-handling units and therefore have similar percentage savings.

- Blast heaters, condenser water pumps, and cooling tower fans with VSDs were assumed to use 50% less energy than the existing conditions.

- Power ventilators with VSDs were also assumed to have 50% savings, but only 25% of the power ventilators were assumed to be retrofittable. The remainder were assumed to be used for exhaust systems requiring full power for health or safety reasons.

Cost estimating parameters are as follows:

- Maintenance costs for the VSD retrofit were assumed to be $10 per motor more than for the existing single-speed motors; this additional cost is for the maintenance of additional controls associated with the VSD operation.

- VSD controller costs (installed) are shown in the following table. Where available (from transformer records) the actual voltage of the motor was used, other motor voltages were assumed as follows: 1-3 hp, 5% 460 V; 5-10 hp, 25% 460 V; 15-30 hp, 50% 460 V; 40+ hp, 100% 460 V. VSD costs were obtained from several manufacturers. These costs are approximate for a wide range of sizes and system types, actual costs may be higher or lower depending on individual circumstances.

Motor Rating, hp	208V Equip. Cost, $	460V Equip. Cost, $
1	1,061	1,358
2	1,188	1,358
3	1,368	1,358
5	1,368	1,503
7.5	1,600	1,752
10	2,168	1,772
15	2,769	2,495
20	3,481	2,550
30	4,645	4,217
40	7,150	5,610
50		6,985
75		10,230
100		12,980
125		13,420
150		15,180
200		21,010
300		30,346
350		35,014

- Additional costs for individual motor types are given in the following table:

Motor Type	Additional Cost	Description
AH and chilled water pumps	$2400/hp for AH $600/hp for pump	For 1/3 of motors requiring CV to VAV retrofit.
Blast Heater	$200 each	Proportional thermostat.
Condenser water pump and cooling tower fans	$100 each	Proportional aquastat.

- VSD life expectancy is 15 years.

Results

Quantitative results of the VSD ERO analysis are presented in Tables 2.7 through 2.19. All motors larger than 1 hp that are considered for VSD retrofit are listed in the first block of each table. Two cases are analyzed: adding VSD to the existing motor, or adding VSD and replacing the motor with the higher efficiency motor recommended in Section 2.7.1.

Budget Implications. The first cost of the VSD and EEM EROs is $238,108, and the VSD to existing motor measures cost is $1,022,625, for a total cost of $1,260,733. The following table shows the first cost for both VSD options by building type:

Building Type	First Cost, VSD & EEM ($1993 $)	First Cost, VSD to Existing (1993 $)
Assembly	0	19,429
Education	0	36,580
Family Housing	0	0
Food Sales	0	0
Food Service	0	22,040
Health Care	0	12,998
Lodging	0	6,559
Office	0	14,415
Other	238,108	890,200
Public Order	0	0
Service	0	20,404
Warehouse	0	0
Water Wells	0	0
Totals:	238,108	1,022,625

Energy, Demand, and Cost Savings. The electric energy savings associated with all cost-effective implementations of this ERO are estimated to be 8,437,310 kWh per year at a cost savings of $232,071 per year. The demand savings are estimated to be 12,167 kW-months per year at a cost savings of $141,993 per year. The total NPV for all cost-effective VSD implementations is $4,319,596. The following table details the energy and demand savings by building type:

Building Type	Energy Savings (kWh/yr)	Energy Savings (1993 $/yr)	Demand Savings (kW-mo/yr)	Demand Savings (1993 $/yr)	Net Present Value (1993 $)
Assembly	31,449	798	196	3,392	43,820
Education	90,290	2,294	266	4,615	63,942
Family Housing	0	0	0	0	0
Food Sales	0	0	0	0	0
Food Service	72,982	1,854	148	2,576	41,668
Health Care	77,398	1,964	155	1,343	35,397
Lodging	11,111	283	27	464	3,112
Office	48,660	1,237	121	1,572	26,005
Other	8,059,370	222,470	11,093	125,238	4,068,381
Public Order	0	0	0	0	0
Service	46,050	1,171	161	2,793	37,271
Warehouse	0	0	0	0	0
Water Wells	0	0	0	0	0
Totals:	8,437,310	232,071	12,167	141,993	4,319,596

Energy and Operations Security. This ERO has no impact on energy security.

Operations and Maintenance. Additional maintenance associated with this ERO is small but not negligible. Controls for the replacement VSDs will have a finite failure rate that is reflected in the estimated maintenance costs.

Environmental Implications. This ERO has no direct environmental impact.

2.7.3 Downsized Energy Efficient Motor ERO

Description

Motors become oversized as a cumulative result of successive safety factors used in the design process. Safety factors are used to account for performance loss over time, scale build-up in pipes, duct obstructions, design uncertainties, or to allow for possible future expansion. In the initial design of a building it is routine to size the system, add 20% safety factor, then round up to the nearest standard motor size. It has been estimated that one-fifth of all motors over 5 horsepower (hp) installed in U.S. buildings

are more than 250% oversized (ACEEE 1991). Motors are considered oversized when the majority of the operating time is spent at or below 40% of the nameplate rating.

Motor efficiency drops off sharply below about 40% of rated nameplate, as much as 2-8% less efficient than at 50% of rated load. Power factor also drops steadily with load. Thus, an oversized motor will run at low efficiency and power factor, increasing energy costs and requiring costly power factor correction or utility charges for reactive current. For this reason, it is recommended that when replacing motors (on failure of the existing motor, or when upgrading to energy efficient motors) studies be undertaken to determine the correct size for the motor system. Efficiency peaks at about 75% for EEMs and about 100% for standard efficiency motors. While it is unrealistic to size a motor for exactly 100% of the load, an attempt should be made to size the motor so the majority of the operating time is spent within 50-75% of the rated nameplate to ensure the highest performance and efficiency.

Results

Detailed analysis of this ERO was not performed due to lack of required data. In order to make decisions regarding downsizing existing motors, detailed information as to motor size, operating time, and existing load are required. This information will need to be collected on an individual motor basis. Size is found on the motor nameplate, operating time can be estimated based on the motor application (or spot metered for a few days), and the load currently on the motor can be measured using an electric power demand analyzer, such as the Dranetz Technologies Series 808.

Only those motors that operate at or less than 40% of rated nameplate should be considered, and then only a subset of those will be cost-effective depending on annual operating hours and size. As stated above, improving a motor from 40-50% of rated capacity can increase efficiency by up to 8%. Even larger gains are possible for grossly oversized motors. This efficiency improvement can be added to the savings from switching from standard efficiency motors to EEMs, as discussed in Section 2.7.1 above.

Table 2.7. Assembly Motor EROs

Existing Motor Operating Parameters

ID	Equipment Description	Number of Units	Motor Size (hp)	Motor Eff. (%)	Time until Failure (Years)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Assembly-1	AHU	6	0.25	65.0%	1	965	1,661	20	0
Assembly-2	AHU	2	0.33	67.0%	1	965	709	9	0
Assembly-3	AHU	13	0.5	74.0%	2	965	6,321	76	0
Assembly-4	AHU	3	0.75	73.0%	1	965	2,218	27	0
Assembly-5A	AHU	4	1	75.4%	2	965	3,818	46	0
Assembly-5B	AHU	5	1	75.4%	2	965	4,772	57	0
Assembly-6A	AHU	5	2	77.8%	3	965	9,249	111	0
Assembly-6B	AHU	7	2	77.8%	3	965	12,949	156	0
Assembly-7A	AHU	2	3	80.8%	4	965	5,344	64	0
Assembly-7B	AHU	2	3	80.8%	4	965	5,344	64	0
Assembly-8A	AHU	2	5	81.8%	4	965	8,797	106	0
Assembly-8B	AHU	2	5	81.8%	4	965	8,797	106	0
Assembly-9	AHU	1	7.5	83.1%	1	965	6,495	78	0
Assembly-10A	AHU	2	10	83.9%	1	965	17,154	206	0
Assembly-10B	AHU	2	10	83.9%	1	965	17,154	206	0
Assembly-11	AHU	2	15	86.1%	1	965	25,073	301	0
Assembly-12	AHU	3	20	86.2%	1	965	50,088	602	0
Assembly-13	AHU	1	30	87.5%	1	965	24,672	297	0
Assembly-14	AHU	1	40	88.3%	1	965	32,598	392	0
Assembly-15	Air Comp.	1	10	83.9%	1	965	8,577	103	0
Assembly-16	CTwr Fan	2	7.5	83.1%	2	965	12,989	156	0
Assembly-17	CTwr Fan	2	10	83.9%	1	965	17,154	206	0
Assembly-18	CWtr Pump	1	7.5	83.1%	1	965	6,495	78	0
Assembly-19	CWtr Pump	2	10	83.9%	2	965	17,154	206	0
Assembly-20	CWtr Pump	1	15	86.1%	1	965	12,537	151	0
Assembly-21	Cond. Fan	5	0.25	65.0%	2	965	1,384	17	0
Assembly-22	Cond. Fan	1	0.33	67.0%	1	965	354	4	0
Assembly-23	Cond. Fan	10	0.5	74.0%	1	965	4,862	58	0
Assembly-24	Cond. Fan	6	0.75	73.0%	1	965	4,436	53	0
Assembly-25	Cond. Fan	1	1	75.4%	1	965	954	11	0
Assembly-26	Cond. Fan	3	2	77.8%	1	965	5,550	67	0
Assembly-27	Cond. Fan	4	5	81.8%	1	965	17,594	211	0
Assembly-28	Cond. Fan	2	7.5	83.1%	1	965	12,989	156	0
Assembly-29	Cond. Fan	1	10	83.9%	1	965	8,577	103	0
Assembly-30	Cond. Pump	2	7.5	83.1%	2	965	12,989	156	0
Assembly-31	Cond. Pump	2	10	83.9%	1	965	17,154	206	0

Table 2.7. (contd)

Energy-Efficient Motor Operating Parameters

ID	Description of Replacement	Number of Units	Motor Size (hp)	Motor Eff. (%)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Assembly-1	EEM	6	0.25	77.0%	965	1,402	17	0
Assembly-2	EEM	2	0.33	78.0%	965	609	7	0
Assembly-3	EEM	13	0.5	81.0%	965	5,775	69	0
Assembly-4	EEM	3	0.75	82.0%	965	1,975	24	0
Assembly-5A	EEM	4	1	86.0%	965	3,347	40	0
Assembly-5B	VSD & EEM	5	1	86.0%	965	1,464	18	50
Assembly-5B	EEM	5	1	86.0%	965	4,184	50	0
Assembly-5B	VSD to Existing	5	1	75.4%	965	1,670	20	50
Assembly-6A	EEM	5	2	86.3%	965	8,338	100	0
Assembly-6B	EEM	7	2	86.3%	965	11,674	140	0
Assembly-6B	VSD & EEM	7	2	86.3%	965	4,086	49	70
Assembly-6B	VSD to Existing	7	2	77.8%	965	4,532	54	70
Assembly-7A	EEM	2	3	90.2%	965	4,787	58	0
Assembly-7B	VSD & EEM	2	3	90.2%	965	1,675	20	20
Assembly-7B	EEM	2	3	90.2%	965	4,787	58	0
Assembly-7B	VSD to Existing	2	3	80.8%	965	1,870	22	20
Assembly-8A	EEM	2	5	90.0%	965	7,996	96	0
Assembly-8B	EEM	2	5	90.0%	965	7,996	96	0
Assembly-8B	VSD & EEM	2	5	90.0%	965	2,798	34	20
Assembly-8B	VSD to Existing	2	5	81.8%	965	3,079	37	20
Assembly-9	VSD & EEM	1	7.5	92.0%	965	2,053	25	10
Assembly-9	EEM	1	7.5	92.0%	965	5,866	71	0
Assembly-9	VSD to Existing	1	7.5	83.1%	965	2,273	27	10
Assembly-10A	EEM	2	10	91.7%	965	15,695	189	0
Assembly-10B	EEM	2	10	91.7%	965	15,695	189	0
Assembly-10B	VSD & EEM	2	10	91.7%	965	5,493	66	20
Assembly-10B	VSD to Existing	2	10	83.9%	965	6,004	72	20
Assembly-11	EEM	2	15	93.0%	965	23,213	279	0
Assembly-11	VSD & EEM	2	15	93.0%	965	8,125	98	20
Assembly-11	VSD to Existing	2	15	86.1%	965	8,776	105	20
Assembly-12	VSD & EEM	3	20	93.6%	965	16,145	194	30
Assembly-12	EEM	3	20	93.6%	965	46,128	554	0
Assembly-12	VSD to Existing	3	20	86.2%	965	17,531	211	30
Assembly-13	EEM	1	30	94.1%	965	22,942	276	0
Assembly-13	VSD & EEM	1	30	94.1%	965	8,030	97	10
Assembly-13	VSD to Existing	1	30	87.5%	965	8,635	104	10
Assembly-14	EEM	1	40	95.0%	965	30,299	364	0
Assembly-14	VSD & EEM	1	40	95.0%	965	10,605	127	10
Assembly-14	VSD to Existing	1	40	88.3%	965	11,409	137	10
Assembly-15	EEM	1	10	91.7%	965	7,847	94	0
Assembly-16	EEM	2	7.5	92.0%	965	11,733	141	0
Assembly-16	VSD & EEM	2	7.5	92.0%	965	5,866	71	20
Assembly-16	VSD to Existing	2	7.5	83.1%	965	6,495	78	20
Assembly-17	EEM	2	10	91.7%	965	15,695	189	0
Assembly-17	VSD & EEM	2	10	91.7%	965	7,847	94	20
Assembly-17	VSD to Existing	2	10	83.9%	965	8,577	103	20
Assembly-18	VSD & EEM	1	7.5	92.0%	965	2,053	25	10
Assembly-18	EEM	1	7.5	92.0%	965	5,866	71	0
Assembly-18	VSD to Existing	1	7.5	83.1%	965	2,273	27	10
Assembly-19	EEM	2	10	91.7%	965	15,695	189	0
Assembly-19	VSD & EEM	2	10	91.7%	965	5,493	66	20

Table 2.7. (contd)

Energy-Efficient Motor Operating Parameters

ID	Description of Replacement	Number of Units	Motor Size (hp)	Motor Eff. (%)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Assembly-19	VSD to Existing	2	10	83.9%	965	6,004	72	20
Assembly-20	EEM	1	15	93.0%	965	11,606	140	0
Assembly-20	VSD & EEM	1	15	93.0%	965	4,062	49	10
Assembly-20	VSD to Existing	1	15	86.1%	965	4,388	53	10
Assembly-21	EEM	5	0.25	77.0%	965	1,168	14	0
Assembly-22	EEM	1	0.33	78.0%	965	304	4	0
Assembly-23	EEM	10	0.5	81.0%	965	4,442	53	0
Assembly-24	EEM	6	0.75	82.0%	965	3,949	47	0
Assembly-25	EEM	1	1	86.0%	965	837	10	0
Assembly-26	EEM	3	2	86.3%	965	5,003	60	0
Assembly-27	EEM	4	5	90.0%	965	15,991	192	0
Assembly-28	EEM	2	7.5	92.0%	965	11,733	141	0
Assembly-29	EEM	1	10	91.7%	965	7,847	94	0
Assembly-30	EEM	2	7.5	92.0%	965	11,733	141	0
Assembly-30	VSD & EEM	2	7.5	92.0%	965	5,866	71	20
Assembly-30	VSD to Existing	2	7.5	83.1%	965	6,495	78	20
Assembly-31	VSD & EEM	2	10	91.7%	965	7,847	94	20
Assembly-31	EEM	2	10	91.7%	965	15,695	189	0
Assembly-31	VSD to Existing	2	10	83.9%	965	8,577	103	20

Table 2.7. (contd)

Energy-Efficient Motor ERO Economic Parameters

ID	Description of Replacement	PV of Installed Cost (1993 $)	RI or ROF	Motor Life (Years)	Full Implm Energy Savings (kWh)	Full Implm Demand Savings (kW-mo)	Annualized Energy Savings (1993 $)	Annualized Demand Savings (1993 $)	Annualized O&M Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio
Assembly-1	EEM	1,165	ROF	15	209	3	5	21	0	401	1.34
Assembly-2	EEM	400	ROF	15	79	1	2	8	0	152	1.38
Assembly-3	EEM	2,728	ROF	15	380	5	9	35	0	680	1.25
Assembly-4	EEM	687	ROF	15	184	2	4	18	0	352	1.51
Assembly-5A	EEM	1,017	ROF	15	372	5	8	34	0	668	1.66
Assembly-5B	EEM	1,271	ROF	15	465	6	10	43	0	835	1.66
Assembly-6A	EEM	1,414	ROF	15	679	8	14	59	0	1,139	1.81
Assembly-6B	EEM	1,979	ROF	15	951	12	20	82	0	1,595	1.81
Assembly-7A	EEM	760	RI	15	557	7	12	48	0	685	1.90
Assembly-7B	EEM	760	RI	15	557	7	12	48	0	685	1.90
Assembly-8A	EEM	868	RI	15	802	10	16	67	0	1,021	2.18
Assembly-8B	EEM	868	RI	15	802	10	16	67	0	1,021	2.18
Assembly-9	EEM	607	RI	15	628	8	12	51	0	936	2.54
Assembly-10A	EEM	1,410	RI	15	1,459	18	28	114	0	2,084	2.48
Assembly-10B	EEM	1,410	RI	15	1,459	18	28	114	0	2,084	2.48
Assembly-11	EEM	1,908	RI	15	1,860	23	34	139	0	2,530	2.33
Assembly-12	EEM	3,348	RI	15	3,960	49	74	303	0	5,596	2.67
Assembly-13	EEM	1,546	RI	15	1,730	22	31	127	0	2,330	2.51
Assembly-14	EEM	1,918	RI	15	2,299	29	41	170	0	3,128	2.63
Assembly-15	EEM	705	RI	15	730	9	14	57	0	1,042	2.48
Assembly-16	VSD to Existing	4,434	ROF	15	6,818	42	173	734	(20)	9,179	3.07
Assembly-17	VSD to Existing	5,280	ROF	15	8,907	55	226	962	(20)	12,732	3.41
Assembly-18	EEM	607	RI	15	628	4	12	51	0	936	2.54
Assembly-19	EEM	1,410	RI	15	1,459	9	28	116	0	2,016	2.43
Assembly-20	EEM	954	RI	15	930	6	17	69	0	1,265	2.33
Assembly-21	EEM	934	ROF	15	174	1	4	16	0	313	1.34
Assembly-22	EEM	200	ROF	15	40	0	1	4	0	76	1.38
Assembly-23	EEM	2,183	ROF	15	292	2	7	29	0	558	1.26
Assembly-24	EEM	1,373	ROF	15	369	2	9	36	0	705	1.51
Assembly-25	EEM	264	ROF	15	93	1	2	9	0	178	1.67
Assembly-26	EEM	917	ROF	15	408	3	10	40	0	779	1.85
Assembly-27	EEM	1,736	RI	15	1,603	10	31	127	0	2,311	2.33
Assembly-28	EEM	1,214	RI	15	1,257	8	25	102	0	1,871	2.54
Assembly-29	EEM	705	RI	15	730	5	14	57	0	1,042	2.48
Assembly-30	VSD to Existing	4,434	ROF	15	6,818	42	173	734	(20)	9,179	3.07
Assembly-31	VSD to Existing	5,280	ROF	15	8,907	55	226	962	(20)	12,732	3.41
Sub-Total:	RI	22,734			23,449	251	443	1,826	0	32,583	2.43
	ROF	16,532			4,695	50	106	434	0	8,431	1.51
	VSD to Existing	19,429			31,449	196	798	3,392	(80)	43,820	3.26
	VSD & EEM	0			0	0	0	0	0	0	0.00
Total		58,695			59,593	496	1,347	5,652	(80)	84,834	2.45

Table 2.8. Education Building Motor EROs

Existing Motor Operating Parameters

ID	Equipment Description	Number of Units	Motor Size (hp)	Motor Eff. (%)	Time until Failure (Years)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Education-1	AHU	2	0.25	65.0%	1	2,040	1,170	7	0
Education-2	AHU	3	0.33	67.0%	1	2,040	2,248	13	0
Education-3	AHU	12	0.5	74.0%	3	2,040	12,334	70	0
Education-4	AHU	4	0.75	73.0%	5	2,040	6,252	36	0
Education-5A	AHU	8	1	75.4%	3	2,040	16,140	92	0
Education-5B	AHU	13	1	75.4%	3	2,040	26,228	149	0
Education-6A	AHU	6	2	77.8%	1	2,040	23,464	133	0
Education-6B	AHU	14	2	77.8%	1	2,040	54,749	311	0
Education-7A	AHU	6	3	80.8%	2	2,040	33,889	193	0
Education-7B	AHU	10	3	80.8%	2	2,040	56,481	321	0
Education-8	AHU	1	10	83.9%	1	2,040	18,131	103	0
Education-9	AHU	3	15	86.1%	2	2,040	79,507	452	0
Education-10	AHU	2	20	86.2%	1	2,040	70,591	401	0
Education-11	AHU	2	30	87.5%	1	2,040	104,313	593	0
Education-12	Air Comp.	2	5	81.8%	1	2,040	18,597	106	0
Education-13	Air Comp.	1	20	86.2%	1	2,040	35,295	201	0
Education-14	Air Comp.	1	30	87.5%	1	2,040	52,156	297	0
Education-15	CTwr Fan	2	7.5	83.1%	1	2,040	27,459	156	0
Education-16	CTwr Fan	2	10	83.9%	1	2,040	36,263	206	0
Education-17A	CWtr Pump	2	10	83.9%	1	2,040	36,263	206	0
Education-17B	CWtr Pump	2	10	83.9%	1	2,040	36,263	206	0
Education-18	Cond. Fan	3	0.33	67.0%	4	2,040	2,248	13	0
Education-19	Cond. Fan	19	0.5	74.0%	2	2,040	19,529	111	0
Education-20	Cond. Fan	5	0.75	73.0%	1	2,040	7,815	44	0
Education-21	Cond. Fan	9	1	75.4%	1	2,040	18,158	103	0
Education-22	Cond. Fan	3	2	77.8%	1	2,040	11,732	67	0
Education-23	Cond. Fan	2	5	81.8%	1	2,040	18,597	106	0
Education-24	Cond. Fan	1	7.5	83.1%	1	2,040	13,729	78	0
Education-25	Cond. Pump	2	7.5	83.1%	1	2,040	27,459	156	0
Education-26	Cond. Pump	2	10	83.9%	1	2,040	36,263	206	0
Education-27	Refrig.	1	10	83.9%	1	6,000	53,328	103	0

Table 2.8. (contd)

Energy-Efficient Motor Operating Parameters

ID	Description of Replacement	Number of Units	Motor Size (hp)	Motor Eff. (%)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Education-1	EEM	2	0.25	77.0%	2,040	988	6	0
Education-2	EEM	3	0.33	78.0%	2,040	1,931	11	0
Education-3	EEM	12	0.5	81.0%	2,040	11,268	64	0
Education-4	EEM	4	0.75	82.0%	2,040	5,565	32	0
Education-5A	EEM	8	1	86.0%	2,040	14,151	80	0
Education-5B	EEM	13	1	86.0%	2,040	22,995	131	0
Education-5B	VSD & EEM	13	1	86.0%	2,040	8,048	46	130
Education-5B	VSD to Existing	13	1	75.4%	2,040	9,180	52	130
Education-6A	EEM	6	2	86.3%	2,040	21,153	120	0
Education-6B	VSD & EEM	14	2	86.3%	2,040	17,275	98	140
Education-6B	EEM	14	2	86.3%	2,040	49,356	281	0
Education-6B	VSD to Existing	14	2	77.8%	2,040	19,162	109	140
Education-7A	EEM	6	3	90.2%	2,040	30,357	173	0
Education-7B	EEM	10	3	90.2%	2,040	50,595	288	0
Education-7B	VSD & EEM	10	3	90.2%	2,040	17,708	101	100
Education-7B	VSD to Existing	10	3	80.8%	2,040	19,768	112	100
Education-8	EEM	1	10	91.7%	2,040	16,589	94	0
Education-8	VSD & EEM	1	10	91.7%	2,040	5,806	33	10
Education-8	VSD to Existing	1	10	83.9%	2,040	6,346	36	10
Education-9	EEM	3	15	93.0%	2,040	73,608	419	0
Education-9	VSD & EEM	3	15	93.0%	2,040	25,763	146	30
Education-9	VSD to Existing	3	15	86.1%	2,040	27,827	158	30
Education-10	VSD & EEM	2	20	93.6%	2,040	22,753	129	20
Education-10	EEM	2	20	93.6%	2,040	65,010	370	0
Education-10	VSD to Existing	2	20	86.2%	2,040	24,707	140	20
Education-11	EEM	2	30	94.1%	2,040	96,996	552	0
Education-11	VSD & EEM	2	30	94.1%	2,040	33,949	193	20
Education-11	VSD to Existing	2	30	87.5%	2,040	36,509	208	20
Education-12	EEM	2	5	90.0%	2,040	16,903	96	0
Education-13	EEM	1	20	93.6%	2,040	32,505	185	0
Education-14	EEM	1	30	94.1%	2,040	48,498	276	0
Education-15	EEM	2	7.5	92.0%	2,040	24,803	141	0
Education-15	VSD & EEM	2	7.5	92.0%	2,040	12,401	71	20
Education-15	VSD to Existing	2	7.5	83.1%	2,040	13,729	78	20
Education-16	EEM	2	10	91.7%	2,040	33,178	189	0
Education-16	VSD & EEM	2	10	91.7%	2,040	16,589	94	20
Education-16	VSD to Existing	2	10	83.9%	2,040	18,131	103	20
Education-17A	EEM	2	10	91.7%	2,040	33,178	189	0
Education-17B	VSD & EEM	2	10	91.7%	2,040	11,612	66	20
Education-17B	EEM	2	10	91.7%	2,040	33,178	189	0
Education-17B	VSD to Existing	2	10	83.9%	2,040	12,692	72	20
Education-18	EEM	3	0.33	78.0%	2,040	1,931	11	0
Education-19	EEM	19	0.5	81.0%	2,040	17,842	101	0
Education-20	EEM	5	0.75	82.0%	2,040	6,957	40	0
Education-21	EEM	9	1	86.0%	2,040	15,920	91	0
Education-22	EEM	3	2	86.3%	2,040	10,576	60	0
Education-23	EEM	2	5	90.0%	2,040	16,903	96	0
Education-24	EEM	1	7.5	92.0%	2,040	12,401	71	0
Education-25	VSD & EEM	2	7.5	92.0%	2,040	12,401	71	20
Education-25	EEM	2	7.5	92.0%	2,040	24,803	141	0
Education-25	VSD to Existing	2	7.5	83.1%	2,040	13,729	78	20

Table 2.8. (contd)

Energy-Efficient Motor Operating Parameters

ID	Description of Replacement	Number of Units	Motor Size (hp)	Motor Eff. (%)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Education-26	EEM	2	10	91.7%	2,040	33,178	189	0
Education-26	VSD & EEM	2	10	91.7%	2,040	16,589	94	20
Education-26	VSD to Existing	2	10	83.9%	2,040	18,131	103	20
Education-27	EEM	1	10	91.7%	6,000	48,792	94	0

Table 2.8. (contd)

Energy-Efficient Motor ERO Economic Parameters

ID	Description of Replacement	PV of Installed Cost (1993 $)	RI or ROF	Motor Life (Years)	Full Implm Energy Savings (kWh)	Full Implm Demand Savings (kW-mo)	Annualized Energy Savings (1993 $)	Annualized Demand Savings (1993 $)	Annualized O&M Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio
Education-1	EEM	388	ROF	15	147	1	4	7	0	163	1.42
Education-2	EEM	600	ROF	15	252	1	6	12	0	278	1.46
Education-3	EEM	2,422	ROF	15	741	4	16	30	0	715	1.30
Education-4	EEM	782	ROF	15	519	3	10	19	0	438	1.56
Education-5A	EEM	1,956	ROF	15	1,572	9	33	64	0	1,522	1.78
Education-5B	EEM	3,178	ROF	15	2,556	15	54	105	0	2,473	1.78
Education-6A	EEM	1,908	RI	15	2,311	14	45	87	0	1,898	1.99
Education-6B	EEM	4,452	RI	15	5,392	32	104	204	0	4,429	1.99
Education-7A	EEM	2,280	RI	15	3,532	21	72	140	0	2,913	2.28
Education-7B	EEM	3,800	RI	15	5,886	35	119	233	0	4,855	2.28
Education-8	EEM	705	RI	15	1,542	9	29	57	0	1,282	2.82
Education-9	EEM	2,862	RI	15	5,899	35	110	214	0	4,564	2.59
Education-10	EEM	2,232	RI	15	5,581	33	104	202	0	4,585	3.05
Education-11	EEM	3,092	RI	15	7,316	43	131	254	0	5,735	2.85
Education-12	EEM	868	RI	15	1,694	10	33	63	0	1,423	2.54
Education-13	EEM	1,116	RI	15	2,790	16	52	101	0	2,293	3.05
Education-14	EEM	1,546	RI	15	3,658	22	65	127	0	2,867	2.85
Education-15	VSD to Existing	4,469	ROF	15	14,412	42	366	736	(20)	12,251	3.74
Education-16	VSD to Existing	5,280	ROF	15	18,829	55	478	962	(20)	16,670	4.16
Education-17A	EEM	1,410	RI	15	3,085	9	58	114	0	2,565	2.82
Education-17B	VSD to Existing	17,080	ROF	15	23,808	70	606	1,220	(20)	6,101	1.36
Education-18	EEM	533	ROF	15	252	1	5	10	0	228	1.43
Education-19	EEM	3,988	ROF	15	1,174	3	26	51	0	1,210	1.30
Education-20	EEM	1,144	ROF	15	649	2	16	30	0	715	1.63
Education-21	EEM	2,380	ROF	15	1,769	5	42	83	0	1,951	1.82
Education-22	EEM	917	ROF	15	861	3	21	40	0	949	2.03
Education-23	EEM	868	RI	15	1,694	5	33	63	0	1,423	2.64
Education-24	EEM	607	RI	15	1,328	4	26	51	0	1,150	2.90
Education-25	VSD to Existing	4,469	ROF	15	14,412	42	366	736	(20)	12,251	3.74
Education-26	VSD to Existing	5,280	ROF	15	18,829	55	478	962	(20)	16,670	4.16
Education-27	EEM	705	RI	15	4,536	9	86	57	0	2,167	4.07
Sub-Total:	RI	28,451			56,246	295	1,066	1,966	0	44,150	2.55
	ROF	18,289			10,493	48	231	450	0	10,642	1.58
	VSD to Existing	36,580			90,290	266	2,294	4,615	(100)	53,942	2.75
	VSD & EEM	0			0	0	0	0	0	0	0.00
Total		83,320			157,028	609	3,591	7,031	(100)	118,734	2.43

Table 2.9. Family Housing Motor EROs

Existing Motor Operating Parameters

ID	Equipment Description	Number of Units	Motor Size (hp)	Motor Eff. (%)	Time until Failure (Years)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
FH-2 to 4-1	AHU	1	0.33	67.0%	1	1,875	689	4	0
FH-2 to 4-2	AHU	109	0.5	74.0%	3	1,875	102,975	637	0
FH-2 to 4-3	AHU	884	0.75	73.0%	2	1,875	1,269,861	7,856	0
FH-2 to 4-4	AHU	666	1	75.4%	2	1,875	1,235,004	7,641	0
FH-2 to 4-5	AHU	28	2	77.8%	1	1,875	100,641	623	0
FH-2 to 4-6	Cond. Fan	110	0.25	65.0%	3	1,875	59,154	366	0
FH-2 to 4-7	Cond. Fan	377	0.33	67.0%	1	1,875	259,625	1,606	0
FH-2 to 4-8	Cond. Fan	1151	0.5	74.0%	2	1,875	1,087,374	6,727	0
FH-2 to 4-9	Cond. Fan	16	0.75	73.0%	1	1,875	22,984	142	0
FH-5 or More-10	AHU	29	0.5	74.0%	6	1,875	27,397	169	0
FH-5 or More-11	AHU	42	0.75	73.0%	5	1,875	60,333	373	0
FH-5 or More-12	AHU	34	1	75.4%	6	1,875	63,048	390	0
FH-5 or More-13	Cond. Fan	29	0.25	65.0%	6	1,875	15,595	96	0
FH-5 or More-14	Cond. Fan	42	0.33	67.0%	5	1,875	28,924	179	0
FH-5 or More-15	Cond. Fan	34	0.5	74.0%	6	1,875	32,121	199	0
FH-Attached-16	AHU	9	0.5	74.0%	8	1,875	8,502	53	0
FH-Attached-17	AHU	376	0.75	73.0%	3	1,875	540,122	3,342	0
FH-Attached-18	AHU	96	1	75.4%	3	1,875	178,019	1,101	0
FH-Attached-19	AHU	22	2	77.8%	2	1,875	79,075	489	0
FH-Attached-20	Cond. Fan	9	0.25	65.0%	8	1,875	4,840	30	0
FH-Attached-21	Cond. Fan	56	0.33	67.0%	2	1,875	38,565	239	0
FH-Attached-22	Cond. Fan	416	0.5	74.0%	3	1,875	393,004	2,431	0
FH-Attached-23	Cond. Fan	20	0.75	73.0%	1	1,875	28,730	178	0
FH-Detached-24	AHU	2	0.5	74.0%	4	1,875	1,889	12	0
FH-Detached-25	AHU	15	0.75	73.0%	6	1,875	21,547	133	0
FH-Detached-26	AHU	16	1	75.4%	1	1,875	29,670	184	0
FH-Detached-27	AHU	6	2	77.8%	1	1,875	21,566	133	0
FH-Detached-28	AHU	1	3	80.8%	1	1,875	5,191	32	0
FH-Detached-29	Cond. Fan	7	0.33	67.0%	5	1,875	4,821	30	0
FH-Detached-30	Cond. Fan	24	0.5	74.0%	3	1,875	22,673	140	0
FH-Detached-31	Cond. Fan	6	0.75	73.0%	1	1,875	8,619	53	0
FH-Detached-32	Cond. Fan	1	2	77.8%	1	1,875	3,594	22	0

Table 2.9. (contd)

Energy-Efficient Motor Operating Parameters

ID	Description of Replacement	Number of Units	Motor Size (hp)	Motor Eff. (%)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
FH-2 to 4-1	EEM	1	0.33	78.0%	1,875	592	4	0
FH-2 to 4-2	EEM	109	0.5	81.0%	1,875	94,076	582	0
FH-2 to 4-3	EEM	884	0.75	82.0%	1,875	1,130,486	6,994	0
FH-2 to 4-4	EEM	666	1	86.0%	1,875	1,082,782	6,699	0
FH-2 to 4-5	EEM	28	2	86.3%	1,875	90,728	561	0
FH-2 to 4-6	EEM	110	0.25	77.0%	1,875	49,935	309	0
FH-2 to 4-7	EEM	377	0.33	78.0%	1,875	223,011	1,380	0
FH-2 to 4-8	EEM	1151	0.5	81.0%	1,875	993,404	6,146	0
FH-2 to 4-9	EEM	16	0.75	82.0%	1,875	20,461	127	0
FH-5 or More-10	EEM	29	0.5	81.0%	1,875	25,029	155	0
FH-5 or More-11	EEM	42	0.75	82.0%	1,875	53,711	332	0
FH-5 or More-12	EEM	34	1	86.0%	1,875	55,277	342	0
FH-5 or More-13	EEM	29	0.25	77.0%	1,875	13,165	81	0
FH-5 or More-14	EEM	42	0.33	78.0%	1,875	24,845	154	0
FH-5 or More-15	EEM	34	0.5	81.0%	1,875	29,345	182	0
FH-Attached-16	EEM	9	0.5	81.0%	1,875	7,768	48	0
FH-Attached-17	EEM	376	0.75	82.0%	1,875	480,840	2,975	0
FH-Attached-18	EEM	96	1	86.0%	1,875	156,077	966	0
FH-Attached-19	EEM	22	2	86.3%	1,875	71,287	441	0
FH-Attached-20	EEM	9	0.25	77.0%	1,875	4,086	25	0
FH-Attached-21	EEM	56	0.33	78.0%	1,875	33,126	205	0
FH-Attached-22	EEM	416	0.5	81.0%	1,875	359,041	2,221	0
FH-Attached-23	EEM	20	0.75	82.0%	1,875	25,577	158	0
FH-Detached-24	EEM	2	0.5	81.0%	1,875	1,726	11	0
FH-Detached-25	EEM	15	0.75	82.0%	1,875	19,182	119	0
FH-Detached-26	EEM	16	1	86.0%	1,875	26,013	161	0
FH-Detached-27	EEM	6	2	86.3%	1,875	19,442	120	0
FH-Detached-28	EEM	1	3	90.2%	1,875	4,650	29	0
FH-Detached-29	EEM	7	0.33	78.0%	1,875	4,141	26	0
FH-Detached-30	EEM	24	0.5	81.0%	1,875	20,714	128	0
FH-Detached-31	EEM	6	0.75	82.0%	1,875	7,673	47	0
FH-Detached-32	EEM	1	2	86.3%	1,875	3,240	20	0

Table 2.9. (contd)

Energy-Efficient Motor ERO Economic Parameters

ID	Description of Replacement	PV of Installed Cost (1993 $)	RI or ROF	Motor Life (Years)	Full Implm Energy Savings (kWh)	Full Implm Demand Savings (kW-mo)	Annualized Energy Savings (1993 $)	Annualized Demand Savings (1993 $)	Annualized O&M Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio
FH-2 to 4-1	EEM	200	ROF	15	77	0	2	4	0	90	1.45
FH-2 to 4-2	EEM	21,996	ROF	15	6,189	30	130	274	0	6,319	1.29
FH-2 to 4-3	EEM	194,519	ROF	15	105,512	508	2,368	5,014	0	115,335	1.59
FH-2 to 4-4	EEM	169,332	ROF	15	120,309	577	2,701	5,726	0	131,644	1.78
FH-2 to 4-5	EEM	8,562	ROF	15	7,390	35	177	374	0	8,612	2.01
FH-2 to 4-6	EEM	19,753	ROF	15	7,453	24	157	332	0	7,638	1.39
FH-2 to 4-7	EEM	75,400	ROF	15	29,088	93	696	1,477	0	33,947	1.45
FH-2 to 4-8	EEM	241,565	ROF	15	65,355	209	1,467	3,096	0	71,287	1.30
FH-2 to 4-9	EEM	3,662	ROF	15	1,910	6	46	97	0	2,226	1.61
FH-5 or More-10	EEM	5,203	ROF	15	1,647	8	28	59	0	1,366	1.26
FH-5 or More-11	EEM	8,216	ROF	15	5,013	24	92	194	0	4,477	1.54
FH-5 or More-12	EEM	7,389	ROF	15	6,142	29	105	222	0	5,113	1.69
FH-5 or More-13	EEM	4,630	ROF	15	1,965	6	34	71	0	1,637	1.35
FH-5 or More-14	EEM	7,180	ROF	15	3,241	10	60	126	0	2,898	1.40
FH-5 or More-15	EEM	6,100	ROF	15	1,931	6	33	69	0	1,602	1.26
FH-Attached-16	EEM	1,493	ROF	15	511	2	8	16	0	364	1.24
FH-Attached-17	EEM	70,555	ROF	15	44,878	215	944	1,996	0	45,921	1.58
FH-Attached-18	EEM	23,470	ROF	15	17,342	83	365	772	0	17,764	1.75
FH-Attached-19	EEM	6,468	ROF	15	5,807	28	130	276	0	6,345	1.98
FH-Attached-20	EEM	1,328	ROF	15	610	2	9	19	0	437	1.33
FH-Attached-21	EEM	10,769	ROF	15	4,321	14	97	206	0	4,728	1.44
FH-Attached-22	EEM	83,950	ROF	15	23,621	76	497	1,047	0	24,117	1.29
FH-Attached-23	EEM	4,577	ROF	15	2,387	8	57	121	0	2,783	1.61
FH-Detached-24	EEM	388	ROF	15	114	1	2	5	0	108	1.28
FH-Detached-25	EEM	2,821	ROF	15	1,790	9	31	65	0	1,489	1.53
FH-Detached-26	EEM	4,231	ROF	15	2,890	14	69	147	0	3,373	1.80
FH-Detached-27	EEM	1,835	ROF	15	1,584	8	38	80	0	1,845	2.01
FH-Detached-28	EEM	380	RI	15	541	3	11	23	0	493	2.30
FH-Detached-29	EEM	1,197	ROF	15	540	2	10	21	0	483	1.40
FH-Detached-30	EEM	4,843	ROF	15	1,363	4	29	60	0	1,391	1.29
FH-Detached-31	EEM	1,373	ROF	15	716	2	17	36	0	835	1.61
FH-Detached-32	EEM	306	ROF	15	264	1	6	13	0	308	2.01
Sub-Total:	RI	380			541	3	11	23	0	493	2.30
	ROF	1,002,311			471,959	2,034	10,403	22,018	0	506,482	1.51
	VSD to Existing	0			0	0	0	0	0	0	0.00
	VSD & EEM	0			0	0	0	0	0	0	0.00
Total		1,002,691			472,500	2,036	10,414	22,041	0	506,974	1.51

Table 2.10. Food Sales Motor EROs

Existing Motor Operating Parameters

ID	Equipment Description	Number of Units	Motor Size (hp)	Motor Eff. (%)	Time until Failure (Years)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Food Sales-1	AHU	1	7.5	83.1%	1	2,655	17,869	78	0
Food Sales-2	AHU	2	20	86.2%	1	2,655	91,872	401	0
Food Sales-3	Cond. Fan	1	5	81.8%	1	2,655	12,102	53	0
Food Sales-4	Cond. Fan	1	50	88.6%	1	2,655	111,729	488	0
Food Sales-5	Refrig.	1	20	86.2%	1	6,500	112,461	201	0
Food Sales-6	Refrig.	1	30	87.5%	1	6,500	166,185	297	0

Energy-Efficient Motor Operating Parameters

ID	Description of Replacement	Number of Units	Motor Size (hp)	Motor Eff. (%)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Food Sales-1	EEM	1	7.5	92.0%	2,655	16,140	71	0
Food Sales-1	VSD & EEM	1	7.5	92.0%	2,655	5,649	25	10
Food Sales-1	VSD to Existing	1	7.5	83.1%	2,655	6,254	27	10
Food Sales-2	EEM	2	20	93.6%	2,655	84,608	370	0
Food Sales-2	VSD & EEM	2	20	93.6%	2,655	29,613	129	20
Food Sales-2	VSD to Existing	2	20	86.2%	2,655	32,155	140	20
Food Sales-3	EEM	1	5	90.0%	2,655	10,999	48	0
Food Sales-4	EEM	1	50	95.0%	2,655	104,202	455	0
Food Sales-5	EEM	1	20	93.6%	6,500	103,569	185	0
Food Sales-6	EEM	1	30	94.1%	6,500	154,529	276	0

Energy-Efficient Motor ERO Economic Parameters

ID	Description of Replacement	PV of Installed Cost (1993 $)	RI or ROF	Motor Life (Years)	Full Implm Energy Savings (kWh)	Full Implm Demand Savings (kW-mo)	Annualized Energy Savings (1993 $)	Annualized Demand Savings (1993 $)	Annualized O&M Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio
Food Sales-1	EEM	607	RI	15	1,729	8	34	51	0	1,273	3.10
Food Sales-2	EEM	2,232	RI	15	7,263	33	135	202	0	5,074	3.27
Food Sales-3	EEM	434	RI	15	1,103	2	21	32	0	788	2.82
Food Sales-4	EEM	2,246	RI	15	7,527	17	130	198	0	4,971	3.21
Food Sales-5	EEM	1,116	RI	15	8,891	16	165	101	0	4,065	4.64
Food Sales-6	EEM	1,546	RI	15	11,656	22	208	127	0	5,096	4.30
Sub-Total:	RI	8,181			38,169	98	696	711	0	21,269	3.60
	ROF	0			0	0	0	0	0	0	0.00
	VSD to Existing	0			0	0	0	0	0	0	0.00
	VSD & EEM	0			0	0	0	0	0	0	0.00
Total		8,181			38,169	98	696	711	0	21,269	3.60

Table 2.11. Food Service Motor EROs

Existing Motor Operating Parameters

ID	Equipment Description	Number of Units	Motor Size (hp)	Motor Eff. (%)	Time until Failure (Years)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Food Service-1	AHU	2	0.25	65.0%	1	2,955	1,695	7	0
Food Service-2	AHU	2	0.33	67.0%	6	2,955	2,171	9	0
Food Service-3	AHU	16	0.5	74.0%	1	2,955	23,822	94	0
Food Service-4	AHU	56	0.75	73.0%	1	2,955	126,779	498	0
Food Service-5	AHU	2	1	75.4%	2	2,955	5,845	23	0
Food Service-6	AHU	2	2	77.8%	5	2,955	11,329	44	0
Food Service-7A	AHU	3	3	80.8%	1	2,955	24,544	96	0
Food Service-7B	AHU	5	3	80.8%	1	2,955	40,907	161	0
Food Service-8A	AHU	1	5	81.8%	1	2,955	13,469	53	0
Food Service-8B	AHU	2	5	81.8%	1	2,955	26,938	106	0
Food Service-9	AHU	1	10	83.9%	1	2,955	26,264	103	0
Food Service-10	AHU	1	15	86.1%	1	2,955	38,389	151	0
Food Service-11	AHU	1	50	88.6%	2	2,955	124,353	488	0
Food Service-12	Air Comp.	1	5	81.8%	1	2,955	13,469	53	0
Food Service-13	Air Comp.	1	7.5	83.1%	1	2,955	19,888	78	0
Food Service-14	Air Comp.	1	30	87.5%	1	2,955	75,550	297	0
Food Service-15	CTwr Fan	1	15	86.1%	2	2,955	38,389	151	0
Food Service-16	CWtr Pump	1	20	86.2%	2	2,955	51,126	201	0
Food Service-17	Cond. Fan	4	2	77.8%	1	2,955	22,659	89	0
Food Service-18	Cond. Fan	2	3	80.8%	1	2,955	16,363	64	0
Food Service-19	Cond. Fan	1	5	81.8%	1	2,955	13,469	53	0
Food Service-20	Cond. Fan	1	7.5	83.1%	1	2,955	19,888	78	0
Food Service-21	Cond. Pump	1	15	86.1%	2	2,955	38,389	151	0
Food Service-22	HW Circ.	1	5	81.8%	1	2,955	13,469	53	0
Food Service-23	Refrig.	1	0.5	74.0%	1	6,000	3,023	6	0
Food Service-24	Refrig.	4	2	77.8%	1	6,000	46,007	89	0
Food Service-25	Refrig.	2	3	80.8%	1	6,000	33,224	64	0

Table 2.11. (contd)

Energy-Efficient Motor Operating Parameters

ID	Description of Replacement	Number of Units	Motor Size (hp)	Motor Eff. (%)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Food Service-1	EEM	2	0.25	77.0%	2,955	1,431	6	0
Food Service-2	EEM	2	0.33	78.0%	2,955	1,865	7	0
Food Service-3	EEM	16	0.5	81.0%	2,955	21,763	85	0
Food Service-4	EEM	56	0.75	82.0%	2,955	112,864	443	0
Food Service-5	EEM	2	1	86.0%	2,955	5,125	20	0
Food Service-6	EEM	2	2	86.3%	2,955	10,213	40	0
Food Service-7A	EEM	3	3	90.2%	2,955	21,987	86	0
Food Service-7B	EEM	5	3	90.2%	2,955	36,644	144	0
Food Service-7B	VSD & EEM	5	3	90.2%	2,955	12,826	50	50
Food Service-7B	VSD to Existing	5	3	80.8%	2,955	14,318	56	50
Food Service-8A	EEM	1	5	90.0%	2,955	12,242	48	0
Food Service-8B	EEM	2	5	90.0%	2,955	24,484	96	0
Food Service-8B	VSD & EEM	2	5	90.0%	2,955	8,569	34	20
Food Service-8B	VSD to Existing	2	5	81.8%	2,955	9,428	37	20
Food Service-9	VSD & EEM	1	10	91.7%	2,955	8,410	33	10
Food Service-9	EEM	1	10	91.7%	2,955	24,030	94	0
Food Service-9	VSD to Existing	1	10	83.9%	2,955	9,192	36	10
Food Service-10	VSD & EEM	1	15	93.0%	2,955	12,439	49	10
Food Service-10	EEM	1	15	93.0%	2,955	35,541	140	0
Food Service-10	VSD to Existing	1	15	86.1%	2,955	13,436	53	10
Food Service-11	EEM	1	50	95.0%	2,955	115,976	455	0
Food Service-11	VSD & EEM	1	50	95.0%	2,955	40,592	159	10
Food Service-11	VSD to Existing	1	50	88.6%	2,955	43,524	171	10
Food Service-12	EEM	1	5	90.0%	2,955	12,242	48	0
Food Service-13	EEM	1	7.5	92.0%	2,955	17,964	71	0
Food Service-14	EEM	1	30	94.1%	2,955	70,251	276	0
Food Service-15	VSD & EEM	1	15	93.0%	2,955	17,771	70	10
Food Service-15	EEM	1	15	93.0%	2,955	35,541	140	0
Food Service-15	VSD to Existing	1	15	86.1%	2,955	19,195	75	10
Food Service-16	VSD & EEM	1	20	93.6%	2,955	16,479	65	10
Food Service-16	EEM	1	20	93.6%	2,955	47,084	185	0
Food Service-16	VSD to Existing	1	20	86.2%	2,955	17,894	70	10
Food Service-17	EEM	4	2	86.3%	2,955	20,427	80	0
Food Service-18	EEM	2	3	90.2%	2,955	14,658	58	0
Food Service-19	EEM	1	5	90.0%	2,955	12,242	48	0
Food Service-20	EEM	1	.7.5	92.0%	2,955	17,964	71	0
Food Service-21	EEM	1	15	93.0%	2,955	35,541	140	0
Food Service-21	VSD & EEM	1	15	93.0%	2,955	17,771	70	10
Food Service-21	VSD to Existing	1	15	86.1%	2,955	19,195	75	10
Food Service-22	EEM	1	5	90.0%	2,955	12,242	48	0
Food Service-23	EEM	1	0.5	81.0%	6,000	2,762	5	0
Food Service-24	EEM	4	2	86.3%	6,000	41,476	80	0
Food Service-25	EEM	2	3	90.2%	6,000	29,762	58	0

Table 2.11. (contd)

Energy-Efficient Motor ERO Economic Parameters

ID	Description of Replacement	PV of Installed Cost (1993 $)	RI or ROF	Motor Life (Years)	Full Implm Energy Savings (kWh)	Full Implm Demand Savings (kW-mo)	Annualized Energy Savings (1993 $)	Annualized Demand Savings (1993 $)	Annualized O&M Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio
Food Service-1	EEM	388	ROF	15	214	1	5	7	0	187	1.48
Food Service-2	EEM	329	ROF	15	243	1	4	6	0	152	1.46
Food Service-3	EEM	3,492	ROF	15	1,432	6	34	46	0	1,252	1.36
Food Service-4	EEM	12,815	ROF	15	10,534	43	252	339	0	9,231	1.72
Food Service-5	EEM	509	ROF	15	569	2	13	17	0	468	1.92
Food Service-6	EEM	636	RI	15	1,116	5	23	31	0	596	1.94
Food Service-7A	EEM	1,140	RI	15	2,558	10	51	69	0	1,769	2.55
Food Service-7B	EEM	1,900	RI	15	4,263	17	85	114	0	2,949	2.55
Food Service-8A	EEM	434	RI	15	1,227	5	24	32	0	826	2.90
Food Service-8B	EEM	868	RI	15	2,454	10	47	63	0	1,651	2.90
Food Service-9	EEM	705	RI	15	2,234	9	42	57	0	1,487	3.11
Food Service-10	EEM	954	RI	15	2,848	12	52	69	0	1,809	2.90
Food Service-11	EEM	2,246	RI	15	8,377	34	152	204	0	5,170	3.30
Food Service-12	EEM	434	RI	15	1,227	5	24	32	0	826	2.90
Food Service-13	EEM	607	RI	15	1,924	8	38	51	0	1,333	3.20
Food Service-14	EEM	1,546	RI	15	5,299	22	95	127	0	3,325	3.15
Food Service-15	VSD to Existing	3,304	ROF	15	19,747	40	501	696	(10)	15,131	5.58
Food Service-16	VSD to Existing	15,432	ROF	15	33,487	68	852	1,184	(10)	11,406	1.74
Food Service-17	EEM	1,272	RI	15	2,232	5	43	58	0	1,475	2.16
Food Service-18	EEM	760	RI	15	1,705	3	34	46	0	1,180	2.55
Food Service-19	EEM	434	RI	15	1,227	2	24	32	0	826	2.90
Food Service-20	EEM	607	RI	15	1,924	4	38	51	0	1,333	3.20
Food Service-21	VSD to Existing	3,304	ROF	15	19,747	40	501	696	(10)	15,131	5.58
Food Service-22	EEM	434	RI	15	1,227	5	24	32	0	826	2.90
Food Service-23	EEM	218	ROF	15	182	0	4	3	0	113	1.52
Food Service-24	EEM	1,272	RI	15	4,531	9	88	58	0	2,171	2.71
Food Service-25	EEM	760	RI	15	3,462	7	69	46	0	1,726	3.27
Sub-Total:	RI	17,009			49,837	172	950	1,171	0	31,276	2.84
	ROF	17,752			13,174	53	313	417	0	11,404	1.64
	VSD to Existing	22,040			72,982	148	1,854	2,576	(30)	41,668	2.89
	VSD & EEM	0			0	0	0	0	0	0	0.00
Total		56,801			135,993	373	3,117	4,164	(30)	84,348	2.48

Table 2.12. Health Care Motor EROs

Existing Motor Operating Parameters

ID	Equipment Description	Number of Units	Motor Size (hp)	Motor Eff. (%)	Time until Failure (Years)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Health Care-1	AHU	1	0.75	73.0%	1	6,000	4,597	9	0
Health Care-2	AHU	2	2	77.8%	1	6,000	23,004	44	0
Health Care-3	AHU	2	3	80.8%	1	6,000	33,224	64	0
Health Care-4	AHU	1	7.5	83.1%	1	6,000	40,381	78	0
Health Care-5	AHU	2	10	83.9%	5	6,000	106,656	206	0
Health Care-6	AHU	1	20	86.2%	2	6,000	103,810	201	0
Health Care-7	CTwr Fan	1	7.5	83.1%	2	6,000	40,381	78	0
Health Care-8	CWtr Pump	1	10	83.9%	2	6,000	53,328	103	0
Health Care-9	Cond. Fan	2	0.75	73.0%	1	6,000	9,194	18	0
Health Care-10	Cond. Fan	1	1	75.4%	1	6,000	5,934	11	0
Health Care-11	Cond. Fan	1	3	80.8%	1	6,000	16,612	32	0
Health Care-12	Cond. Pump	1	7.5	83.1%	2	6,000	40,381	78	0
Health Care-13	Vac. Sys	1	7.5	83.1%	14	6,000	40,381	78	0

Table 2.12. (contd)

Energy-Efficient Motor Operating Parameters

ID	Description of Replacement	Number of Units	Motor Size (hp)	Motor Eff. (%)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Health Care-1	EEM	1	0.75	82.0%	6,000	4,092	8	0
Health Care-2	VSD & EEM	2	2	86.3%	6,000	7,258	14	20
Health Care-2	EEM	2	2	86.3%	6,000	20,738	40	0
Health Care-2	VSD to Existing	2	2	77.8%	6,000	8,051	16	20
Health Care-3	VSD & EEM	2	3	90.2%	6,000	10,417	20	20
Health Care-3	EEM	2	3	90.2%	6,000	29,762	58	0
Health Care-3	VSD to Existing	2	3	80.8%	6,000	11,628	22	20
Health Care-4	VSD & EEM	1	7.5	92.0%	6,000	12,766	25	10
Health Care-4	EEM	1	7.5	92.0%	6,000	36,474	71	0
Health Care-4	VSD to Existing	1	7.5	83.1%	6,000	14,133	27	10
Health Care-5	VSD & EEM	2	10	91.7%	6,000	34,154	66	20
Health Care-5	EEM	2	10	91.7%	6,000	97,583	189	0
Health Care-5	VSD to Existing	2	10	83.9%	6,000	37,329	72	20
Health Care-6	VSD & EEM	1	20	93.6%	6,000	33,461	65	10
Health Care-6	EEM	1	20	93.6%	6,000	95,603	185	0
Health Care-6	VSD to Existing	1	20	86.2%	6,000	36,333	70	10
Health Care-7	VSD & EEM	1	7.5	92.0%	6,000	18,237	35	10
Health Care-7	EEM	1	7.5	92.0%	6,000	36,474	71	0
Health Care-7	VSD to Existing	1	7.5	83.1%	6,000	20,190	39	10
Health Care-8	EEM	1	10	91.7%	6,000	48,792	94	0
Health Care-8	VSD & EEM	1	10	91.7%	6,000	17,077	33	10
Health Care-8	VSD to Existing	1	10	83.9%	6,000	18,665	36	10
Health Care-9	EEM	2	0.75	82.0%	6,000	8,185	16	0
Health Care-10	EEM	1	1	86.0%	6,000	5,203	10	0
Health Care-11	EEM	1	3	90.2%	6,000	14,881	29	0
Health Care-12	VSD & EEM	1	7.5	92.0%	6,000	18,237	35	10
Health Care-12	EEM	1	7.5	92.0%	6,000	36,474	71	0
Health Care-12	VSD to Existing	1	7.5	83.1%	6,000	20,190	39	10
Health Care-13	EEM	1	7.5	92.0%	6,000	36,474	71	0

Table 2.12. (contd)

Energy-Efficient Motor ERO Economic Parameters

ID	Description of Replacement	PV of Installed Cost (1993 $)	RI or ROF	Motor Life (Years)	Full Implm Energy Savings (kWh)	Full Implm Demand Savings (kW-mo)	Annualized Energy Savings (1993 $)	Annualized Demand Savings (1993 $)	Annualized O&M Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio
Health Care-1	EEM	229	ROF	15	382	1	9	6	0	237	2.04
Health Care-2	EEM	636	RI	15	2,266	5	44	29	0	1,085	2.71
Health Care-3	EEM	760	RI	15	3,462	7	69	46	0	1,726	3.27
Health Care-4	EEM	607	RI	15	3,906	8	77	51	0	1,942	4.20
Health Care-5	EEM	1,410	RI	15	9,072	18	185	123	0	4,254	4.02
Health Care-6	EEM	1,116	RI	15	8,207	16	156	103	0	3,865	4.46
Health Care-7	VSD to Existing	2,141	ROF	15	21,195	42	537	367	(10)	11,731	6.48
Health Care-8	VSD to Existing	8,716	ROF	15	35,009	70	890	609	(10)	11,935	2.37
Health Care-9	EEM	458	ROF	15	764	2	18	12	0	475	2.04
Health Care-10	EEM	275	RI	15	731	1	15	10	0	365	2.33
Health Care-11	EEM	380	RI	15	1,731	3	34	23	0	863	3.27
Health Care-12	VSD to Existing	2,141	ROF	15	21,195	42	537	367	(10)	11,731	6.48
Health Care-13	EEM	607	RI	15	3,906	8	91	61	0	1,802	3.97
Sub-Total:	RI	5,791			33,283	67	672	446	0	15,903	3.75
	ROF	687			1,146	2	27	18	0	712	2.04
	VSD to Existing	12,998			77,398	155	1,964	1,343	(30)	35,397	3.72
	VSD & EEM	0			0	0	0	0	0	0	0.00
Total		19,476			111,827	224	2,663	1,807	(30)	52,013	3.67

Table 2.13. Lodging Motor EROs

Existing Motor Operating Parameters

ID	Equipment Description	Number of Units	Motor Size (hp)	Motor Eff. (%)	Time until Failure (Years)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Lodging-1	AHU	1	0.33	67.0%	1	2,500	918	4	0
Lodging-2	AHU	212	0.5	74.0%	1	2,500	267,041	1,239	0
Lodging-3	AHU	8	0.75	73.0%	1	2,500	15,323	71	0
Lodging-4A	AHU	4	1	75.4%	1	2,500	9,890	46	0
Lodging-4B	AHU	5	1	75.4%	1	2,500	12,362	57	0
Lodging-5	AHU	1	2	77.8%	1	2,500	4,792	22	0
Lodging-6A	AHU	5	3	80.8%	2	2,500	34,609	161	0
Lodging-6B	AHU	8	3	80.8%	2	2,500	55,374	257	0
Lodging-7	AHU	2	5	81.8%	1	2,500	22,790	106	0
Lodging-8	AHU	1	7.5	83.1%	1	2,500	16,825	78	0
Lodging-9	Air Comp.	7	5	81.8%	1	2,500	79,766	370	0
Lodging-10	CWtr Pump	1	7.5	83.1%	1	2,500	16,825	78	0
Lodging-11	Cond. Fan	2	0.25	65.0%	1	2,500	1,434	7	0
Lodging-12	Cond. Fan	2	0.33	67.0%	1	2,500	1,836	9	0
Lodging-13	Cond. Fan	7	0.5	74.0%	1	2,500	8,817	41	0
Lodging-14	Cond. Fan	1	1	75.4%	1	2,500	2,472	11	0
Lodging-15	Cond. Fan	12	2	77.8%	1	2,500	57,509	267	0
Lodging-16	Cond. Fan	2	3	80.8%	1	2,500	13,843	64	0

Table 2.13. (contd)

Energy-Efficient Motor Operating Parameters

ID	Description of Replacement	Number of Units	Motor Size (hp)	Motor Eff. (%)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Lodging-1	EEM	1	0.33	78.0%	2,500	789	4	0
Lodging-2	EEM	212	0.5	81.0%	2,500	243,964	1,132	0
Lodging-3	EEM	8	0.75	82.0%	2,500	13,641	63	0
Lodging-4A	EEM	4	1	86.0%	2,500	8,671	40	0
Lodging-4B	VSD & EEM	5	1	86.0%	2,500	3,794	18	50
Lodging-4B	EEM	5	1	86.0%	2,500	10,839	50	0
Lodging-4B	VSD to Existing	5	1	75.4%	2,500	4,327	20	50
Lodging-5	VSD & EEM	1	2	86.3%	2,500	1,512	7	10
Lodging-5	EEM	1	2	86.3%	2,500	4,320	20	0
Lodging-5	VSD to Existing	1	2	77.8%	2,500	1,677	8	10
Lodging-6A	EEM	5	3	90.2%	2,500	31,002	144	0
Lodging-6B	EEM	8	3	90.2%	2,500	49,603	230	0
Lodging-6B	VSD & EEM	8	3	90.2%	2,500	17,361	81	80
Lodging-6B	VSD to Existing	8	3	80.8%	2,500	19,381	90	80
Lodging-7	EEM	2	5	90.0%	2,500	20,714	96	0
Lodging-7	VSD & EEM	2	5	90.0%	2,500	7,250	34	20
Lodging-7	VSD to Existing	2	5	81.8%	2,500	7,977	37	20
Lodging-8	EEM	1	7.5	92.0%	2,500	15,198	71	0
Lodging-8	VSD & EEM	1	7.5	92.0%	2,500	5,319	25	10
Lodging-8	VSD to Existing	1	7.5	83.1%	2,500	5,889	27	10
Lodging-9	EEM	7	5	90.0%	2,500	72,499	336	0
Lodging-10	EEM	1	7.5	92.0%	2,500	15,198	71	0
Lodging-10	VSD & EEM	1	7.5	92.0%	2,500	5,319	25	10
Lodging-10	VSD to Existing	1	7.5	83.1%	2,500	5,889	27	10
Lodging-11	EEM	2	0.25	77.0%	2,500	1,211	6	0
Lodging-12	EEM	2	0.33	78.0%	2,500	1,577	7	0
Lodging-13	EEM	7	0.5	81.0%	2,500	8,055	37	0
Lodging-14	EEM	1	1	86.0%	2,500	2,168	10	0
Lodging-15	EEM	12	2	86.3%	2,500	51,845	241	0
Lodging-16	EEM	2	3	90.2%	2,500	12,401	58	0

Table 2.13. (contd

Energy-Efficient Motor ERO Economic Parameters

ID	Description of Replacement	PV of Installed Cost (1993 $)	RI or ROF	Motor Life (Years)	Full Implm Energy Savings (kWh)	Full Implm Demand Savings (kW-mo)	Annualized Energy Savings (1993 $)	Annualized Demand Savings (1993 $)	Annualized O&M Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio
Lodging-1	EEM	200	ROF	15	103	0	2	4	0	100	1.50
Lodging-2	EEM	46,273	ROF	15	16,050	58	384	608	0	15,503	1.34
Lodging-3	EEM	1,831	ROF	15	1,273	5	30	48	0	1,232	1.67
Lodging-4A	EEM	1,058	ROF	15	963	3	23	37	0	933	1.88
Lodging-4B	EEM	1,322	ROF	15	1,204	4	29	46	0	1,167	1.88
Lodging-5	EEM	318	RI	15	472	2	9	15	0	343	2.08
Lodging-6A	EEM	1,900	RI	15	3,607	13	73	116	0	2,638	2.39
Lodging-6B	EEM	3,040	RI	15	5,771	21	117	186	0	4,220	2.39
Lodging-7	EEM	868	RI	15	2,076	7	40	63	0	1,538	2.77
Lodging-8	EEM	607	RI	15	1,628	6	32	51	0	1,242	3.05
Lodging-9	EEM	3,038	RI	15	7,268	35	140	222	0	5,382	2.77
Lodging-10	VSD to Existing	6,559	ROF	15	11,111	27	283	464	(10)	3,112	1.47
Lodging-11	EEM	388	ROF	15	181	0	4	7	0	175	1.45
Lodging-12	EEM	400	ROF	15	206	0	5	8	0	199	1.50
Lodging-13	EEM	1,528	ROF	15	530	1	13	20	0	512	1.34
Lodging-14	EEM	264	ROF	15	241	1	6	9	0	233	1.88
Lodging-15	EEM	3,816	RI	15	5,664	14	110	175	0	4,112	2.08
Lodging-16	EEM	760	RI	15	1,443	3	29	46	0	1,098	2.44
Sub-Total:	RI	14,347			27,928	101	549	874	0	20,572	2.43
	ROF	53,264			20,751	73	496	787	0	20,054	1.38
	VSD to Existing	6,559			11,111	27	283	464	(10)	3,112	1.47
	VSD & EEM	0			0	0	0	0	0	0	0.00
Total		74,170			59,790	201	1,328	2,125	(10)	43,738	1.59

Table 2.14. Office Motor EROs

Existing Motor Operating Parameters

ID	Equipment Description	Number of Units	Motor Size (hp)	Motor Eff. (%)	Time until Failure (Years)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Office-1	AHU	79	0.25	65.0%	1	3,230	73,185	263	0
Office-2	AHU	1	0.33	67.0%	1	3,230	1,186	4	0
Office-3	AHU	48	0.5	74.0%	2	3,230	78,117	281	0
Office-4	AHU	4	0.75	73.0%	3	3,230	9,898	36	0
Office-5A	AHU	4	1	75.4%	2	3,230	12,778	46	0
Office-5B	AHU	5	1	75.4%	2	3,230	15,972	57	0
Office-6A	AHU	14	2	77.8%	2	3,230	86,685	311	0
Office-6B	AHU	22	2	77.8%	2	3,230	136,220	489	0
Office-7A	AHU	10	3	80.8%	2	3,230	89,429	321	0
Office-7B	AHU	16	3	80.8%	2	3,230	143,086	514	0
Office-8A	AHU	11	5	81.8%	2	3,230	161,948	582	0
Office-8B	AHU	16	5	81.8%	2	3,230	235,561	846	0
Office-9A	AHU	4	7.5	83.1%	3	3,230	86,953	312	0
Office-9B	AHU	5	7.5	83.1%	3	3,230	108,692	390	0
Office-10A	AHU	3	10	83.9%	1	3,230	86,124	309	0
Office-10B	AHU	4	10	83.9%	1	3,230	114,832	412	0
Office-11	AHU	2	15	86.1%	1	3,230	83,924	301	0
Office-12	AHU	1	30	87.5%	1	3,230	82,581	297	0
Office-13	Air Comp.	4	10	83.9%	1	3,230	114,832	412	0
Office-14	CTwr Fan	1	10	83.9%	1	3,230	28,708	103	0
Office-15	CWtr Pump	1	10	83.9%	1	3,230	28,708	103	0
Office-16	Cond. Fan	17	0.25	65.0%	1	3,230	15,749	57	0
Office-17	Cond. Fan	4	0.33	67.0%	1	3,230	4,745	17	0
Office-18	Cond. Fan	8	0.5	74.0%	2	3,230	13,020	47	0
Office-19	Cond. Fan	17	0.75	73.0%	3	3,230	42,068	151	0
Office-20	Cond. Fan	12	1	75.4%	1	3,230	38,333	138	0
Office-21	Cond. Fan	13	2	77.8%	2	3,230	80,493	289	0
Office-22	Cond. Fan	10	3	80.8%	2	3,230	89,429	321	0
Office-23	Cond. Fan	14	5	81.8%	2	3,230	206,116	740	0
Office-24	Cond. Fan	2	7.5	83.1%	1	3,230	43,477	156	0
Office-25	Cond. Pump	1	10	83.9%	1	3,230	28,708	103	0

Table 2.14. (contd)

Energy-Efficient Motor Operating Parameters

ID	Description of Replacement	Number of Units	Motor Size (hp)	Motor Eff. (%)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Office-1	EEM	79	0.25	77.0%	3,230	61,779	222	0
Office-2	EEM	1	0.33	78.0%	3,230	1,019	4	0
Office-3	EEM	48	0.5	81.0%	3,230	71,366	256	0
Office-4	EEM	4	0.75	82.0%	3,230	8,812	32	0
Office-5A	EEM	4	1	86.0%	3,230	11,203	40	0
Office-5B	VSD & EEM	5	1	86.0%	3,230	4,901	18	50
Office-5B	EEM	5	1	86.0%	3,230	14,004	50	0
Office-5B	VSD to Existing	5	1	75.4%	3,230	5,590	20	50
Office-6A	EEM	14	2	86.3%	3,230	78,147	281	0
Office-6B	EEM	22	2	86.3%	3,230	122,803	441	0
Office-6B	VSD & EEM	22	2	86.3%	3,230	42,981	154	220
Office-6B	VSD to Existing	22	2	77.8%	3,230	47,677	171	220
Office-7A	EEM	10	3	90.2%	3,230	80,109	288	0
Office-7B	VSD & EEM	16	3	90.2%	3,230	44,861	161	160
Office-7B	EEM	16	3	90.2%	3,230	128,174	460	0
Office-7B	VSD to Existing	16	3	80.8%	3,230	50,080	180	160
Office-8A	EEM	11	5	90.0%	3,230	147,193	529	0
Office-8B	EEM	16	5	90.0%	3,230	214,099	769	0
Office-8B	VSD & EEM	16	5	90.0%	3,230	74,935	269	160
Office-8B	VSD to Existing	16	5	81.8%	3,230	82,446	296	160
Office-9A	EEM	4	7.5	92.0%	3,230	78,542	282	0
Office-9B	VSD & EEM	5	7.5	92.0%	3,230	34,362	123	50
Office-9B	EEM	5	7.5	92.0%	3,230	98,177	353	0
Office-9B	VSD to Existing	5	7.5	83.1%	3,230	38,042	137	50
Office-10A	EEM	3	10	91.7%	3,230	78,799	283	0
Office-10B	VSD & EEM	4	10	91.7%	3,230	36,773	132	40
Office-10B	EEM	4	10	91.7%	3,230	105,065	377	0
Office-10B	VSD to Existing	4	10	83.9%	3,230	40,191	144	40
Office-11	VSD & EEM	2	15	93.0%	3,230	27,194	98	20
Office-11	EEM	2	15	93.0%	3,230	77,697	279	0
Office-11	VSD to Existing	2	15	86.1%	3,230	29,373	105	20
Office-12	VSD & EEM	1	30	94.1%	3,230	26,876	97	10
Office-12	EEM	1	30	94.1%	3,230	76,789	276	0
Office-12	VSD to Existing	1	30	87.5%	3,230	28,903	104	10
Office-13	EEM	4	10	91.7%	3,230	105,065	377	0
Office-14	EEM	1	10	91.7%	3,230	26,266	94	0
Office-14	VSD & EEM	1	10	91.7%	3,230	13,133	47	10
Office-14	VSD to Existing	1	10	83.9%	3,230	14,354	52	10
Office-15	VSD & EEM	1	10	91.7%	3,230	9,193	33	10
Office-15	EEM	1	10	91.7%	3,230	26,266	94	0
Office-15	VSD to Existing	1	10	83.9%	3,230	10,048	36	10
Office-16	EEM	17	0.25	77.0%	3,230	13,294	48	0
Office-17	EEM	4	0.33	78.0%	3,230	4,076	15	0
Office-18	EEM	8	0.5	81.0%	3,230	11,894	43	0
Office-19	EEM	17	0.75	82.0%	3,230	37,451	134	0
Office-20	EEM	12	1	86.0%	3,230	33,609	121	0
Office-21	EEM	13	2	86.3%	3,230	72,565	261	0
Office-22	EEM	10	3	90.2%	3,230	80,109	288	0
Office-23	EEM	14	5	90.0%	3,230	187,336	673	0
Office-24	EEM	2	7.5	92.0%	3,230	39,271	141	0
Office-25	EEM	1	10	91.7%	3,230	26,266	94	0
Office-25	VSD & EEM	1	10	91.7%	3,230	13,133	47	10
Office-25	VSD to Existing	1	10	83.9%	3,230	14,354	52	10

Table 2.14. (contd)

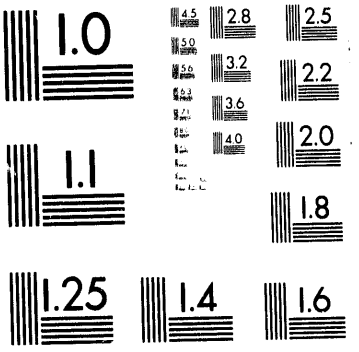
Energy-Efficient Motor ERO Economic Parameters

ID	Description of Replacement	PV of Installed Cost (1993 $)	RI or ROF	Motor Life (Years)	Full Implm Energy Savings (kWh)	Full Implm Demand Savings (kW-mo)	Annualized Energy Savings (1993 $)	Annualized Demand Savings (1993 $)	Annualized O&M Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio
Office-1	EEM	15,344	ROF	15	9,221	34	221	272	0	7,695	1.50
Office-2	EEM	200	ROF	15	133	0	3	4	0	111	1.55
Office-3	EEM	10,074	ROF	15	4,695	17	105	129	0	3,664	1.36
Office-4	EEM	846	ROF	15	822	3	17	21	0	602	1.71
Office-5A	EEM	1,017	ROF	15	1,245	5	28	34	0	974	1.96
Office-5B	EEM	1,271	ROF	15	1,556	6	35	43	0	1,217	1.96
Office-6A	EEM	4,452	RI	15	8,538	32	169	208	0	5,125	2.15
Office-6B	EEM	6,996	RI	15	13,417	50	265	326	0	8,053	2.15
Office-7A	EEM	3,800	RI	15	9,320	35	189	233	0	5,942	2.56
Office-7B	EEM	6,080	RI	15	14,911	55	302	372	0	9,507	2.56
Office-8A	EEM	4,774	RI	15	14,755	55	289	356	0	9,264	2.94
Office-8B	EEM	6,944	RI	15	21,462	80	420	518	0	13,474	2.94
Office-9A	EEM	2,428	RI	15	8,412	31	171	211	0	5,367	3.21
Office-9B	EEM	3,035	RI	15	10,515	39	214	264	0	6,709	3.21
Office-10A	EEM	2,115	RI	15	7,326	27	139	170	0	4,644	3.20
Office-10B	EEM	2,820	RI	15	9,768	36	185	227	0	6,193	3.20
Office-11	EEM	1,908	RI	15	6,227	23	113	139	0	3,767	2.97
Office-12	EEM	1,546	RI	15	5,792	22	103	127	0	3,462	3.24
Office-13	EEM	2,820	RI	15	9,768	36	185	227	0	6,193	3.20
Office-14	VSD to Existing	2,838	ROF	15	14,907	37	379	481	(10)	10,236	4.61
Office-15	VSD to Existing	8,738	ROF	15	18,847	47	480	610	(10)	5,533	1.63
Office-16	EEM	3,302	ROF	15	1,984	5	47	59	0	1,656	1.50
Office-17	EEM	800	ROF	15	532	1	13	16	0	444	1.55
Office-18	EEM	1,679	ROF	15	783	2	18	22	0	611	1.36
Office-19	EEM	3,597	ROF	15	3,495	9	73	90	0	2,558	1.71
Office-20	EEM	3,173	ROF	15	3,734	9	89	110	0	3,115	1.98
Office-21	EEM	4,134	RI	15	7,928	20	157	193	0	4,759	2.15
Office-22	EEM	3,800	RI	15	9,320	23	189	233	0	5,942	2.56
Office-23	EEM	6,076	RI	15	18,779	47	368	453	0	11,790	2.94
Office-24	EEM	1,214	RI	15	4,206	10	83	102	0	2,776	3.29
Office-25	VSD to Existing	2,838	ROF	15	14,907	37	379	481	(10)	10,236	4.61
Sub-Total	RI	64,942			180,443	621	3,539	4,359	0	112,967	2.74
	ROF	41,304			28,200	92	650	800	0	22,645	1.55
	VSD to Existing	14,415			48,660	121	1,237	1,572	(30)	26,005	2.80
	VSD & EEM	0			0	0	0	0	0	0	0.00
Total		120,660			257,302	833	5,426	6,731	(30)	161,617	2.34

Table 2.15. Other Building Motor EROs

Existing Motor Operating Parameters

ID	Equipment Description	Number of Units	Motor Size (hp)	Motor Eff. (%)	Time until Failure (Years)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Other-1	AHU	3	0.33	67.0%	5	2,050	2,259	13	0
Other-2	AHU	22	0.5	74.0%	1	2,050	22,724	129	0
Other-3	AHU	16	0.75	73.0%	2	2,050	25,129	142	0
Other-4A	AHU	2	1	75.4%	3	2,050	4,055	23	0
Other-4B	AHU	3	1	75.4%	3	2,050	6,082	34	0
Other-5A	AHU	5	2	77.8%	2	2,050	19,649	111	0
Other-5B	AHU	8	2	77.8%	2	2,050	31,438	178	0
Other-6A	AHU	4	3	80.8%	3	2,050	22,703	128	0
Other-6B	AHU	6	3	80.8%	3	2,050	34,055	193	0
Other-7A	AHU	7	5	81.8%	3	2,050	65,408	370	0
Other-7B	AHU	11	5	81.8%	3	2,050	102,784	582	0
Other-8A	AHU	1	7.5	83.1%	5	2,050	13,797	78	0
Other-8B	AHU	2	7.5	83.1%	5	2,050	27,594	156	0
Other-9	AHU	2	15	86.1%	5	2,050	53,264	301	0
Other-10	AHU	1	30	87.5%	3	2,050	52,412	297	0
Other-11	Air Comp.	1	1	75.4%	1	2,050	2,027	11	0
Other-12	Air Comp.	1	3	80.8%	5	4,000	11,075	32	0
Other-13	Air Comp.	2	10	83.9%	1	2,050	36,441	206	0
Other-14	Air Comp.	2	30	87.5%	1	2,050	104,824	593	0
Other-15	Air Comp.	1	50	88.6%	1	2,050	86,269	488	0
Other-16	Air Comp.	1	50	88.6%	1	4,000	168,330	488	0
Other-17	Air Comp.	1	150	90.7%	4	2,050	252,814	1,431	0
Other-18	CTwr Fan	1	10	83.9%	3	2,050	18,220	103	0
Other-19	CTwr Fan	2	10	83.9%	1	4,000	71,104	206	0
Other-20	CTwr Fan	3	50	88.6%	1	6,000	757,483	1,464	0
Other-21	CTwr Fan	1	60	88.6%	1	6,000	302,993	586	0
Other-22	CWtr Pump	1	10	83.9%	3	2,050	18,220	103	0
Other-23	CWtr Pump	1	40	88.3%	5	5,000	168,901	392	0
Other-24	CWtr Pump	1	60	88.6%	5	6,500	328,243	586	0
Other-25	CWtr Pump	2	125	90.3%	1	8,760	1,808,508	2,395	0
Other-26	CWtr Pump	1	300	91.6%	1	8,760	2,139,410	2,833	0
Other-27	CWtr Pump	1	350	91.3%	1	8,760	2,504,180	3,316	0
Other-28	Circ. Pump	1	3	80.8%	3	2,050	5,676	32	0
Other-29	Circ. Pump	1	15	86.1%	5	8,760	113,804	151	0
Other-30	Cond. Fan	10	0.25	65.0%	1	2,050	5,880	33	0
Other-31	Cond. Fan	9	0.33	67.0%	2	2,050	6,776	38	0
Other-32	Cond. Fan	6	0.5	74.0%	2	2,050	6,197	35	0
Other-33	Cond. Fan	10	0.75	73.0%	3	2,050	15,706	89	0
Other-34	Cond. Fan	3	1	75.4%	1	2,050	6,082	34	0
Other-35	Cond. Fan	11	2	77.8%	3	2,050	43,228	245	0
Other-36	Cond. Fan	10	3	80.8%	4	2,050	56,758	321	0
Other-37	Cond. Fan	1	5	81.8%	5	2,050	9,344	53	0
Other-38	Cond. Pump	1	10	83.9%	3	2,050	18,220	103	0
Other-39	Cond. Pump	1	15	86.1%	1	2,050	26,632	151	0
Other-40	Cond. Pump	1	30	87.5%	1	4,000	102,267	297	0
Other-41	Cond. Pump	2	125	90.3%	1	6,500	1,341,930	2,395	0
Other-42	Cond. Pump	1	200	91.1%	1	5,800	949,519	1,899	0
Other-43	HTW Pump	1	15	86.1%	5	8,760	113,804	151	0
Other-44	HTW Pump	1	100	90.0%	1	8,760	725,815	961	0
Other-45	HTW Pump	1	125	90.3%	1	8,760	904,254	1,197	0
Other-46	Makeup Pmp	1	3	80.8%	5	2,050	5,676	32	0


1.0
4.5
2.8
2.5
5.0
3.2
2.2
5.6
3.6
2.0
4.0
1.1
1.8
1.25
1.4
1.6

2 of 4

Table 2.15. (contd)

Existing Motor Operating Parameters

ID	Equipment Description	Number of Units	Motor Size (hp)	Motor Eff. (%)	Time until Failure (Years)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Other-47	Oil Pump	1	50	88.6%	1	3,000	126,247	488	0
Other-48	Pumps	1	30	87.5%	1	8,760	223,966	297	0
Other-49	Pumps	1	40	88.3%	1	8,760	295,915	392	0
Other-50	Pumps	1	50	88.6%	1	8,760	368,642	488	0
Other-51	HTW Pump	1	50	88.6%	7	8,760	368,642	488	0
Other-52	Makeup Pmp	1	20	86.2%	7	4,380	75,781	201	0
Other-53	CWtr Pump	1	300	91.6%	1	6,500	1,587,462	2,833	0
Other-54	Cond. Pump	1	75	89.8%	1	6,500	404,820	722	0
Other-55	CWtr Pump	1	30	87.5%	4	5,800	148,288	297	0
Other-56	CWtr Pump	1	50	88.6%	6	7,200	302,993	488	0
Other-57	FD Fan #4	1	60	88.6%	7	8,760	442,370	586	0
Other-58	Under Air #4	1	100	90.0%	7	8,760	725,815	961	0

Table 2.15. (contd)

Energy-Efficient Motor Operating Parameters

ID	Description of Replacement	Number of Units	Motor Size (hp)	Motor Eff. (%)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Other-1	EEM	3	0.33	78.0%	2,050	1,940	11	0
Other-2	EEM	22	0.5	81.0%	2,050	20,760	117	0
Other-3	EEM	16	0.75	82.0%	2,050	22,371	127	0
Other-4A	EEM	2	1	86.0%	2,050	3,555	20	0
Other-4B	EEM	3	1	86.0%	2,050	5,333	30	0
Other-4B	VSD & EEM	3	1	86.0%	2,050	1,866	11	30
Other-4B	VSD to Existing	3	1	75.4%	2,050	2,129	12	30
Other-5A	EEM	5	2	86.3%	2,050	17,714	100	0
Other-5B	EEM	8	2	86.3%	2,050	28,342	160	0
Other-5B	VSD & EEM	8	2	86.3%	2,050	9,920	56	80
Other-5B	VSD to Existing	8	2	77.8%	2,050	11,003	62	80
Other-6A	EEM	4	3	90.2%	2,050	20,337	115	0
Other-6B	VSD & EEM	6	3	90.2%	2,050	10,677	60	60
Other-6B	EEM	6	3	90.2%	2,050	30,506	173	0
Other-6B	VSD to Existing	6	3	80.8%	2,050	11,919	67	60
Other-7A	EEM	7	5	90.0%	2,050	59,449	336	0
Other-7B	VSD & EEM	11	5	90.0%	2,050	32,697	185	110
Other-7B	EEM	11	5	90.0%	2,050	93,420	529	0
Other-7B	VSD to Existing	11	5	81.8%	2,050	35,975	204	110
Other-8A	EEM	1	7.5	92.0%	2,050	12,462	71	0
Other-8B	VSD & EEM	2	7.5	92.0%	2,050	8,723	49	20
Other-8B	EEM	2	7.5	92.0%	2,050	24,924	141	0
Other-8B	VSD to Existing	2	7.5	83.1%	2,050	9,658	55	20
Other-9	EEM	2	15	93.0%	2,050	49,312	279	0
Other-9	VSD & EEM	2	15	93.0%	2,050	17,259	98	20
Other-9	VSD to Existing	2	15	86.1%	2,050	18,643	105	20
Other-10	VSD & EEM	1	30	94.1%	2,050	17,058	97	10
Other-10	EEM	1	30	94.1%	2,050	48,736	276	0
Other-10	VSD to Existing	1	30	87.5%	2,050	18,344	104	10
Other-11	EEM	1	1	86.0%	2,050	1,778	10	0
Other-12	EEM	1	3	90.2%	4,000	9,921	29	0
Other-13	EEM	2	10	91.7%	2,050	33,341	189	0
Other-14	EEM	2	30	94.1%	2,050	97,472	552	0
Other-15	EEM	1	50	95.0%	2,050	80,457	455	0
Other-16	EEM	1	50	95.0%	4,000	156,989	455	0
Other-17	EEM	1	150	96.2%	2,050	238,360	1,349	0
Other-18	EEM	1	10	91.7%	2,050	16,671	94	0
Other-18	VSD & EEM	1	10	91.7%	2,050	8,335	47	10
Other-18	VSD to Existing	1	10	83.9%	2,050	9,110	52	10
Other-19	VSD & EEM	2	10	91.7%	4,000	32,528	94	20
Other-19	EEM	2	10	91.7%	4,000	65,056	189	0
Other-19	VSD to Existing	2	10	83.9%	4,000	35,552	103	20
Other-20	EEM	3	50	95.0%	6,000	706,453	1,363	0
Other-20	VSD & EEM	3	50	95.0%	6,000	353,226	683	30
Other-20	VSD to Existing	3	50	88.6%	6,000	378,742	731	30
Other-21	VSD & EEM	1	60	95.0%	6,000	141,291	273	0
Other-21	EEM	1	60	95.0%	6,000	282,581	546	0
Other-21	VSD to Existing	1	60	88.6%	6,000	151,497	293	10
Other-22	VSD & EEM	1	10	91.7%	2,050	5,835	33	10
Other-22	EEM	1	10	91.7%	2,050	16,671	94	0
Other-22	VSD to Existing	1	10	83.9%	2,050	6,377	36	10

Table 2.15. (contd)

Energy-Efficient Motor Operating Parameters

ID	Description of Replacement	Number of Units	Motor Size (hp)	Motor Eff. (%)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Other-23	VSD & EEM	1	40	95.0%	5,000	54,946	127	10
Other-23	EEM	1	40	95.0%	5,000	156,989	364	0
Other-23	VSD to Existing	1	40	88.3%	5,000	59,116	137	10
Other-24	VSD & EEM	1	60	95.0%	6,500	107,145	191	10
Other-24	EEM	1	60	95.0%	6,500	306,129	546	0
Other-24	VSD to Existing	1	60	88.6%	6,500	114,885	205	10
Other-25	EEM	2	125	95.6%	8,760	1,708,246	2,262	0
Other-25	VSD & EEM	2	125	95.6%	8,760	597,886	792	20
Other-25	VSD to Existing	2	125	90.3%	8,760	632,978	838	20
Other-26	EEM	1	300	96.2%	8,760	2,037,110	2,698	0
Other-26	VSD & EEM	1	300	96.2%	8,760	712,988	944	10
Other-26	VSD to Existing	1	300	91.6%	8,760	748,794	992	10
Other-27	EEM	1	350	96.2%	8,760	2,376,628	3,147	0
Other-27	VSD & EEM	1	350	96.2%	8,760	831,820	1,101	10
Other-27	VSD to Existing	1	350	91.3%	8,760	876,463	1,161	10
Other-28	EEM	1	3	90.2%	2,050	5,084	29	0
Other-29	EEM	1	15	93.0%	8,760	105,360	140	0
Other-30	EEM	10	0.25	77.0%	2,050	4,963	28	0
Other-31	EEM	9	0.33	78.0%	2,050	5,821	33	0
Other-32	EEM	6	0.5	81.0%	2,050	5,662	32	0
Other-33	EEM	10	0.75	82.0%	2,050	13,982	79	0
Other-34	EEM	3	1	86.0%	2,050	5,333	30	0
Other-35	EEM	11	2	86.3%	2,050	38,970	221	0
Other-36	EEM	10	3	90.2%	2,050	50,843	288	0
Other-37	EEM	1	5	90.0%	2,050	8,493	48	0
Other-38	EEM	1	10	91.7%	2,050	16,671	94	0
Other-38	VSD & EEM	1	10	91.7%	2,050	8,235	47	10
Other-38	VSD to Existing	1	10	83.9%	2,050	9,110	52	10
Other-39	EEM	1	15	93.0%	2,050	24,656	140	0
Other-39	VSD & EEM	1	15	93.0%	2,050	12,328	70	10
Other-39	VSD to Existing	1	15	86.1%	2,050	13,316	75	10
Other-40	VSD & EEM	1	30	94.1%	4,000	47,547	138	10
Other-40	EEM	1	30	94.1%	4,000	95,095	276	0
Other-40	VSD to Existing	1	30	87.5%	4,000	51,134	148	10
Other-41	EEM	2	125	95.6%	6,500	1,267,534	2,262	0
Other-41	VSD & EEM	2	125	95.6%	6,500	633,767	1,131	20
Other-41	VSD to Existing	2	125	90.3%	6,500	670,965	1,197	20
Other-42	EEM	1	200	96.5%	5,800	896,385	1,793	0
Other-42	VSD & EEM	1	200	96.5%	5,800	448,193	896	10
Other-42	VSD to Existing	1	200	91.1%	5,800	474,760	950	10
Other-43	EEM	1	15	93.0%	8,760	105,360	140	0
Other-44	EEM	1	100	95.4%	8,760	684,731	907	0
Other-45	EEM	1	125	95.6%	8,760	854,123	1,131	0
Other-46	EEM	1	3	90.2%	2,050	5,084	29	0
Other-47	EEM	1	50	95.0%	3,000	117,742	455	0
Other-48	VSD & EEM	1	30	94.1%	8,760	104,129	138	10
Other-48	EEM	1	30	94.1%	8,760	208,257	276	0
Other-48	VSD to Existing	1	30	87.5%	8,760	111,983	148	10
Other-49	EEM	1	40	95.0%	8,760	275,046	364	0
Other-49	VSD & EEM	1	40	95.0%	8,760	137,523	182	10
Other-49	VSD to Existing	1	40	88.3%	8,760	147,958	196	10

Table 2.15. (contd)

Energy-Efficient Motor Operating Parameters

ID	Description of Replacement	Number of Units	Motor Size (hp)	Motor Eff. (%)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Other-50	EEM	1	50	95.0%	8,760	343,807	455	0
Other-50	VSD & EEM	1	50	95.0%	8,760	171,903	228	10
Other-50	VSD to Existing	1	50	88.6%	8,760	184,321	244	10
Other-51	EEM	1	50	95.0%	8,760	343,807	455	0
Other-52	EEM	1	20	93.6%	4,380	69,790	185	0
Other-53	EEM	1	300	96.2%	6,500	1,511,554	2,698	0
Other-53	VSD & EEM	1	300	96.2%	6,500	529,044	944	10
Other-53	VSD to Existing	1	300	91.6%	6,500	555,612	992	10
Other-54	VSD & EEM	1	75	95.4%	6,500	190,529	340	10
Other-54	EEM	1	75	95.4%	6,500	381,057	680	0
Other-54	VSD to Existing	1	75	89.8%	6,500	202,410	361	10
Other-55	EEM	1	30	94.1%	5,800	137,887	276	0
Other-56	EEM	1	50	95.0%	7,200	282,581	455	0
Other-57	EEM	1	60	95.0%	8,760	412,568	546	0
Other-58	EEM	1	100	95.4%	8,760	684,731	907	0

Table 2.15. (contd)

Energy-Efficient Motor ERO Economic Parameters

ID	Description of Replacement	PV of Installed Cost (1993 $)	RI or ROF	Motor Life (Years)	Full Implm Energy Savings (kWh)	Full Implm Demand Savings (kW-mo)	Annualized Energy Savings (1993 $)	Annualized Demand Savings (1993 $)	Annualized O&M Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio
Other-1	EEM	513	ROF	15	253	1	5	9	0	213	1.42
Other-2	EEM	4,802	ROF	15	1,366	8	33	63	0	1,497	1.31
Other-3	EEM	3,521	ROF	15	2,088	12	47	91	0	2,150	1.61
Other-4A	EEM	489	ROF	15	395	2	8	16	0	381	1.78
Other-4B	EEM	733	ROF	15	593	3	12	24	0	572	1.78
Other-5A	EEM	1,590	RI	15	1,935	11	38	74	0	1,487	1.93
Other-5B	EEM	2,544	RI	15	3,096	18	61	119	0	2,378	1.93
Other-6A	EEM	1,520	RI	15	2,366	14	49	95	0	1,861	2.22
Other-6B	EEM	2,280	RI	15	3,549	21	73	142	0	2,791	2.22
Other-7A	EEM	3,038	RI	15	5,959	35	119	231	0	4,707	2.55
Other-7B	EEM	4,774	RI	15	9,365	55	187	363	0	7,396	2.55
Other-8A	EEM	607	RI	15	1,335	8	28	55	0	1,046	2.72
Other-8B	EEM	1,214	RI	15	2,669	16	56	109	0	2,093	2.72
Other-9	EEM	1,908	RI	15	3,952	23	78	152	0	2,839	2.49
Other-10	EEM	1,546	RI	15	3,676	22	69	134	0	2,780	2.80
Other-11	EEM	264	ROF	15	198	1	5	9	0	217	1.82
Other-12	EEM	380	RI	15	1,154	3	24	24	0	611	2.61
Other-13	EEM	1,410	RI	15	3,100	18	59	114	0	2,569	2.82
Other-14	EEM	3,092	RI	15	7,352	43	131	254	0	5,745	2.86
Other-15	EEM	2,246	RI	15	5,812	34	102	198	0	4,499	3.00
Other-16	EEM	2,246	RI	15	11,340	34	200	198	0	6,021	3.68
Other-17	EEM	7,286	RI	15	14,454	85	261	505	0	9,576	2.31
Other-18	VSD to Existing	2,795	ROF	15	9,461	28	239	479	(10)	8,010	3.87
Other-19	VSD to Existing	5,280	ROF	15	36,920	55	938	962	(20)	23,850	5.52
Other-20	VSD to Existing	26,643	ROF	15	387,535	517	9,854	6,741	(30)	230,413	9.65
Other-21	VSD to Existing	8,881	ROF	15	155,014	207	3,942	2,696	(10)	94,088	11.59
Other-22	VSD to Existing	8,695	ROF	15	11,961	35	304	609	(10)	2,762	1.32
Other-23	VSD to Existing	30,919	ROF	15	110,214	132	2,803	2,303	(10)	38,340	2.24
Other-24	VSD to Existing	44,520	ROF	15	213,851	329	5,442	3,439	(10)	78,564	2.76
Other-25	VSD to Existing	185,427	ROF	15	1,171,435	1,605	29,833	13,991	(20)	437,587	3.36
Other-26	VSD to Existing	219,938	ROF	15	1,380,708	1,891	35,171	16,496	(10)	516,880	3.35
Other-27	VSD to Existing	260,086	ROF	15	1,618,680	2,217	41,229	19,336	(10)	602,690	3.32
Other-28	EEM	380	RI	15	591	3	12	24	0	465	2.22
Other-29	EEM	954	RI	15	8,443	12	168	76	0	3,424	4.59
Other-30	EEM	1,942	ROF	15	741	2	18	34	0	815	1.42
Other-31	EEM	1,731	ROF	15	759	2	17	33	0	783	1.45
Other-32	EEM	1,259	ROF	15	372	1	8	16	0	383	1.30
Other-33	EEM	2,116	ROF	15	1,305	4	27	53	0	1,258	1.59
Other-34	EEM	793	ROF	15	593	2	14	28	0	651	1.82
Other-35	EEM	3,498	RI	15	4,258	12	86	166	0	3,063	1.88
Other-36	EEM	3,800	RI	15	5,915	17	124	240	0	4,447	2.17
Other-37	EEM	434	RI	15	851	2	18	34	0	635	2.46
Other-38	VSD to Existing	2,795	ROF	15	9,461	28	239	479	(10)	8,010	3.87
Other-39	VSD to Existing	3,333	ROF	15	13,699	40	348	697	(10)	12,775	4.83
Other-40	VSD to Existing	5,549	ROF	15	52,435	79	1,333	1,368	(10)	36,323	7.55
Other-41	VSD to Existing	35,627	ROF	15	679,085	940	17,278	10,914	(20)	403,860	12.34
Other-42	VSD to Existing	28,041	ROF	15	480,929	663	12,236	8,662	(10)	299,239	11.67
Other-43	EEM	954	RI	15	8,443	12	168	76	0	3,424	4.59
Other-44	EEM	4,252	RI	15	41,084	56	669	302	0	14,788	4.48
Other-45	EEM	5,125	RI	15	50,131	69	808	364	0	17,863	4.49
Other-46	EEM	380	RI	15	591	3	13	24	0	425	2.12
Other-47	EEM	2,246	RI	15	8,505	23	150	198	0	5,241	3.33
Other-48	VSD to Existing	5,549	ROF	15	114,832	157	2,919	1,368	(10)	61,105	12.01
Other-49	VSD to Existing	7,241	ROF	15	151,839	208	3,860	1,809	(10)	80,809	12.16
Other-50	VSD to Existing	8,881	ROF	15	188,600	258	4,796	2,247	(10)	100,408	12.31

Table 2.15. (contd)

Energy-Efficient Motor ERO Economic Parameters

ID	Description of Replacement	PV of Installed Cost (1993 $)	RI or ROF	Motor Life (Years)	Full Implm Energy Savings (kWh)	Full Implm Demand Savings (kW-mo)	Annualized Energy Savings (1993 $)	Annualized Demand Savings (1993 $)	Annualized O&M Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio
Other-51	EEM	2,246	RI	15	24,835	34	503	229	0	10,213	5.55
Other-52	EEM	1,116	RI	15	5,991	16	125	114	0	3,133	3.81
Other-53	VSD & EEM	224,451	RI	15	1,058,418	1,466	39,608	24,417	(10)	788,483	4.51
Other-54	VSD & EEM	13,657	RI	15	214,292	297	10,097	6,224	(10)	244,186	18.88
Other-55	EEM	1,546	RI	15	10,401	14	200	137	0	4,752	4.07
Other-56	EEM	2,246	RI	15	20,412	28	405	224	0	8,771	4.91
Other-57	EEM	2,246	RI	15	29,802	41	603	274	1	12,514	6.57
Other-58	EEM	4,252	RI	15	41,084	56	795	361	5	15,838	4.72
Sub-Total:	RI	73,356			342,453	839	6,379	5,609	6	167,395	3.28
	ROF	18,164			8,662	40	194	377	0	8,919	1.49
	VSD to Existing	890,200			6,786,660	9,390	172,765	94,597	(230)	3,035,712	4.41
	VSD & EEM	238,108			1,272,710	1,762	49,705	30,641	(20)	1,032,669	5.34
Total		1,219,827			8,410,485	12,031	229,044	131,223	(244)	4,244,695	4.48

Table 2.16. Public Order Motor EROs

Existing Motor Operating Parameters

ID	Equipment Description	Number of Units	Motor Size (hp)	Motor Eff. (%)	Time until Failure (Years)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Public Order-1	AHU	2	2	77.8%	1	3,470	13,304	44	0
Public Order-2	AHU	1	3	80.8%	5	3,470	9,607	32	0
Public Order-3	AHU	1	5	81.8%	10	3,470	15,816	53	0
Public Order-4	AHU	1	7.5	83.1%	10	3,470	23,354	78	0
Public Order-5	Cond. Fan	2	0.75	73.0%	1	3,470	5,317	18	0
Public Order-6	Cond. Fan	1	2	77.8%	5	3,470	6,652	22	0
Public Order-7	Cond. Fan	1	3	80.8%	10	3,470	9,607	32	0
Public Order-8	Cond. Fan	1	5	81.8%	10	3,470	15,816	53	0

Energy-Efficient Motor Operating Parameters

ID	Description of Replacement	Number of Units	Motor Size (hp)	Motor Eff. (%)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Public Order-1	VSD & EEM	2	2	86.3%	3,470	4,198	14	20
Public Order-1	EEM	2	2	86.3%	3,470	11,993	40	0
Public Order-1	VSD to Existing	2	2	77.8%	3,470	4,656	16	20
Public Order-2	VSD & EEM	1	3	90.2%	3,470	3,012	10	10
Public Order-2	EEM	1	3	90.2%	3,470	8,606	29	0
Public Order-2	VSD to Existing	1	3	80.8%	3,470	3,363	11	10
Public Order-3	EEM	1	5	90.0%	3,470	14,375	48	0
Public Order-3	VSD & EEM	1	5	90.0%	3,470	5,031	17	10
Public Order-3	VSD to Existing	1	5	81.8%	3,470	5,536	19	10
Public Order-4	EEM	1	7.5	92.0%	3,470	21,094	71	0
Public Order-4	VSD & EEM	1	7.5	92.0%	3,470	7,383	25	10
Public Order-4	VSD to Existing	1	7.5	83.1%	3,470	8,174	27	10
Public Order-5	EEM	2	0.75	82.0%	3,470	4,733	16	0
Public Order-6	EEM	1	2	86.3%	3,470	5,997	20	0
Public Order-7	EEM	1	3	90.2%	3,470	8,606	29	0
Public Order-8	EEM	1	5	90.0%	3,470	14,375	48	0

Table 2.16. (contd)

Energy-Efficient Motor ERO Economic Parameters

ID	Description of Replacement	PV of Installed Cost (1993 $)	RI or ROF	Motor Life (Years)	Full Implm Energy Savings (kWh)	Full Implm Demand Savings (kW-mo)	Annualized Energy Savings (1993 $)	Annualized Demand Savings (1993 $)	Annualized O&M Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio
Public Order-1	EEM	636	RI	15	1,310	5	25	29	0	796	2.25
Public Order-2	EEM	380	RI	15	1,001	3	21	24	0	561	2.48
Public Order-3	EEM	434	RI	15	1,441	5	32	37	0	757	2.75
Public Order-4	EEM	607	RI	15	2,259	8	51	58	0	1,259	3.07
Public Order-5	EEM	458	ROF	15	442	1	11	12	0	354	1.77
Public Order-6	EEM	318	RI	15	655	1	14	16	0	330	2.04
Public Order-7	EEM	380	RI	15	1,001	2	23	26	0	482	2.27
Public Order-8	EEM	434	RI	15	1,441	2	32	37	0	757	2.75
Sub-Total:	RI	3,189			9,109	26	197	227	0	4,943	2.55
	ROF	458			442	1	11	12	0	354	1.77
	VSD to Existing	0			0	0	0	0	0	0	0.00
	VSD & EEM	0			0	0	0	0	0	0	0.00
Total		3,647			9,551	27	208	239	0	5,297	2.45

Table 2.17. Service Motor EROs

Existing Motor Operating Parameters

ID	Equipment Description	Number of Units	Motor Size (hp)	Motor Eff. (%)	Time until Failure (Years)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Service-1	AHU	1	0.5	74.0%	1	1,720	867	6	0
Service-2	AHU	2	0.75	73.0%	2	1,720	2,635	18	0
Service-3A	AHU	1	1	75.4%	2	1,720	1,701	11	0
Service-3B	AHU	2	1	75.4%	2	1,720	3,402	23	0
Service-4A	AHU	2	2	77.8%	1	1,720	6,594	44	0
Service-4B	AHU	2	2	77.8%	1	1,720	6,594	44	0
Service-5A	AHU	1	3	80.8%	1	1,720	4,762	32	0
Service-5B	AHU	2	3	80.8%	1	1,720	9,524	64	0
Service-6	AHU	1	5	81.8%	1	1,720	7,840	53	0
Service-7	AHU	1	50	88.6%	1	1,720	72,382	488	0
Service-8	Air Comp.	1	200	91.1%	1	1,720	281,582	1,899	0
Service-9	CTwr Fan	1	20	86.2%	1	1,720	29,759	201	0
Service-10	CWtr Pump	2	7.5	83.1%	1	1,720	23,152	156	0
Service-11	Cond. Fan	1	0.5	74.0%	1	1,720	867	6	0
Service-12	Cond. Fan	3	0.75	73.0%	1	1,720	3,953	27	0
Service-13	Cond. Fan	3	2	77.8%	1	1,720	9,892	67	0
Service-14	Cond. Fan	1	3	80.8%	1	1,720	4,762	32	0
Service-15	Cond. Pump	1	20	86.2%	1	1,720	29,759	201	0
Service-16	HTW Pump	2	3	80.8%	1	1,720	9,524	64	0

Table 2.17. (contd)

Energy-Efficient Motor Operating Parameters

ID	Description of Replacement	Number of Units	Motor Size (hp)	Motor Eff. (%)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Service-1	EEM	1	0.5	81.0%	1,720	792	5	0
Service-2	EEM	2	0.75	82.0%	1,720	2,346	16	0
Service-3A	EEM	1	1	86.0%	1,720	1,491	10	0
Service-3B	VSD & EEM	2	1	86.0%	1,720	1,044	7	20
Service-3B	EEM	2	1	86.0%	1,720	2,983	20	0
Service-3B	VSD to Existing	2	1	75.4%	1,720	1,191	8	20
Service-4A	EEM	2	2	86.3%	1,720	5,945	40	0
Service-4B	VSD & EEM	2	2	86.3%	1,720	2,081	14	20
Service-4B	EEM	2	2	86.3%	1,720	5,945	40	0
Service-4B	VSD to Existing	2	2	77.8%	1,720	2,308	16	20
Service-5A	EEM	1	3	90.2%	1,720	4,266	29	0
Service-5B	EEM	2	3	90.2%	1,720	8,532	58	0
Service-5B	VSD & EEM	2	3	90.2%	1,720	2,986	20	20
Service-5B	VSD to Existing	2	3	80.8%	1,720	3,334	22	20
Service-6	EEM	1	5	90.0%	1,720	7,126	48	0
Service-6	VSD & EEM	1	5	90.0%	1,720	2,494	17	10
Service-6	VSD to Existing	1	5	81.8%	1,720	2,744	19	10
Service-7	VSD & EEM	1	50	95.0%	1,720	23,627	159	10
Service-7	EEM	1	50	95.0%	1,720	67,505	455	0
Service-7	VSD to Existing	1	50	88.6%	1,720	25,334	171	10
Service-8	EEM	1	200	96.5%	1,720	265,825	1,793	0
Service-9	VSD & EEM	1	20	93.6%	1,720	13,703	92	10
Service-9	EEM	1	20	93.6%	1,720	27,406	185	0
Service-9	VSD to Existing	1	20	86.2%	1,720	14,879	100	10
Service-10	EEM	2	7.5	92.0%	1,720	20,912	141	0
Service-10	VSD & EEM	2	7.5	92.0%	1,720	7,319	49	20
Service-10	VSD to Existing	2	7.5	83.1%	1,720	8,103	55	20
Service-11	EEM	1	0.5	81.0%	1,720	792	5	0
Service-12	EEM	3	0.75	82.0%	1,720	3,519	24	0
Service-13	EEM	3	2	86.3%	1,720	8,917	60	0
Service-14	EEM	1	3	90.2%	1,720	4,266	29	0
Service-15	EEM	1	20	93.6%	1,720	27,406	185	0
Service-15	VSD & EEM	1	20	93.6%	1,720	13,703	92	10
Service-15	VSD to Existing	1	20	86.2%	1,720	14,879	100	10
Service-16	EEM	2	3	90.2%	1,720	8,532	58	0

Table 2.17. (contd)

Energy-Efficient Motor ERO Economic Parameters

ID	Description of Replacement	PV of Installed Cost (1993 $)	RI or ROF	Motor Life (Years)	Full Implm Energy Savings (kWh)	Full Implm Demand Savings (kW-mo)	Annualized Energy Savings (1993 $)	Annualized Demand Savings (1993 $)	Annualized O&M Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio
Service-1	EEM	218	ROF	15	52	0	1	3	0	64	1.29
Service-2	EEM	440	ROF	15	219	2	5	11	0	254	1.58
Service-3A	EEM	254	ROF	15	166	1	4	9	0	192	1.76
Service-3B	EEM	509	ROF	15	331	2	7	17	0	385	1.76
Service-4A	EEM	612	ROF	15	484	3	12	27	0	599	1.98
Service-4B	EEM	612	ROF	15	484	3	12	27	0	599	1.98
Service-5A	EEM	380	RI	15	496	3	10	23	0	479	2.26
Service-5B	EEM	760	RI	15	993	7	20	46	0	958	2.26
Service-6	EEM	434	RI	15	714	5	14	32	0	672	2.55
Service-7	EEM	2,246	RI	15	4,876	34	86	198	0	4,242	2.89
Service-8	EEM	9,174	RI	15	15,757	110	256	589	0	12,418	2.35
Service-9	VSD to Existing	3,567	ROF	15	15,381	54	391	933	(10)	17,008	5.77
Service-10	VSD to Existing	13,269	ROF	15	15,288	53	389	928	(20)	3,254	1.25
Service-11	EEM	218	ROF	15	52	0	1	3	0	64	1.29
Service-12	EEM	687	ROF	15	328	1	8	18	0	406	1.59
Service-13	EEM	917	ROF	15	726	3	17	40	0	898	1.98
Service-14	EEM	380	RI	15	496	2	10	23	0	479	2.26
Service-15	VSD to Existing	3,567	ROF	15	15,381	54	391	933	(10)	17,008	5.77
Service-16	EEM	760	RI	15	993	7	20	46	0	958	2.26
Sub-Total:	RI	14,134			24,325	168	415	956	0	20,205	2.43
	ROF	4,466			2,844	16	67	155	0	3,462	1.78
	VSD to Existing	20,404			46,050	161	1,171	2,793	(40)	37,271	2.83
	VSD & EEM	0			0	0	0	0	0	0	0.00
Total		39,004			73,219	345	1,653	3,904	(40)	60,938	2.56

Table 2.18. Warehouse Motor EROs

Existing Motor Operating Parameters

ID	Equipment Description	Number of Units	Motor Size (hp)	Motor Eff. (%)	Time until Failure (Years)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Warehouse-1	AHU	4	0.25	65.0%	1	2,325	2,667	13	0
Warehouse-2	AHU	13	0.33	67.0%	2	2,325	11,101	55	0
Warehouse-3	AHU	32	0.5	74.0%	4	2,325	37,487	187	0
Warehouse-4	AHU	8	0.75	73.0%	4	2,325	14,250	71	0
Warehouse-5A	AHU	5	1	75.4%	2	2,325	11,497	57	0
Warehouse-5B	AHU	7	1	75.4%	2	2,325	16,096	80	0
Warehouse-6A	AHU	14	2	77.8%	2	2,325	62,397	311	0
Warehouse-6B	AHU	20	2	77.8%	2	2,325	89,139	445	0
Warehouse-7A	AHU	2	3	80.8%	1	2,325	12,874	64	0
Warehouse-7B	AHU	3	3	80.8%	1	2,325	19,312	96	0
Warehouse-8	AHU	1	10	83.9%	1	2,325	20,665	103	0
Warehouse-9	AHU	1	15	86.1%	5	2,325	30,205	151	0
Warehouse-10	Cond. Fan	12	0.25	65.0%	2	2,325	8,002	40	0
Warehouse-11	Cond. Fan	2	0.33	67.0%	1	2,325	1,708	9	0
Warehouse-12	Cond. Fan	9	0.5	74.0%	1	2,325	10,543	53	0
Warehouse-13	Cond. Fan	7	0.75	73.0%	1	2,325	12,469	62	0
Warehouse-14	Cond. Fan	3	1	75.4%	1	2,325	6,898	34	0
Warehouse-15	Cond. Fan	3	2	77.8%	1	2,325	13,371	67	0
Warehouse-16	Cond. Fan	1	5	81.8%	1	2,325	10,598	53	0
Warehouse-17	Refrig.	1	5	81.8%	1	8,000	36,465	53	0
Warehouse-18	Refrig.	1	50	88.6%	1	8,000	336,659	488	0

Table 2.18. (contd)

Energy-Efficient Motor Operating Parameters

ID	Description of Replacement	Number of Units	Motor Size (hp)	Motor Eff. (%)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Warehouse-1	EEM	4	0.25	77.0%	2,325	2,252	11	0
Warehouse-2	EEM	13	0.33	78.0%	2,325	9,536	48	0
Warehouse-3	EEM	32	0.5	81.0%	2,325	34,247	171	0
Warehouse-4	EEM	8	0.75	82.0%	2,325	12,686	63	0
Warehouse-5A	EEM	5	1	86.0%	2,325	10,080	50	0
Warehouse-5B	EEM	7	1	86.0%	2,325	14,112	70	0
Warehouse-5B	VSD & EEM	7	1	86.0%	2,325	4,939	25	70
Warehouse-5B	VSD to Existing	7	1	75.4%	2,325	5,634	28	70
Warehouse-6A	EEM	14	2	86.3%	2,325	56,252	281	0
Warehouse-6B	VSD & EEM	20	2	86.3%	2,325	28,126	140	200
Warehouse-6B	EEM	20	2	86.3%	2,325	80,359	401	0
Warehouse-6B	VSD to Existing	20	2	77.8%	2,325	31,199	156	200
Warehouse-7A	EEM	2	3	90.2%	2,325	11,533	58	0
Warehouse-7B	VSD & EEM	3	3	90.2%	2,325	6,055	30	30
Warehouse-7B	EEM	3	3	90.2%	2,325	17,299	86	0
Warehouse-7B	VSD to Existing	3	3	80.8%	2,325	6,759	34	30
Warehouse-8	VSD & EEM	1	10	91.7%	2,325	6,617	33	10
Warehouse-8	EEM	1	10	91.7%	2,325	18,907	94	0
Warehouse-8	VSD to Existing	1	10	83.9%	2,325	7,233	36	10
Warehouse-9	VSD & EEM	1	15	93.0%	2,325	9,787	49	10
Warehouse-9	EEM	1	15	93.0%	2,325	27,964	140	0
Warehouse-9	VSD to Existing	1	15	86.1%	2,325	10,572	53	10
Warehouse-10	EEM	12	0.25	77.0%	2,325	6,755	34	0
Warehouse-11	EEM	2	0.33	78.0%	2,325	1,467	7	0
Warehouse-12	EEM	9	0.5	81.0%	2,325	9,632	48	0
Warehouse-13	EEM	7	0.75	82.0%	2,325	11,100	55	0
Warehouse-14	EEM	3	1	86.0%	2,325	6,048	30	0
Warehouse-15	EEM	3	2	86.3%	2,325	12,054	60	0
Warehouse-16	EEM	1	5	90.0%	2,325	9,632	48	0
Warehouse-17	EEM	1	5	90.0%	8,000	33,142	48	0
Warehouse-18	EEM	1	50	95.0%	8,000	313,979	455	0

Table 2.18. (contd)

Energy-Efficient Motor ERO Economic Parameters

ID	Description of Replacement	PV of Installed Cost (1993 $)	RI or ROF	Motor Life (Years)	Full Implm Energy Savings (kWh)	Full Implm Demand Savings (kW-mo)	Annualized Energy Savings (1993 $)	Annualized Demand Savings (1993 $)	Annualized O&M Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio
Warehouse-1	EEM	777	ROF	15	336	1	8	14	0	341	1.44
Warehouse-2	EEM	2,500	ROF	15	1,244	5	28	48	0	1,182	1.47
Warehouse-3	EEM	6,209	ROF	15	2,253	9	44	75	0	1,869	1.30
Warehouse-4	EEM	1,628	ROF	15	1,184	5	23	40	0	984	1.60
Warehouse-5A	EEM	1,271	ROF	15	1,120	4	25	43	0	1,064	1.84
Warehouse-5B	EEM	1,780	ROF	15	1,568	6	35	60	0	1,490	1.84
Warehouse-6A	EEM	4,452	RI	15	6,146	24	121	208	0	4,386	1.99
Warehouse-6B	EEM	6,360	RI	15	8,780	34	173	297	0	6,266	1.99
Warehouse-7A	EEM	760	RI	15	1,342	5	27	46	0	1,066	2.40
Warehouse-7B	EEM	1,140	RI	15	2,013	8	40	69	0	1,600	2.40
Warehouse-8	EEM	705	RI	15	1,758	7	33	57	0	1,346	2.91
Warehouse-9	EEM	954	RI	15	2,241	9	44	76	0	1,502	2.57
Warehouse-10	EEM	2,241	ROF	15	1,008	3	23	39	0	959	1.43
Warehouse-11	EEM	400	ROF	15	191	0	5	8	0	194	1.48
Warehouse-12	EEM	1,964	ROF	15	634	2	15	26	0	640	1.33
Warehouse-13	EEM	1,602	ROF	15	1,036	3	25	42	0	1,049	1.65
Warehouse-14	EEM	793	ROF	15	672	2	16	28	0	681	1.86
Warehouse-15	EEM	954	RI	15	1,317	3	26	44	0	998	2.05
Warehouse-16	EEM	434	RI	15	966	2	19	32	0	747	2.72
Warehouse-17	EEM	434	RI	15	3,322	5	64	32	0	1,454	4.35
Warehouse-18	EEM	2,246	RI	15	22,680	34	400	198	0	9,143	5.07
Sub-Total:	RI	18,439			50,563	131	947	1,057	0	28,508	2.55
	ROF	21,166			11,246	39	247	422	0	10,453	1.49
	VSD to Existing	0			0	0	0	0	0	0	0.00
	VSD & EEM	0			0	0	0	0	0	0	0.00
Total		39,605			61,809	170	1,194	1,479	0	38,962	1.98

Table 2.19. Water Well Motor EROs

Existing Motor Operating Parameters

ID	Equipment Description	Number of Units	Motor Size (hp)	Motor Eff. (%)	Time until Failure (Years)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Water Well-1	P-933	1	200	91.1%	8	5,475	896,313	1,899	0
Water Well-2	P-456	1	125	90.3%	8	5,658	583,997	1,197	0
Water Well-3	P-1345	1	125	90.3%	8	5,110	527,482	1,197	0
Water Well-4	T-9961	1	125	90.3%	8	5,475	565,159	1,197	0
Water Well-5	P-4524	1	100	90.0%	8	7,665	635,088	961	0
Water Well-6	T-7732	1	40	88.3%	8	548	18,495	392	0
Water Well-7	T-15003	1	30	87.5%	8	730	18,664	297	0
Water Well-8	S-19222	1	10	83.9%	8	2,044	18,167	103	0

Energy-Efficient Motor Operating Parameters

ID	Description of Replacement	Number of Units	Motor Size (hp)	Motor Eff. (%)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Billable Demand (kW-mo)	Annualized O&M Costs (1993 $)
Water Well-1	EEM	1	200	96.5%	5,475	846,157	1,793	0
Water Well-2	EEM	1	125	95.6%	5,658	551,621	1,131	0
Water Well-3	EEM	1	125	95.6%	5,110	498,238	1,131	0
Water Well-4	EEM	1	125	95.6%	5,475	533,827	1,131	0
Water Well-5	EEM	1	100	95.4%	7,665	599,139	907	0
Water Well-6	EEM	1	40	95.0%	548	17,190	364	0
Water Well-7	EEM	1	30	94.1%	730	17,355	276	0
Water Well-8	EEM	1	10	91.7%	2,044	16,622	94	0

Energy-Efficient Motor ERO Economic Parameters

ID	Description of Replacement	PV of Installed Cost (1993 $)	RI or ROF	Motor Life (Years)	Full Implm Energy Savings (kWh)	Full Implm Demand Savings (kW-mo)	Annualized Energy Savings (1993 $)	Annualized Demand Savings (1993 $)	Annualized O&M Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio
Water Well-1	EEM	9,174	RI	15	50,156	110	993	722	0	21,235	3.31
Water Well-2	EEM	5,125	RI	15	32,376	69	638	449	0	13,865	3.71
Water Well-3	EEM	5,125	RI	15	29,243	69	576	449	0	12,901	3.52
Water Well-4	EEM	5,125	RI	15	31,332	69	617	449	0	13,544	3.64
Water Well-5	EEM	4,252	RI	15	35,948	56	712	369	0	14,315	4.37
Water Well-6	EEM	1,918	RI	15	1,304	10	27	198	0	2,353	2.23
Water Well-7	EEM	1,546	RI	15	1,309	7	27	148	0	1,807	2.17
Water Well-8	EEM	705	RI	15	1,545	6	33	65	0	1,100	2.56
Sub-Total:	RI	32,265			181,670	389	3,590	2,783	0	80,021	3.48
	ROF	0			0	0	0	0	0	0	0.00
	VSD to Existing	0			0	0	0	0	0	0	0.00
	VSD & EEM	0			0	0	0	0	0	0	0.00
Total		32,265			181,670	389	3,590	2,783	0	80,021	3.48

2.8 Air Conditioning/Chiller EROs

Air Conditioning/Chiller EROs are analyzed by the Level-2 software. Energy and demand savings are based on the difference in coefficient of performance (COP) between new, high-efficiency replacement equipment and the existing equipment. Additional savings can result from the interactive effects of other EROs reducing the overall cooling load, which in turn results in a smaller replacement unit.

The following possible retrofits are considered by the Level-2 software:

- Package Units - replace with newer more efficient unit. There are two categories of package units: single zone (1.5 to 20 tons) and multi-zone (20 to 150 tons).

- Single Building Electric Chiller - replace with newer more efficient unit. There are four categories of electric chillers: large (75 to 200 tons) and small (20 to 75 tons) reciprocating, and large (500 to 1,200 tons) and small (200 to 500 tons) centrifugal.

- District Chilled Water - switch from district chilled water to single building electric chiller. FEDS is currently only implemented for buildings. Hence the only retrofit of district cooling systems is conversion to a building-level centralized system.

The FEDS software will also model existing heat pumps, window/room air-conditioners, and evaporative coolers, but the current version of Level-2 does not analyze retrofit options for any of these A/C types.

2.8.1 Replace Existing A/C with High-Efficiency A/C

Description

Almost every building at Fort Stewart has some type of air conditioning equipment. Energy and demand savings can be realized by replacing the existing air conditioning equipment with new high-efficiency equipment. In addition, new environmental regulations call for the elimination of CFC refrigerants in the future. New equipment is available with non-CFC refrigerants to meet these regulations with efficiencies comparable to the best CFC-based models.

Assumptions

The technical assumptions are as follows:

- A/C equipment type and size was allowed to default based on Level-2 assumptions. These defaults were then modified with available data gathered from on-site inspections and/or the Real Property List.

- Existing units have efficiencies based on equipment type and age from a survey of manufacturers data over the last 20 years.

- New unit efficiencies are as follows:

Equipment Type	Description	COP
1	Small Centrifugal (200-500 ton)	5.86
2	Large Centrifugal (500-1200 ton)	5.17
3	Small Reciprocating (20-75 ton)	2.85
4	Large Reciprocating (75-200 ton)	3.63
6	Small Package (1.5-20 ton)	2.45
7	Large Package (20-150 ton)	2.63

- Existing and retrofit equipment size, energy use and demand are calculated based on building load calculations performed by the Level-2 software.

- Packaged units have an expected equipment life of 12 years, chillers have an expected equipment life of 20 years.

Cost to implement the ERO are as follows:

- First cost of replacing equipment, including material and installation, is given in terms of capacity (in MBtu) as shown in the following table:

Equipment Type	First Cost Equation
1	$52404.9*(Cap.)^{0.673846}$
2	$52404.9*(Cap.)^{0.673846}$
3	$13130.72e^{1.469094*(Cap.)}$
4	$2346.001+49563.57*(Cap.)$
6	$272.6239+68357.43*(Cap.)$
7	$92082.77*(Cap.)^{0.514841}$

Results

Qualitative results of the ERO analysis appear in Table 2.20. The table contains specific energy, cost, and economic data for each piece of A/C equipment considered for replacement.

2.8.2 Install Liquid Pressure Amplification Device

Liquid pressure amplification (LPA) is a mechanical means of increasing the operating efficiency of vapor-compression refrigeration and air conditioning systems. This efficiency increase results from the

installation of a pump designed to increase the refrigerant pressure while reducing the work required of the compressor and thus saving energy.

Most vapor-compression refrigeration and air conditioning systems have the following components: a receiver, an expansion valve, an evaporator, a compressor, and a condenser. Typically, these components are designed and sized to meet the required load on the hottest days of the year (the design-day). This is true of the condenser, which is designed to operate at condenser pressures required to achieve refrigerant condensation on the hottest days of the year. These elevated pressures, required only for those hot days, result in wasted energy during cooler weather when the system is needlessly operating at these higher pressures. One way to reduce energy consumption is to allow the condenser pressure to vary or "float" with the ambient temperature. Floating the condenser pressure allows the compressor to maintain pressures necessary for condensation on a given day instead of the higher design-day pressure conditions. While this seems like a simple solution, the drawback to lowering the condenser pressure is the formation of gas in the liquid refrigerant prior to the expansion valve. This gas, called flash-gas, reduces the system operating efficiency by displacing liquid refrigerant while doing no work itself. To reduce flash-gas formation while allowing the condenser pressure to float, the LPA pump is installed in between the condenser and the expansion valve. With the LPA pump installed in the liquid-line, flash-gas formation is minimized allowing condenser pressure to float, thus reducing compressor energy consumption.

Annual energy savings resulting from LPA are a direct function of annual weather conditions. The greater the number of hours per year the system can operate at a lowered condenser pressure, the greater the annual energy savings will be. Applications of LPA systems in climates having moderate average temperatures with relatively short high-temperature peaks are more attractive than applications in climates having warm, relatively constant, average temperatures. The manufacturer, Hy-Save Inc., reports estimated annual saving as high as 57%, while a number of independent case studies estimate the savings to be between 10% and 25%, depending on application. Savings discrepancies aside, cost-effective energy savings are possible with proper system selection and LPA application.

Table 2.20. FEDS Air Conditioning EROs

Bldg Type	Existing Technology	Retrofit Technology	Retro Number	Exist Eff, COP or Lamp Wattage	Retro Eff, COP or Lamp Wattage	Existing Fuel (MBtu)	Retrofit Fuel (MBtu)	First Year Energy Savings (MBtu)	Present Value of Installed Cost (1993 $)	Annualized O&M Savings (1993 $)	Annualized Energy & Demand Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio
Assembly-05	single conv chiller	Air-Cooled Reciprocating Chiller (20 to 75 tons cooling)	1	2 4547	2 8519	Electricity	Electricity	47	19,423	0	1,614	5,793	1 30
Education-07	package unit	Single Zone Packaged AC Unit (5 4167 to 11 25 tons cooling)	1	2 2844	2 61	Electricity	Electricity	7	4,095	0	1,397	17,726	5 33
Education-08	single conv chiller	Air-Cooled Reciprocating Chiller (20 to 75 tons cooling)	4	2 4547	2 8519	Electricity	Electricity	106	60,470	0	6,681	43,905	1 73
Education-08	package unit	Single Zone Packaged AC Unit (5 4167 to 11 25 tons cooling)	4	2 4431	2 61	Electricity	Electricity	12	16,454	0	3,818	43,190	3 62
Education-18	single conv chiller	Air-Cooled Reciprocating Chiller (20 to 75 tons cooling)	1	2 2351	2 8519	Electricity	Electricity	60	10,021	0	4,201	55,608	6 55
Food Service-17	single conv chiller	Centrifugal Liquid (Water) Chiller (200 to 500 tons cooling)	1	2 7597	5 86	Electricity	Electricity	688	46,962	0	4,010	15,686	1 33
Office-01	package unit	Single Zone Packaged AC Unit (5 4167 to 11 25 tons cooling)	1	2 2844	2 61	Electricity	Electricity	11	5,662	0	1,138	12,118	3 14
Office-02	package unit	Single Zone Packaged AC Unit (5 4167 to 11 25 tons cooling)	2	2 2844	2 61	Electricity	Electricity	16	8,348	0	819	4,439	1 53
Office-03	package unit	Single Zone Packaged AC Unit (11 25 to 20 tons cooling)	2	2 4431	2 49	Electricity	Electricity	3	14,058	0	1,435	8,365	1 60
Office-22	package unit	Multizone Packaged AC Unit (20 to 150 tons cooling)	1	2 4431	2 6256	Electricity	Electricity	16	38,424	0	4,794	36,474	1 95

2.9 Residential Appliance EROs

2.9.1 Replace Electric Clothes Dryers with More Efficient Models

Description

Although clothes dryers are not supplied by Fort Stewart to family housing residents, the family housing units have washer/dryer hook-ups and utilities are provided by the Fort. This ERO explores the option of providing each residence with a more efficient electric clothes dryer, saving energy over letting the tenant use their own dryer.

A major energy saving improvement that has been made recently is moisture-sensing controls. This control automatically turns off the dryer when the moisture level in the exhaust stream reaches some minimum amount. While it is possible that some of the tenant-owned dryers have this feature, it is generally available only in the higher priced models, which precludes its widespread use. The Fort, by purchasing through GSA, can get a volume price for these units, which may make this ERO economically feasible.

Since the existing units belong to the occupants, there may be issues as to storage/removal of the existing dryers and appliance repair that may need to be addressed.

Assumptions

The technical assumptions are as follows:

- Energy consumption for electric clothes dryers is from representative data shown in *The State of the Art: Appliances, Competitek, Aug. 1990* (Shepard et al. 1990). Existing dryers are assumed to consume 5.5 kW/unit, and replacement dryers are assumed to consume 4.9 kW/unit.

- Clothes dryers are assumed to operate 183 hours per year.

- Equipment costs for the new dryer is $219 each from the GSA price catalog. Installation labor from Means (1992c) is $20.52 each.

- Since the Base would own the dryers, there is an assumed additional maintenance cost of $10 per year per dryer. This is an annualized value to account for occasional repairs and/or replacement.

Results

The complete quantitative results of this ERO appear in Table 2.21. The table contains specific energy, cost and economic performance data. This ERO has no positive NPV options.

2.9.2 Replace Electric Clothes Dryers with Natural Gas Clothes Dryers

Description

Family housing units at Fort Stewart currently have natural gas available for heating and domestic hot water uses. Natural gas can be made available for clothes dryers relatively easily. Although clothes dryers are not supplied by Fort Stewart, the units have washer/dryer hook-ups and utilities are provided by the Fort. This ERO analyzes the feasibility of extending the natural gas lines inside each unit to the laundry room and having the Fort purchase and install natural gas dryers in each family housing unit. Since the existing units belong to the occupants, there may be issues as to storage/removal of the existing dryers and appliance repair that need to be addressed.

Assumptions

The technical assumptions are as follows:

- Energy consumption for electric clothes dryers is 5.5 kW/unit from representative data shown in *The State of the Art: Appliances, Competitek, Aug. 1990* (Shepard et al. 1990). The dryer is assumed to have 183 run-hours per year.

- Energy consumption for natural gas clothes dryers is 60 therms/year (from City Gas Company, Florida).

The cost assumptions are as follows:

- Equipment cost for a natural gas dryer is $269 from the GSA price catalog. Installation costs are from Means Mechanical Cost Data (1992c). $200 per dryer was assumed for the cost of running gas to the dryer from the mechanical room and hooking up the dryer.

- Since the Fort would own the natural gas dryers, there is an assumed additional maintenance cost of $10 per year per dryer. This is an annualized value to account for occasional repairs and/or replacement.

Results

The complete quantitative results of this ERO appear in Table 2.21. The table contains specific energy, cost and economic performance data. This ERO has no positive NPV options.

2.9.3 Replace Existing Dishwashers with Energy Efficient Models

Description

Between 1972 and 1980, the average efficiency of household dishwashers improved by 35% (American Home Appliance Manufacturers), even though the Department of Energy does not set efficiency standards for dishwashers in the same manner as for refrigerators and window air conditioners. The most recent requirement of dishwashers was that all units produced after 1988 must have an energy-saving drying cycle (no-heat dry). Improvements in efficiency between 1972 and 1989 were due to improved technology and design, such as decreased water consumption, efficient motors, and more efficient drying cycles. Therefore, it is believed that new currently available models are considerably more efficient than the units

in place at Fort Stewart. This ERO is not considered as a replace-on-failure option because units which fail are assumed to be replaced with new units.

Assumptions

The technical assumptions are as follows:

- The average efficiency of existing dishwashers at Fort Stewart is midway between the average 1972 efficiency and the average 1989 efficiency. Because average energy consumption decreased 35% in this period, the existing units are assumed to consume roughly 25% less energy than those produced in 1972.

- Based upon operating conditions which are considered to be typical (American Home Appliance Manufacturers Association), the yearly electrical consumption of the existing dishwashers is 1,037 kWh per year.

- Dishwashers are assumed to operate, on average, 1 hour per day and 7 days per week.

The cost estimates are as follows:

- The installed cost of new dishwashers is $272 per unit (GSA price for dishwasher).

Results

The complete quantitative results of this ERO appear in Table 2.21. The table contains specific energy, cost and economic performance data. This ERO has no positive NPV options.

2.9.4 Refrigeration EROs

Description

New appliance standards that went into effect on January 1, 1990, eliminated the most inefficient refrigerator models from the market (Turiel 1990). New standards that took effect on January 1, 1993, made the least efficient 1993 models 26–28% more efficient than the average 1989 model. Although efficient refrigerators are currently available, they are generally quite expensive. With the 1993 standard in effect, the incremental costs of design features needed to meet the standard are expected to increase the price of mass-produced units by 12.5%. It is reasonable to expect that replacement of all units in 1993 will be economically attractive. However, after 1993, there will be no choice but to replace units that fail with units meeting the new standard.

This ERO involves 2,437 full-sized units in family housing and 180 units in commercial building breakrooms. Compact units in barracks rooms, numbering 1,284, were also analyzed.

Assumptions

The following technical data and assumptions pertain to the ERO evaluation:

- Non-energy operations and maintenance (O&M) costs are the same for the retrofit models as for the current models. Refrigerator O&M includes replacement if the refrigeration system fails and repair of shelves and cleaning of coils, drip pans and finished surfaces.

- Each family housing unit contains one full-size refrigerator with a DOE energy rating of 1,000 kWh/yr; actual consumption is 1,296 kWh/yr, and the peak factor (percent of refrigerators affecting peak load) is 0.90.

- Existing units are assumed to be 27% less efficient than the replacement units. A 17-cubic foot model was chosen from the GSA "catalog" as a replacement. Energy consumption for this model is 946 kWh/yr.

Results

The complete quantitative results of this ERO appear in Table 2.21. The table contains specific energy, cost and economic performance data. This ERO has no positive NPV options.

Table 2.21. Residential Appliance EROs

Existing Appliance Operating Parameters

ID	Equipment Description	Number of Units	Size (cu. ft.)	Avg. Load (kW/Unit)	Time until Failure (Years)	Annual Run Hrs. (Hours)	Peak Factor	Annual Energy Consumption (kWh)	Annual Demand (kW-mo)	Annualized O&M Costs (1993 $)
RF-1	Refrig. - Housing	2,437	18	0.148	10	8,760	0.9	3,159,522	3,895	0
RF-2	Refrig. - Break Rms	180	18	0.148	10	8,760	0.9	233,366	288	0
RF-3	Refrig. - Barracks	1,284	5.6	0.033	10	8,760	0.9	371,179	458	0
DW-1	Dishwasher - Hsg.	2,437	na	2.84	7	365	0.005	2,526,194	415	0
DR-1	Clothes Dryer - Hsg.	2,437	na	5.5	9	183	0.03	2,452,841	4,825	0

Energy Efficient Appliance Operating Parameters

ID	Description of Replacement	Number of Units	Size (cu.ft)	Avg. Load (kW/Unit)	Annual Run Hrs. (Hours)	Annual Energy Consumption (kWh)	Annual Demand (kW-mo)	Annualized O&M Costs (1993 $)
RF-1	1993 Std. Refrig.	2,437	17	0.108	8,760	2,312,685	2,851	0
RF-2	1993 Std. Refrig.	180	17	0.108	8,760	170,818	211	0
RF-3	1993 Std. Refrig.	1,284		0.032	8,760	359,931	444	0
DW-1	Energy Eff. Appl.	2,437	NA	2.13	365	1,894,646	311	0
DR-1a	Energy Eff. Appl.	2,437	NA	4.9	183	2,185,258	4,299	24,370
DR-1b	Fuel Switch to Gas	1,630	NA	NA	183	9,780 MBtu	NA	16,300

Energy-Efficient Appliance ERO Economic Parameters

ID	Description of Replacement	PV of Installed Cost (1993 $)	RI or ROF	Life Expectancy (Years)	Energy Savings (kWh)	Demand Savings (kW-mo)	Annualized Energy Savings (1993 $)	Annualized Demand Savings (1993 $)	Annualized O&M Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio

No Positive Net Present Value Options were Found.

2.10 Transmission and Distribution EROs (Manual)

2.10.1 Conservation Voltage Reduction

Energy can be saved by reducing Fort Stewart's distribution voltage (nominally 24.94 kV) by a small amount. This approach to energy conservation is known as conservation voltage reduction (CVR). The magnitude of the voltage reduction is constrained by the requirement that service entrance voltage be maintained above the standard minimum (5% below nominal) at all buildings and other loads on the distribution system.

How a given piece of end-use equipment responds to CVR can be described in terms of input (energy savings), output (service provided), and service life. The most common loads (lights, fans and pumps) respond with input and output reductions approximately proportional to the voltage reduction and a small (but hard to quantify) increase in service life. Loads controlled by feedback (refrigeration, air conditioning, most electric heaters, and computers or others that involve dc power supplies) respond, on the average, with practically no change in service, energy consumption, or service life.

An aggressive CVR implementation will use feedback from the most heavily loaded transformer near the end of each feeder to regulate substation voltage. A milder implementation will involve simply reducing the main transformer setpoints or tap points at each substation by a small (typically 0.5 to 2%) fixed amount. An intermediate implementation is possible using an open-loop control scheme in which the setpoint is varied with load.

Description

The ERO evaluated here consists of changing the voltage tap points of the main (115 kV to 24.94 kV) transformers. A fixed voltage reduction of 1% is appropriate for Fort Stewart because the distribution system is not heavily loaded and the simple change in setpoint does not involve any increase in maintenance activity. Open- or closed-loop control schemes are probably not necessary at Fort Stewart because the distribution lines and transformers are not heavily loaded.

Assumptions

The technical assumptions are as follows:

- There are two 30-MVA transformers at the main Georgia Power-served substation.
- Worst-case building service entrance voltages are currently at least 1% above the minimum acceptable voltage (i.e., a 1% voltage tap point reduction is feasible).
- The average building service voltage is 3% above the minimum.
- A load-to-voltage reduction factor of 0.85 for the Georgia Power transformers is assumed based on factors of 0.76 for residential, 0.41 for industrial and 0.99 for commercial (Lovins et al. 1989, p. 296).

Costs to implement the ERO are based on the following assumptions:

- A semi-annual check of distribution voltage is assumed to be a part of the existing preventive maintenance program.

- The labor to change the tap points initially will cost $200 per transformer; there are two transformers at the main substation.

Results

Quantitative results of the ERO analysis are presented in Table 2.22. The results are discussed below.

Budget Implications. The total first cost of implementing the ERO is estimated to be $400.

Energy, Demand, and Cost Savings. Annual energy savings of 1,249,786 kWh and cost savings of $31,822 per year will result from this ERO. Demand savings are estimated to be 2,447 kW-month per year with a cost savings of $21,129 per year.

Energy Security. This ERO has no effect on energy security.

Operations and Maintenance. There will be little or no net effect on maintenance of distribution system or of end-use equipment.

Environmental Issues. This ERO will have no environmental effect beyond the generally beneficial effects of reduced power generation in the region.

2.10.2 Power Factor Correction

Power factor correction reduces losses in the transmission system and generators of the supplying utility and reduces or eliminates excess reactive load charges that a large customer typically incurs each month. The more aggressive power factor correction measures can also reduce losses in a site's distribution lines and transformers.

Low power factors are usually due to the load current lagging the voltage (i.e., to the reactive component of a load). The reactive component is a significant part of any motor, transformer or inductive ballast load. The current associated with the reactive component does not contribute to the service provided by the load and does not result directly in a power demand. However, indirect power consumption due to resistance (I^2R) loss occurs in the T&D system.

A lagging power factor can be corrected (brought closer to unity power factor) by installing capacitors. Power factor correcting capacitors are most effective when installed at each load that has a reactive component. Power-factor corrected inductive ballasts are the most common implementation of this approach. However, it is generally not economical to retrofit capacitors to each load because of the high cost per load. The practical alternative implementations are 1) service entrance capacitors (advantage: reduced transformer loss) 2) capacitors on primary and secondary of each distribution transformer (eliminates most of the excitation current with fixed capacitors) 3) at the substation (most economical place to install switched banks or modulating reactors), and 4) distributed along feeder lines.

Description

Only the simplest implementations are considered here because the site's reactive loads are expected to change significantly with implementation of other electric EROs. Power correction by fixed capacitors at the substation will reduce losses in the main transformers that result from lagging power factor but will not affect the corresponding losses in the rest of the site's distribution system. More importantly, these implementations will reduce losses in Georgia Power's transmission and generation system and eliminate the excess reactive load charges that Fort Stewart has been paying monthly.

There are two options analyzed for power factor correction: 1) size the capacitors to correct the power factor to 1 (unity), or 2) size the capacitors to correct the power factor to 0.95 (the point at which Georgia Power starts charging for excess KVAR). Both options will remove the monthly excess reactive load charge, the first by just meeting the Georgia Power requirements; the second goes one step further by completely correcting the power factor, giving slightly lower losses in the main transformers as well. The second option has a slightly higher first cost, but will cover any future reactive load growth due to base expansion or other reasons.

Assumptions

The technical assumptions are as follows:

- The ratio of reactive baseload to reactive peak load is taken to be 0.5 (i.e., equal to the ratio of real power baseload to peak load that has been observed in a year of continuous power monitoring at the site).
- The largest monthly peak reactive and excess reactive loads from FY91 Georgia Power Company billings are 14 MVAR and 4 MVAR, respectively.
- Losses at the main transformers due to poor power factor, calculated as part of a similar study for Fort Drum, NY, are as follows: 0.2172 kWh saved per actual KVAR and 0.000388 kW per actual KVAR. It is assumed that these losses (when weighted for actual KVARs) provide reasonable estimates of the losses that occur in substation transformers of the type typically found on military bases.

Cost estimates are based on the following data.

- Labor and material costs of the ERO [Means, manufacturers, 1992c] are as follows:

ERO Item Description	Material ($/MVAR)	Labor ($/MVAR)	Total ($/MVAR)	Annualized O&M Cost ($/yr)
13 kV Static	2,815	695	3,510	0.2%

Results

Quantitative results of the ERO analysis are presented in Table 2.22. The results are discussed below.

Budget Implications. The total first cost of implementing option 2 (correction to power factor of 0.95) of the ERO is estimated to be $14,040.

Energy, Demand and Cost Savings. Annual energy savings of 5,411 kWh and cost savings of $138 per year will result from this ERO. Demand savings are estimated to be 10 kW-mo and 24,911 excess KVAR-mo per year, corresponding to a cost savings of $6,942 per year.

Energy Security. This ERO has no effect on energy security.

Operation and Maintenance. There is a finite probability of equipment failure during the nominal life of the power factor correction equipment. The product of failure probability and replacement cost is reflected in the O&M cost estimate.

Environmental Issues. This ERO will have no environmental effect beyond the generally beneficial effects of reduced power generation in the region.

2.10.3 Energy-Efficient Transformers

There is a 115,686-KVA mixture of pad- and pole-mounted utility transformers that provide power to Fort Stewart's buildings, streetlights and other utilities. Transformer losses can be reduced by replacing existing units with low-loss transformers. Low-loss transformers use improved magnetic circuit materials and design to reduce stand-by (no-load) losses and improved winding design to reduce losses that are primarily a function of load current. Analysis at other sites (including Fort Drum, Griffiss AFB, and Patrick AFB) indicates that it may be cost-effective, as a conservation measure alone, to replace transformers with properly sized low-loss transformer when replacing a failed transformer.

Description

Normally, replacement of all 5 kVA and larger distribution transformers by low-loss transformers should be considered. Since the information was not available for Fort Stewart regarding the specifics of each transformer, a detailed analysis was not performed. Given Fort Stewart's relatively low cost of electricity, it is difficult to ascertain whether it is feasible to replace any transformer with an amorphous core unit. Specific pricing information from vendors would be needed provide accurate results. Therefore, it is recommended that a detailed analysis with accurate pricing information on the transformer, along with labor estimates, be conducted before opting to retrofit any transformer. The main (24.94 kV primary) substation transformers were not analyzed given the poor economics demonstrated in previous assessments.

The methodology used at the above-mentioned sites of (Griffiss AFB in particular) is generally assumed to be equally valid at Fort Stewart. Therefore, analysis methods used, especially from Griffiss AFB, will be shown to illustrate the findings of transformer retrofit options in general.

Amorphous core transformer no-load loss is approximately 30% of a conventional unit, with an estimated cost 1.4 times that of a conventional unit (Brooks et al. 1986). Since amorphous cores are not available for large transformers, this option is only available for sizes of 1000 kVA or smaller. Improved silicon steel transformers have approximately 75% of a conventional unit's no-load loss, and have an estimated capital cost of 1.2 times the present cost of a conventional distribution transformer (Brooks et al. 1986). For both of the above technologies, it is assumed that the load loss can be reduced by 20% with a

10% increase in the capital cost as compared to a conventional transformer, which is based on calculations using Westinghouse Electric Corporation technical data (1981).

Assumptions

The technical assumptions are as follows:

- Load is distributed equally according to transformer size. This assumption is used to estimate average and peak load for each transformer.

- Each transformer is assumed to have a peak load of 75% of the nameplate capacity, and an average power factor of 0.85.

Cost estimates are based on the following:

Transformer costs are based on Means data (1992c) for dry transformers, and a correction factor based on Means data for large oil-filled and dry transformers is included where appropriate. The Means data are used to create scaling relationships between transformer size and cost. The old transformer removed has some salvage value, albeit mainly as scrap material for transformers which are near the end-of-life. However, the Means labor cost estimate is only to install new transformers, not remove the old ones. This analysis assumes that these antithetical costs and values are approximately equal and consequently ignored (any salvage value will be absorbed by the demolition labor cost).

Results

The results of typical transformer ERO analysis indicate that it is generally cost-effective to retrofit old transformers with amorphous core or improved silicon steel units upon failure of the old model. However, at Fort Stewart, given the cost of electricity, the results are more questionable. As stated above, an analysis with accurate information would need to be made on a case-by-case basis to determine feasibility. The analysis needs to include specific information on such items as size, primary and secondary voltages, number of phases, location, and price of the replacement equipment (amorphous core or improved silicon steel).

Environmental Issues. Some of the existing transformers may contain PCB-bearing oils. These transformers have to be replaced regardless of whether or not the ERO is implemented. Most of the other materials (copper and steel) present in the existing transformers can be recycled.

Table 2.22. Transmission and Distribution EROs

Existing T & D Operating Parameters

ID	Equipment Description	Number of Units	Size (MVA)	Annual Energy Consumption (kWh)	Annual Demand (kW-mo)	Excess Reactive Demand (kVAR-mo)	Annualized O&M Costs (1993 $)
T&D - 1	Sub. Transformers	2	NA	147,033,600	287,883	NA	0
T&D - 2	Capacitor Bank	1	NA	147,033,600	287,883	24,911	0

Energy Efficient T & D Operating Parameters

ID	Description of Replacement	Number of Units	Size (MVA)	Annual Energy Consumption (kWh)	Annual Demand (kW-mo)	Excess Reactive Demand (kVAR-mo)	Annualized O&M Costs (1993 $)
T&D - 1	Conservation Voltage Reduction	2	30	145,783,814	285,436	NA	NA
T&D - 2	Power Factor Correction to .95	1	4	147,028,189	287,873	0	3
T&D - 3	Power Factor Correction to Unity	1	14	147,007,416	287,836	0	10

Energy-Efficient T & D ERO Economic Parameters

ID	Description of Replacement	PV of Installed Cost (1993 $)	RI or ROF	Life Expectancy (Years)	Energy Savings (kWh)	Demand Savings (kW-mo)	Annualized Energy Savings (1993 $)	Annualized Demand Savings (1993 $)	Annualized O&M Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio
T&D - 1	Conservation Voltage Reductio	400	RI	25	1,249,786	2,447	31,822	21,129	0	826,805	2,068 01
T&D - 2	Power Factor Correction to 95	14,040	RI	25	5,411	10	138	6,942	(3)	96,512	7 87

2.11 Convert Fleet Vehicles to Use Compressed Natural Gas

Description

The Fort Stewart motor vehicle fleet consists of approximately 385 vehicles that presently run on unleaded, premium unleaded gasoline or diesel fuel. The vehicles are general transportation vehicles including: cars, pickups, trucks, buses, vans, wagons, maintenance type vehicles, etc. All of these vehicles can be converted to operate on compressed natural gas (CNG) as a primary fuel source.

Converting Gasoline Vehicles to Use CNG

Most gasoline powered cars and trucks can be converted to operate on CNG in either single fuel (CNG only) or a dual fuel (either gasoline or CNG) configuration. Modifications include changes to the fuel delivery and carburetion system. Fuel-injected cars can also be easily converted. The conversion equipment consists of fuel storage cylinders, a pressure regulator, a gas/air mixer, a fuel selector control (for dual fuel use), and a fuel gage. A typical vehicle can usually be converted to CNG in less than a day.

Converting Diesel Vehicles to Use CNG

One of the primary advantages of diesel fuel is its high centane rating, which allows the fuel to autoignite when sufficiently compressed. Compression ignition simplifies the diesel engine, as compared with spark plug engines, by eliminating the spark plugs, distributors, and other electrical components. Ordinarily natural gas will not autoignite due to its low centane rating. Therefore, some means of igniting the alternative fuel must be provided. Some of the proven ignition methods are to add spark plugs, glow plugs, or use a fumigation system. The traditional procedure to have a diesel engine burn natural gas would mean adding spark plugs and associated electronics. Rather than make these extensive engine modifications, a fumigation system can be used. A fumigation system burns natural gas in tandem with diesel fuel. For this type of conversion, diesel is used as a "pilot fuel" for starting and for low engine RPM operation. The amount of natural gas is increased as engine speed increases. Retrofitting a diesel engine to CNG using a fumigation system is very similar to converting a gasoline engine to CNG. The major difference is the need for an RPM monitoring device to control the mixture of diesel and natural gas. The mixture of fuels is controlled by either mechanical or solenoid switches. Diesel is used to start the engine and is decreased as engine speed increases. When engine speed drops off during gear changes, diesel again becomes the primary fuel.

Assumptions

Table 2.23 identifies all the vehicles at Fort Stewart under consideration for conversion to CNG.

The technical assumptions are as follows:

- Gasoline energy content is 110,000 Btu per gallon.
- Diesel energy content is 135,000 Btu per gallon.
- CNG fuel efficiency is 7% greater than gasoline or diesel fuel.
- The fumigation system conversion will operate with an overall average fuel mix ratio of 40% diesel and 60% CNG.

- Vehicle mileage, fuel consumption, fuel cost, and O&M cost are based on pro-rated records maintained by the support contractor for FY92 for Patrick AFB. The records were pro-rated due to the similarity of vehicles with conversion potential between Patrick AFB and Fort Stewart. The detailed information was not readily available for Fort Stewart, thus the reason for using the pro-rated analysis approach.

- O&M costs for vehicles operating on CNG are estimated to be reduced by as much as 50%. For this analysis, an average 25% reduction is assumed.

Results

Quantitative results of the ERO analysis are presented in Table 2.23. The results are discussed below.

Budget Implications. Present value of installed cost for all cost-effective implementations of this ERO is estimated to be $691,054; in addition, there is the cost of the compressor station. The life of the compressor station should exceed the 25-year life-cycle cost analysis. In addition, the conversion equipment lifetime should also last close to 25 years. Since this is longer than the life of the vehicles, the conversion equipment may be transferred from older vehicles to their replacements.

Another option in implementing this ERO is to specify CNG vehicles in place of gasoline or diesel vehicles as the vehicles are replaced at the end of their lives. CNG vehicles are available through normal GSA contracts at costs similar to typical vehicles. Under this plan, only a CNG refueling station would be required. Estimated cost of the CNG refueling station is approximately $195,000. The cost of the station will depend on the size of the compressor station and the number and capacity of fast-fill and slow-fill stations.

Energy and Cost Savings. It is estimated that this ERO will reduce annual gasoline consumption by 16,536 gallons per year and diesel by 48,506 gallons per year. Natural gas consumption will increase by 180,116 therms per year. Net energy savings will be 561 MBtu per year.

This results in a fuel cost reduction of $100,221 per year in gasoline, $35,410 per year in diesel and a cost increase of $6,401 per year in natural gas. Net energy cost reduction is $129,230 per year.

Energy Security. Natural gas is a domestic energy source, whereas most gasoline and diesel fuel relies on imported oil. For this reason, CNG vehicles are less vulnerable to world oil supply problems and cost fluctuations.

Operations and Maintenance. Natural gas has many advantages over liquid fuels like gasoline and diesel. Since it is a gas, it burns more easily and completely. It also burns cooler than gasoline. For these and other reasons, CNG vehicles require less O&M than standard vehicles. Spark plugs last longer and the engine operates cleaner. Oil changes may be less frequent and still be cleaner. Changes in the vehicle performance result in reduced engine, transmission and tire wear. It has been estimated by some sources that these factors may result in increased vehicle life and increase resale value. Some sources have estimated that O&M costs can be reduced by as much as 50%. Furthermore, with overnight slow-fill stations, operator time is no longer wasted waiting in refueling lines at the beginning or end of the day. In the case of fast-fill stations, the refueling time is similar to that of standard fuel vehicles. Net reduction in O&M costs is estimated to be $8,535 per year.

Environmental Issues. Natural gas is a much cleaner burning fuel. Emissions are estimated to be significantly reduced. Federal and state regulations highly encourage CNG vehicles over standard fuel vehicles due to the reductions in emissions.

Table 2.23. CNG Vehicle EROs

Existing Vehicle Operating Parameters

ID	Equipment Description	Number of Units	Existing Fuel	Time until Failure (years)	Miles per Year (miles)	Annual Fuel Consumption (gal/yr)	Annualized O&M Costs (1993 $)
CNG -1	Sedan	62	Gasoline	3	703,344	23,018	62,266
CNG - 2	Panel Truck, 4x2, 6,999 GVW & under	11	Gasoline	4	87,503	5,167	13,523
CNG - 3	Multistop, 4x2, 12,500-16,999 GVW	33	Gasoline	3	33,041	2,706	13,901
CNG - 4	Carryall, 4x2, 6,999 GVW & under	27	Gasoline	4	232,952	15,909	23,487
CNG - 5	Carryall, 4x4, 7,500 GVW	11	Gasoline	4	97,867	6,699	20,009
CNG - 6	Carryall, 4x2, Conv, 15 psgr, 7,700 GVW	14	Gasoline	4	106,484	10,953	17,799
CNG - 7	Compact, 4x2, 4,599 GVW & under	29	Gasoline	4	181,548	8,270	24,807
CNG - 8	Cargo, 4x4, 12,499 GVW & under	29	Gasoline	4	35,467	3,845	11,565
CNG - 9	Stake, 4x2, 7,000 GVW	89	Gasoline	4	546,449	54,791	90,507
CNG - 10	Bus, School, 28-29 psgr	4	Diesel	7	24,856	2,110	3,517
CNG - 11	Bus, School, 42-45 psgr	7	Diesel	7	48,969	5,572	25,074
CNG - 12	Bus, Intercity, 41-51 psgr, 4x2	23	Diesel	6	194,097	41,998	61,479
CNG - 13	Modular, 4x2	13	Diesel	6	118,924	15,028	31,798
CNG - 14	Multistop, 4x2, 8,499 GVW & under	10	Diesel	3	50,833	4,282	10,475
CNG - 15	Multistop, 4x2, 1-ton	1	Diesel	4	2,489	238	1,287
CNG - 16	Stake, 4x2, 10,000 GVW	16	Diesel	5	136,538	9,156	20,322
CNG - 17	Tractor, 4x2, 24,000-44,500 GVW	4	Diesel	5	36,105	4,057	4,586
CNG - 18	Tractor, 6x4, 24,000-44,500 GVW	2	Diesel	6	15,149	2,924	25,684

Energy Efficient Vehicle Operating Parameters

ID	Description of Replacement	Number of Units	Resulting Fuel	Miles per Year (miles)	Annual Fuel Consumption (gal/yr)	Annual Fuel Consumption (therms/yr)	Annualized O&M Costs (1993 $)
CNG -1	CNG Vehicle	62	CNG	703,344	0	23,546.9	46,700
CNG - 2	CNG Vehicle	11	CNG	87,503	0	5,286.0	10,142
CNG - 3	CNG Vehicle	33	CNG	33,041	0	2,768.2	10,426
CNG - 4	CNG Vehicle	27	CNG	232,952	0	16,275.4	17,615
CNG - 5	CNG Vehicle	11	CNG	97,867	0	6,853.1	15,007
CNG - 6	CNG Vehicle	14	CNG	106,484	0	11,204.6	13,349
CNG - 7	CNG Vehicle	29	CNG	181,548	0	8,460.7	18,605
CNG - 8	CNG Vehicle	29	CNG	35,467	0	3,933.8	8,674
CNG - 9	CNG Vehicle	89	CNG	546,449	0	56,050.8	67,881
CNG - 10	CNG Vehicle	4	CNG & Diesel	24,856	844	1,589.2	2,638
CNG - 11	CNG Vehicle	7	CNG & Diesel	48,969	2,229	4,197.4	18,806
CNG - 12	CNG Vehicle	23	CNG & Diesel	194,097	16,799	31,637.1	46,109
CNG - 13	CNG Vehicle	13	CNG & Diesel	118,924	6,011	11,320.6	23,849
CNG - 14	CNG Vehicle	10	CNG & Diesel	50,833	1,713	3,225.3	7,856
CNG - 15	CNG Vehicle	1	CNG & Diesel	2,489	95	179.3	965
CNG - 16	CNG Vehicle	16	CNG & Diesel	136,538	3,662	6,897.2	15,242
CNG - 17	CNG Vehicle	4	CNG & Diesel	36,105	1,623	3,056.0	3,439
CNG - 18	CNG Vehicle	2	CNG & Diesel	15,149	1,169	2,202.3	19,263

Table 2.23. (contd)

Energy-Efficient Vehicle ERO Economic Parameters

ID	Description of Replacement	PV of Installed Cost (1993 $)	RI or ROF	Life Expectancy (Years)	Energy Savings (MBtu)	Annualized Energy Savings (1993 $)	Annualized O&M Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio
CNG -1	CNG Vehicle	110,236	ROF	7	585	13,245	12,801	141,482	2.28
CNG - 2	CNG Vehicle	28,209	ROF	8	131	2,802	2,595	25,533	1.91
CNG - 4	CNG Vehicle	69,239	ROF	8	404	8,626	4,507	60,901	1.88
CNG - 5	CNG Vehicle	28,209	ROF	8	170	3,632	3,840	57,953	3.05
CNG - 6	CNG Vehicle	35,902	ROF	8	278	5,939	3,416	71,327	2.99
CNG - 9	CNG Vehicle	228,233	ROF	9	1,392	29,708	17,369	304,815	2.34
CNG - 10	CNG Vehicle	12,159	ROF	14	17	436	541	705	1.06
CNG - 11	CNG Vehicle	21,278	ROF	14	44	1,153	3,860	52,812	3.48
CNG - 12	CNG Vehicle	72,709	ROF	12	334	9,276	10,212	202,692	3.79
CNG - 13	CNG Vehicle	30,822	ROF	13	119	3,319	5,282	93,827	4.04
CNG - 16	CNG Vehicle	39,453	ROF	10	73	2,149	3,633	24,223	1.61
CNG - 17	CNG Vehicle	9,863	ROF	11	32	952	820	12,382	2.26
CNG - 18	CNG Vehicle	4,742	ROF	12	23	646	4,266	70,099	15.78

3.0 Energy Resource Opportunity Impact Study

All EROs identified in Section 2 of this report are subjected to economic analysis to determine their cost-effectiveness. The economic analysis is part of the FEDS System for developing fuel-neutral assessments of facilities to identify and quantify major efficiency resources, supply alternatives, and fuel-switching opportunities. The intent of the assessment is to identify the major resource alternatives available to decision makers. The economic analysis provides an estimate of the magnitude of the cost-effective resource available at a facility using the most realistic assumptions possible. Individual projects should be examined more thoroughly at a project level at the implementation stage.

Section 3.1 discusses the methodology and assumptions used in the economic analysis, and Section 3.2 defines the analysis metrics. Section 3.3 describes the life-cycle cost evaluation method. Section 3.4 discusses the fuel rates used for the evaluation, and Section 3.5 presents the results of the evaluation for Fort Stewart. Section 3.6 presents additional notes on the analysis.

3.1 Economic Analysis Methodology and Assumptions

According to the provisions of 10 CFR Part 436, federal agencies are required to analyze all potential energy investments using a life-cycle cost (LCC) methodology developed by the National Institute of Standards and Technology (NIST). The NIST LCC methodology calculates all relevant costs of a project and discounts them to result in present dollars, and then subtracts that sum from a similarly constructed LCC of baseline, current conditions or technology. This difference is called the net present value (NPV) of the action being considered. Actions are cost-effective if the NPV is positive and greater than the NPV of alternative actions. Following this methodology results in minimizing the LCC of energy services at a site.

This economic analysis is central to the FEMP model approach for federal energy efficiency using the FEDS System to develop a fuel-neutral assessment of facilities to identify and quantify energy efficiency resources, supply alternatives, and fuel-switching opportunities.

All EROs identified by the FEDS assessment and described in this resource assessment report are therefore subjected to the LCC economic analysis to determine their cost-effectiveness. The purpose of the FEDS assessment is to identify the facility energy efficiency resource alternatives available to decision makers; the economic analysis provides an estimate of the installed cost and energy savings of the cost-effective resource available at a facility using the most current and realistic assumptions possible. Individual projects and actions considered for implementation should be examined and analyzed more thoroughly at a project level prior to design and implementation.

Under the NIST methodology, energy prices are escalated and costs and benefits are discounted using factors taken from the current edition of "Energy Prices and Discount Factors for Life-Cycle Cost Analysis." Costs and benefits are analyzed over a 25-year period, reflecting the average expected remaining life of a typical building. Other key assumptions in the methodology are:

- Prices for all goods and services (e.g., installed cost of a technology) will vary at the same rate as the inflation rate; therefore the "real" rate of inflation is zero.

- Energy or fuel prices vary at a rate different than that of the inflation rate. NIST reports the value by which the energy prices vary from the real rate of inflation (the escalation rate).

- All costs and benefits are discounted using the current federal discount rate (4.0% real for CY 1993).

- All EROs are analyzed for a 25-year period. This does not mean that a 25-year life is assumed for all installed equipment: actual estimates of equipment life are used, and the costs of replacing worn-out equipment over a 25-year period are incorporated. The 25-year analysis period also does not mean that all streams of savings from EROs are assumed to endure 25 years: many are assumed to disappear as the existing equipment is replaced with more efficient equipment as part of the baseline.

- The analysis assumes that up-front unconstrained federal financing (at the federal discount rate) is available for all potential energy efficiency improvements and actions.

The last assumption, unconstrained (unlimited) federal financing, is incorporated into the LCC analysis to determine the total cost-effective energy efficiency resource at a site. Therefore, the analysis (under the unconstrained funding assumption) results in a menu of all identified energy project opportunities whose benefits exceed their costs.

In the presence of constraints on the funding available to implement these projects, some method of prioritizing the projects is needed. For this reason a savings to investment ratio (SIR) is calculated to rank order projects starting with the project with the highest SIR. This ranking allows available capital to be allocated to those cost-effective projects in an order that results in the greatest savings per dollar of investment.

For most agencies or facilities, the entire list of cost-effective projects from the LCC analysis is significant and cannot be financed from a single source. Rather, all available funding sources need to be determined. Funding sources include federal funds (MILCON, ECIP, Federal Energy Efficiency Fund); utility financing including utility offered rebates or other financial assistance; and energy services industry-financed projects. Each of these funding sources has its own requirements and its own costs and therefore, the cost-effectiveness of individual projects needs to be evaluated using the LCC analysis adjusted for each potential funding source's costs and constraints.

Many assumptions in addition to those listed above are required in the course of a FEDS assessment. In every case, the analysis team attempts to make the most realistic and defensible assumption. Where uncertainty exists, the team attempts to err on the side of conservatism. Therefore, the resulting estimate of the total cost-effective energy efficiency resource is a minimum estimate of the total potential resource, given the above assumptions. A more exact estimate and/or the development and design of projects may require a detailed facility audit, which is beyond the scope of a FEDS assessment.

3.1.1 Building Sector Analysis Methodology and Assumptions

The analysis of EROs within the building sector was performed using the FEDS System, a multi-level energy analysis software system. As discussed in Section 1, there are currently two levels of FEDS assessments: Level-1 and Level-2. Level-1 assesses the likelihood of cost-effective energy projects based on high-level facility inputs and numerous assumptions, while Level-2 provides detailed information on energy and cost savings, as well as the estimated investment requirement for specific technology retrofits.

Currently, Level-1 and Level-2 analyze most major building end uses (heating, cooling, lighting, insulation, and service hot water) including their interactive effects (e.g., the effect a lighting technology has on heating and cooling loads). The analysis provides specific installed cost, energy (and demand) charges and life-cycle cost information, by technology. The FEDS analysis is performed using a

sophisticated optimization algorithm that takes into account the complex economic and energy components involved. This optimization algorithm performs energy use simulations for a number of equipment combinations for each building type and finds the optimal set. As part of this algorithm, the FEDS software estimates existing energy consumption for the site-based long-term weather data using a 30-year average. While the estimated consumption may not match any single year's consumption, it should represent the site's average consumption over a number of years, assuming other factors remain constant.

The information on individual retrofit energy and cost savings was generated using the Beta version of FEDS Level-2 software. The optimized building energy consumption output considers all interactive effects between building systems and is based on the assumption of all life-cycle cost-effective retrofits being implemented within a given building. The individual retrofit energy savings estimates represent the opportunity cost to the government of not implementing that retrofit within the optimized building. As such, the sum of the individual retrofit savings estimates is not expected to add to the total optimized building retrofit savings estimate. This is due to the fact that although all interactive effects between building systems are accounted for, the interactive effects between retrofits are not currently accounted for in the Beta version of FEDS. These effects will be accounted for in FEDS Release 2.0, which is forthcoming. For a more thorough discussion on the FEDS analysis approach, see the paper titled "Facility Energy Decision Screening (FEDS) Software System" (Dirks and Wrench (1993).

3.1.2 Non-Building Sector Analysis Methodology and Assumptions

The FEDS software currently analyzes most building end uses, which include heating, cooling, lighting, insulation, and service hot water. There are other building sector EROs that are not currently part of the FEDS software, including motors, exterior lighting, and some building envelope actions such as shade screens and window films. These EROs are evaluated by PNL staff in the same manner that non-building sector EROs (transmission and distribution, vehicles) are evaluated. As with the FEDS analysis, the manual analysis complies with 10 CFR 436; however, because it is not performed using a complex computer model, there are tradeoffs made between the best methods to perform the calculations and the feasibility of those methods.

There are two main differences between the analysis performed by Level-2 and the manual analysis. First, the Level-2 analysis assumes in the baseline situation (what would happen if the ERO was not implemented) that a piece of equipment will be replaced upon failure by the most life-cycle cost-effective piece of equipment, in accordance with 10 CFR 436. The manual analysis uses a baseline defined in conjunction with site personnel; therefore, the baseline may not always reflect replacement of exhausted equipment with the most life-cycle cost-effective equipment.

Second, the manual analysis uses actual energy consumption data to determine base energy consumption, and then applies an estimate of savings to that consumption. The Level-2 analysis, on the other hand, bases its energy consumption estimate on 30-year average weather data. Ideally, the manual estimate would be weather-normalized; however, the data required for such an effort are difficult to obtain. The result of this is that, unless the actual year's weather was similar to the 30-year average, the consumption estimates will be different, as is the case at Fort Stewart.

The manual analysis is based on consumption data gathered during FY 1990, a warmer year than the 30-year average (see Table 3.16). Thus, it would be expected that the Level-2 estimate of consumption would

be higher than the FY 1990 consumption for all fuels used for heating, and lower for all fuels used in cooling. All major fuels (electricity, fuel oil #2, natural gas, and propane) are used for heating, while electricity is the only fuel used for cooling. Because electricity is used for both heating and cooling, the difference between the FY 1990 use and estimated use would depend on the percentage of electricity that goes to heating versus the percentage that goes toward cooling. Table 3.17 contains the annual facility energy use by fuel type, excluding fuel use for the central plant. As expected, all fuel consumption estimates are greater than the FY 1990 values. Table 3.18 presents the actual annual energy use by fuel type and end-use technology. Heating use for all fuels exceeds cooling use for all fuels, which confirms our assumption that the Level-2 estimate of fuel use should be higher than the FY 1990 consumption.[a]

3.2 Economic Analysis Metrics Used

The EROs described in Section 2 were analyzed in a number of ways, with the intent of presenting a variety of analysis metrics. An analysis metric is a numerical measure of the attractiveness of an ERO as an investment. Different analysis metrics are used for different purposes. Some economic metrics commonly used to evaluate measure effectiveness include net present value, the savings to investment ratio, and the discounted payback period.

3.2.1 Net Present Value

The most useful analysis metric is the net present value (NPV), expressed in dollars. The NPV, as described in Section 3.3.6, is the difference between the LCCs of a project and its baseline. This is equivalent to saying that the NPV is the present value of all of the benefits associated with an ERO, less the present value of all of the costs of the ERO. The concept of present value is discussed in more detail in the following paragraphs. The NPV is used to define the cost-effectiveness of an ERO: a negative NPV means that the costs of an ERO outweigh its benefits, while a positive NPV means that the benefits are greater than the costs. The higher the NPV, the better.

The costs and the benefits of an efficiency investment occur at different periods of time, which must be accounted for in the analysis. The timing of the streams of costs and benefits is accounted for in an LCC analysis by converting all streams to present values. Present values account for the fact that a dollar today is worth more than a dollar tomorrow, for two primary reasons: general price inflation and the time value of money. In the face of general price inflation, the purchasing power of a dollar declines over time, and since the true value of money lies in what it is capable of purchasing, inflation causes its value to decline. The time value of money refers to the fact that even in the absence of general price inflation, money received sooner is preferred to money received later.

It is this preference for consuming sooner rather than later that leads to the existence of positive rates of interest, even in the absence of price level inflation. Individuals and firms are willing to pay a premium to obtain goods and services sooner rather than later: the premium they are willing to pay is the "real rate of interest." (Although interest rates are generally positive, negative rates can exist for short periods of time, but cannot persist.) The market rate of interest, or the "nominal" rate, is the real rate plus the rate of inflation (this is a slight simplification).

(a) This assumes that most of the electricity serving the central plant is used for heating; therefore the percentage of electricity used for heating is approximately 21%, while cooling comprises only 16% of electricity use.

3.2.2 Savings to Investment Ratio

The savings to investment ratio (SIR) is used to prioritize a group of minimum LCC EROs. For example, suppose a total of 100 EROs were evaluated. Of these, suppose 25 had negative NPVs, leaving 75 EROs to consider. Of these, say that there are 5 groups of mutually exclusive pairs, and that the highest NPV ERO of each group is selected. This results in the elimination of 5 EROs, for a grand total of 70 EROs to be implemented. Suppose the total cost of implementing all 70 is $5 million, and the facility has an annual budget for energy modernization projects of $1 million. The SIR would be used to determine which of the 70 EROs provide the greatest "return on investment," thereby deserving immediate implementation. It is important to note that selection of cost-effective EROs should not be done on the basis of the SIR. That would not minimize the LCC. Rather, it is necessary to select the cost-effective set of EROs on the basis of their NPVs. The SIR should only be used for prioritization.

3.2.3 Discounted Payback Period

The discounted payback period was calculated to illustrate the time frame over which an investment would pay for itself with savings in energy, demand, O&M, and replacement capital expenditures. The dollar streams used in the payback calculation are discounted to compensate for the time value of money, and annualized values are used to allow for comparison of projects that have differing cost and savings time profiles. The discounted payback should not be used to select among mutually exclusive projects, as this will lead to a failure to acquire much of the cost-effective resource. Discounted payback can be used to prioritize among a set of selected projects. Discounted payback will sort projects in the same order as the SIR.

3.3 Life-Cycle Cost Evaluation Method

Federal agencies are required to evaluate energy-related investments on the basis of minimum life-cycle costs (10 CFR Part 436). A life-cycle cost evaluation computes the total long-run costs of a number of potential actions, and selects the action that minimizes the long-run costs. The life-cycle cost (LCC) of a potential investment is the present value of all of the costs associated with the investment over time. The first step in calculating the LCC is the identification of the relevant costs: these are listed in Table 3.1.

3.3.1 Life-Cycle Cost Calculation

The LCC of an alternative is calculated by summing the present values of the installed cost, the annual energy cost, the annual O&M cost, and the replacement cost, as shown in Equation 3.1.

$$LCC = PV(IC) + PV(EC) + PV(OM) + PV(REP) \tag{3.1}$$

where
- LCC = Life-Cycle Cost
- PV(IC) = Present value of installed cost
- PV(EC) = Present value of annual energy cost
- PV(OM) = Present value of annual O&M cost
- PV(REP) = Present value of future replacement cost

Table 3.1. Cost Elements in a Life-Cycle Cost Analysis

Cost Element	Description	Example
Installed Cost	Cost of materials purchased and the labor required to install them.	Price of an energy efficient lighting fixture, plus cost of labor to install it.
Energy Cost	Annual expenditures on energy to operate equipment.	A lighting fixture that draws 100 watts and operates 2,000 hours annually requires 200,000 watt-hours (200 kWh) annually. At an electricity price of $0.10 per kWh, this fixture has an annual energy cost of $20.
Non-fuel Operations and Maintenance	Annual expenditures on parts and activities required to operate equipment.	Replacing burned out light bulbs.
Replacement Costs	Expenditures to replace equipment upon failure.	Replacing an oil furnace when it is no longer usable.

3.3.2 Installed Cost

The installed cost is the one-time, first cost of an ERO. Replacement of existing equipment in the baseline case is covered by the replacement cost category. The present value of installed cost is used because not all EROs are "replace-immediately" (RI) actions. In those cases where the ERO is to be implemented immediately, the present value of the installed cost is equal to the installed cost. When implementation of an ERO is scheduled for some future time, however, as in the case of "replace-on-failure" (ROF) EROs, the installed cost paid at that time must be discounted back to the present. The calculation for the present value of installed cost is equal to:

$$PV(IC) = \frac{IC}{(1+d)^N} \tag{3.2}$$

where PV(IC) = Present value of installed cost
IC = Installed cost
d = Discount rate
N = Number of years until failure or removal of existing equipment

3.3.3 Energy Cost

The present value of the annual energy cost is composed of both energy and demand costs. Energy costs represent the recurring annual expenditures on energy to operate equipment. These costs include both the fuel costs for consumption and the demand charges. The estimated stream of annual energy and demand costs over the analysis period is adjusted to account for increasing real energy prices, and is discounted to determine the present value of the future cost stream. This adjustment for price escalation

and discounting is accomplished through the use of a modified uniform present worth factor (UPW*). The UPW* incorporates the discount rate and the projected energy price rates of change. For ROF measures, the existing stream of costs is assumed to continue until failure of the existing equipment, at which time the ERO cost stream replaces it. The UPW* is calculated using Equation 3.3.

$$UPW^*_N = \sum_{n=1}^{N} \frac{I_{(1992+n)}}{(1+d)^n} \tag{3.3}$$

where UPW* = Modified uniform present worth factor
n = Counter used to designate each year, with n=1 for the year 1993;
N = Number of periods over which energy costs or savings accrue;
$I_{(1992+n)}$ = Projected average fuel price index, provided by NIST
d = Discount rate

The present value of energy costs is then calculated using Equation 3.4:

$$PV(EC) = AEC \times UPW^*_N \tag{3.4}$$

where PV(EC) = Present value of energy cost
AEC = Annual energy and demand cost
UPW^*_N = Modified uniform present worth factor.

This calculation has been complicated at Fort Stewart due to the type of electricity structure under which the Fort receives its electricity. The rate schedule, discussed more thoroughly in Appendix A, has a seasonal demand ratchet, so the value of demand savings is not realized until the summer months. Therefore, the present value of the energy costs of the ERO must be adjusted so as not to include the value of the first five months of demand savings. This is accomplished using Equation 3.5. This adjusted value is added to the present value of the energy costs of the ERO.

$$A = \frac{e_n}{(1+d)^n} \times V_{DS} \times m \times P \tag{3.5}$$

where A = Adjustment value
e_n = Fuel escalation rate in year n
d = Discount rate
VDS = Value of demand savings
m = Proportionate number of months not affected by demand savings in first year (5/12)
P = Ratchet percentage in effect during unaffected months

3.3.4 Operations and Maintenance Cost

The present value of the annual operations and maintenance (O&M) cost is the discounted stream of annual non-fuel expenditures on parts and activities required to operate the equipment. The present value of the stream of expenditures is calculated using the uniform present worth factor (UPW). As with energy costs, for ROF measures the existing stream of costs is assumed to continue until failure of the existing equipment, at which time the ERO cost stream replaces it. The UPW is calculated using Equation 3.6.

$$UPW_N = \frac{(1 + d)^N - 1}{d\,(1 + d)^N} \tag{3.6}$$

where UPW = Uniform present worth factor
d = Discount rate
N = Number of periods over which the costs or savings accrue.

The present value of operations and maintenance savings is then given by Equation 3.7.

$$PV(OM) = OM \times UPW_N \tag{3.7}$$

where PV(OM) = Present value of annual O&M costs
OM = Annual O&M expenditures
UPW_N = Uniform present worth factor.

3.3.5 Replacement Cost

Although the installed cost category covers the first cost of implementing an ERO, subsequent equipment installations fall into the replacement cost category, as do all equipment costs associated with the baseline case. Unlike energy and O&M expenditures, replacement costs are not regular, annual expenses. The present value of the replacement cost is the discounted stream of expenditures to replace equipment upon failure. While the cost to replace a piece of equipment is actually borne in the year in which the equipment is bought, the replacement costs are annualized for this analysis. Any part of the annualized cost that would be borne after the analysis period is then subtracted off of the total, in effect adding a salvage value. If the remaining time in the analysis period is less than the life of equipment installed for the ERO, the installed cost will overstate the true cost. The replacement cost calculation corrects for this overstatement. In this type of situation, the PV (Replacement Cost) is negative, corresponding to negative replacement costs (salvage value).

Existing equipment is assumed to have no salvage value or disposal cost. While these may not be entirely accurate assumptions, they partially offset each other. If salvage value is to be included for existing equipment, a few requirements must be met. First, it must be likely that the base will actually carry out a salvage process rather than dispose of the equipment. Regardless of value, if the base does not carry out this process, no savings will be accrued. Second, the salvage value should be the actual value of the equipment in its existing condition, less all costs associated with preparing it for sale and selling it. If this resulting net value is not greater than the disposal cost, then it should be ignored for analysis purposes. The replacement cost is annualized as shown in Equation 3.8, and the PV (Replacement Cost) is calculated using Equation 3.9.

$$REP_A = REP \times \frac{d}{1 - (d + 1)^{-L}} \tag{3.8}$$

$$PV(REP) = REP_A \times UPW_{25-N} \tag{3.9}$$

where REP_A = Annualized replacement cost
REP = Replacement cost
d = Discount rate
L = Life of ERO equipment
N = Number of periods until replacement
$PV(REP)$ = Present value of annualized replacement cost
UPW_N = Uniform present worth factor, as discussed in Section 3.3.4.

Equation 3.8 yields a present value at the time of replacement, rather than at the beginning of the analysis period. This value must be discounted to current dollars using the single present worth factor (SPW). While the UPW is used to calculate the present value of a stream of annual costs or savings, the SPW is used to find the present value of a single non-annual amount. The SPW is calculated using Equation 3.10, and the present value of replacement costs in current dollars is represented by Equation 3.11.

$$SPW_N = \frac{1}{(1 + d)^N} \tag{3.10}$$

$$PV_c(REP) = PV(REP) \times SPW_N \tag{3.11}$$

where $PV_c(REP)$ = Current dollar present value
REP = Replacement cost
d = discount rate
N = number of periods until replacement
SPW_N = Single present worth factor.

3.3.6 Net Present Value Calculation

Energy resource opportunities are selected for implementation on the basis of their net present value (NPV). The NPV of an ERO is the life-cycle savings of the ERO as compared to not implementing the ERO:

$$NPV = LCC - LCC' \tag{3.12}$$

where NPV = the net present value of the ERO,
LCC = the life-cycle cost of the existing situation,
LCC' = the life-cycle cost if the ERO is implemented.

Most EROs are selected according to a very simple rule: if the NPV is positive, then the project should be undertaken. If the NPV is zero or negative, then the ERO should not be implemented. A positive NPV means the long-run costs of the ERO are less than the long-run costs of the existing situation.

The selection criteria can be complicated by a number of factors. If the ERO is part of a set of mutually exclusive options, then only the option with the highest NPV is selected. For example, many of the motors at Fort Stewart can be replaced with energy-efficient models, or a variable speed drive (VSD) can be added to the existing motor, or the existing motor can be replaced with an energy-efficient model with a VSD. The analysis would proceed by calculating the LCC of the existing motors, the LCC of energy-efficient motors, and the LCC of VSDs added to both the existing and the energy-efficient motor. Any of the EROs might be chosen, or it may be optimal to do nothing. If the NPV of two or more EROs considered is positive, then the ERO with the highest NPV would be selected.

3.3.7 Savings to Investment Ratio Calculation

The savings to investment ratio (SIR) is equal to the total savings of an ERO divided by the installed cost of that ERO. Any ERO with an SIR greater than 1 indicates that the savings outweigh the costs. Thus, an SIR of 1 denotes an NPV of 0. As noted earlier, the SIR is only to be used as a prioritization measure, rather than a selection device. Equation 3.13 defines the SIR.

$$SIR = \frac{PV(ES) + PV(OMS) + PV(REPS)}{PV(IC)} \tag{3.13}$$

where SIR = Savings to investment ratio of an ERO,
PV(ES) = Present value of energy savings of an ERO,
PV(OMS) = Present value of O&M savings of an ERO,
PV(REPS) = Present value of replacement savings of an ERO, and
PV(IC) = Present value of the installed cost of an ERO.

3.3.8 Discounted Payback Period Calculation

The discounted payback period is the present value of the installed cost divided by the annualized present value of total savings. Equations 3.14 and 3.15 show the calculation of the annualized present value of total savings, and Equation 3.16 shows the calculation of the discounted payback period.

$$TS = PV(ES) + PV(OMS) + PV(REPS) \tag{3.14}$$

where TS = present value of total savings associated with an ERO,
PV(ES) = Present value of energy and demand savings of an ERO,
PV(OMS) = Present value of O&M savings of an ERO,
PV(REPS = Present value of replacement savings of an ERO.

$$ATS = TS \times \frac{d}{1-(d+1)^{-P}} \tag{3.15}$$

where ATS = annualized total savings associated with an ERO,
TS = present value of total savings associated with an ERO,
d = discount rate
P = analysis period.

$$DPB = \frac{PV(IC)}{ATS} \tag{3.16}$$

where DPB = discounted payback period,
PV(IC) = Present value of the installed cost of an ERO,
ATS = annualized total savings associated with an ERO.

3.4 Fuel Cost Determination

In order to examine the energy resource opportunities (EROs) at Fort Stewart, marginal fuel costs must be calculated. The marginal, or avoided, cost of fuel service is used in conjunction with the estimated energy savings of an ERO to calculate the dollar value of those savings. In the case of natural gas, the costing becomes more complicated due to the installation of a propane-air mixing station, while the electricity cost is more difficult due to the type of rate schedule under which Fort Stewart purchases its electricity.

3.4.1 Natural Gas Cost Determination

In addition to the natural gas rate structure, some costs associated with the propane-air station must also be incorporated in the cost analysis. The propane-air station is being built under a shared energy savings (SES) contract. The building of a propane-air station allows Fort Stewart to purchase natural gas from their local utility at an interruptible rate, which is lower than the rate for contracting natural gas on a firm basis. The propane-air station will also provide Fort Stewart with fuel in the event that the natural gas supply is curtailed. While the propane-air station does not affect the actual cost of natural gas, it does affect the cost of services provided by gas. Because the propane-air station and the SES contract affect the cost of gas service, they must be included in the analysis.

Our analysis indicates a marginal cost of gas service of 30.0 cents per therm, assuming a total propane usage by the mixing station of 42,278 gallons (38,600 therms) annually. Because the amount of propane that may be required in the event of a curtailment is small relative to the total service requirement, variations in the actual amount should not significantly affect the cost per therm. A more detailed explanation of the analysis can be found in Appendix A, or by referring to the report, "Natural Gas Cost for Evaluating Energy Resource Opportunities at Fort Stewart" (Stucky and Shankle 1993).

3.4.2 Electricity Cost Determination

The cost of electricity at Fort Stewart is complicated by the structure of the rate schedule under which Fort Stewart purchases its electricity. Fort Stewart purchases its electricity from Georgia Power Company (GPC) under GPC's government rate, schedule G-10, that incorporates declining block rates. The structure of a declining block rate is such that the cost per unit of electricity declines as electricity consumption increases. To further complicate matters, the G-10 structure incorporates a "floating" cut-off point between the last two blocks of the rate structure. This floating point is based on billing demand.

The G-10 schedule bases billing demand on the peak 30 minute kW draw within the billing month and the preceding 11 months based on a seasonal ratchet. At Fort Stewart, the seasonal ratchet in effect is the summer ratchet. Historical data indicates that demand usually peaks in at least three of the four summer months. The remaining eight months then have billing demand set at 95% of the peak summer month. Consequently, the value of demand savings must be based on billing demand savings, and not demand savings. If an ERO was assumed to save energy during any or all of the summer months, it followed that the change in annual billing demand was equal to four months of actual demand change and eight months of 95% of the demand change, as shown in Equation 3.17. This would be true even if the ERO reduced demand only in the summer months. Under the G-10 rate structure, any measure that reduces demand during the summer months affects billing demand through the winter months. Conversely, if an ERO was assumed to reduce demand in only the winter months, it would not affect billing demand, and therefore the demand savings would be zero for that particular ERO.

$$\Delta D = 4 \times DS + 8 \times (0.95 \times DS) \tag{3.17}$$

where ΔD = annual change in billing demand (kW)
DS = kW change per 30 minute period, summer month demand

While billing demand may not peak in all four summer months, historically it has peaked in at least three of the four, and the difference in the value of cost savings between demand based on a 4:8 or 3:9 month setting was assumed to be minimal.

The total cost savings associated with an ERO can be determined using Equation 3.18, which is simply the derivative of the G-10 electricity bill calculation formula.

$$CS = \$8.85 \times \Delta D + (\$0.0115 + FCR) \times \Delta E \tag{3.18}$$

where CS = total cost savings
ΔE = annual change in electricity consumption (kWh)
ΔD = annual change in billing demand (kW), as determined in Equation 3.16.
FCR = Fuel cost recovery rate, currently \$0.013471 per kWh.

Equation 3.18 also exhibits the savings associated with demand (demand savings) and savings associated with consumption or usage (electricity savings). For the Fort Stewart analysis, demand savings should be valued at \$8.85 per kW and energy savings at \$0.0115 plus FCR per kWh.

3.5 Summary of ERO Impact Study

Table 3.2 defines the assumptions that are common to all of the EROs analyzed. The rates in effect are straightforward; however, mention should be made as to the calculation of the full cost of energy. In a forthcoming PNL report, "Determining Appropriate Energy Costs for Federal Residential Building Standards Analysis," by S. A. Shankle et al., the authors note that the appropriate cost of energy to use in determining the correct level of investment in energy-efficient construction should include the following elements:

1. Energy rates paid to the supplier by the federal facility;
2. Avoidable demand charges;
3. Avoidable distribution system losses;
4. Avoidable distribution system capital costs;
5. Avoidable external costs of energy supply and distribution.

The incorporation of the above elements is referred to as the "full cost" of energy. Current federal life-cycle costing methods do not include the cost of environmental externalities unless they are reflected in some manner within the utility bill. The external cost of energy will increasingly become internalized within the LCC process, however, due to such factors as utility least-cost planning, the 1990 Amendments to the Clean Air Act, and emissions trading. As these costs become internalized, they will be reflected in the actual cost of energy paid by the facility, and will no longer need to receive separate consideration.

Table 3.2. Assumptions Used in LCC Analysis

Discount Rate: 4.0% real	
Analysis Period: 25 years	
Current Fuel Prices:	
Natural Gas:	$0.2999/Therm
Electricity:	
Energy	$0.024971/kWh
Demand	$8.85/kW
Propane:	$0.679/gallon
Fuel Oil:	$0.690/gallon
Gasoline:	$0.860/gallon
Diesel:	$0.730/gallon
Fuel Conversion Factors:	
Natural Gas:	10.00 Therms/MBtu
Electricity:	292.997 kWh/MBtu
Propane:	10.953 gallons/MBtu
Fuel Oil:	7.2046 gallons/MBtu
Gasoline:	7.8309 gallons/MBtu
Diesel:	7.2046 gallons/MBtu

Table 3.3 defines the column headings used in the remaining tables in this section. One of the distinctions made is between first year energy savings and full implementation energy savings. First year energy savings are those savings that should be experienced after the first year of the analysis. These savings will be zero for EROs that will not be implemented immediately. Full implementation energy savings are those savings that should be experienced after the ERO has been fully implemented; either after the first year, or sometime in the future. Differences in these numbers can be caused when an ERO is implemented in steps; for example, when a variable speed drive (VSD) is added immediately to an existing motor, there are immediate savings associated with that action (first year savings); however, the second part of the ERO is to replace the existing motor when it fails with an energy efficient motor. Once this has been done, the equipment should experience the full savings of the ERO action, that is the full implementation savings.

The annual energy and demand reductions and the present values of costs and savings for all EROs are presented in Tables 3.5 and 3.6. All tables except Tables 3.10 and 3.11 have been sub-divided into two groups: building EROs (evaluated using Level-2) and non-building EROs (manual evaluation process). Many EROs have negative NPVs, and so are not cost-effective. Many others are cost-effective, but are inferior to an alternative ERO. Tables 3.7 and 3.8 present the annual energy and demand reductions and the present values of costs and savings for all cost-effective EROs that are not excluded by an ERO with a higher NPV. The annualized values of the costs and savings for these EROs are given in Table 3.9. Tables 3.10 and 3.11 present cumulative values for the energy and demand reductions and the costs and savings for the cost-effective EROs. The cumulative values are calculated by sorting the EROs by their SIRs, and then summing the values over the EROs. The resulting table allows the reader to compare the total energy, demand, and dollar savings available for any given level of total investment. A cumulative SIR is calculated as well. The cumulative SIR shows the SIR of all EROs up to that point, if all were implemented as a single project. The SIR of each individual ERO is shown as well, to illustrate how the EROs were sorted.

The total energy, demand, and dollar savings, as well as the overall NPV and SIR are presented in Table 3.14. The cost-effective efficiency resource at Fort Stewart is estimated to be over 200,000 MBtu for building EROs; and almost 45,000 MBtu the first year for non-building EROs, rising to over 50,000 MBtu after full implementation of all non-building EROs. The Level-2 model does not break out demand savings, however, the non-building EROs represent demand savings of 18,000 kW the first year, and over 20,000 kW after all non-building EROs have been fully implemented.

Estimated annual energy consumption using Level-2 is approximately 948,698 MBtu (see Section 3.1.2 for discussion), including chilled water and district hot water. The building energy savings would be equivalent to 21.1% of estimated annual energy consumption. Typical annual energy consumption, as determined by actual consumption figures, at Fort Stewart is approximately 766,119 MBtu. This number excludes the use of wood chips and fuel oil #5, as these fuels were not addressed by any of the EROs, but includes other fuel use by the central plant. This number also includes only the gasoline and diesel consumption of vehicles for which EROs were proposed; any other gasoline and diesel consumption is not included in the total. The non-building energy savings would be equivalent to 6.6% of typical annual total energy consumption (see Table S.2 in Volume 2 for annual totals). Demand savings would be equivalent to 7.4% of typical annual electricity demand.

These savings can be broken down further into electricity and fossil fuel savings. For building EROs, the estimated annual electricity consumption at Fort Stewart is 138,180 MWh. Full implementation of all electric EROs results in a reduction of almost 24,900 MWh. This represents a reduction of approximately

Table 3.3. Description of Column Headings

All Tables (Except Summaries)

Column Heading	Description	Unit
End Use	Designates the general end-use of an ERO.	End Use
Building Set Number	Designates the building set number used in the FEDS analysis.	Bldg. Set No.
Building Type	Designates the building type used in building (FEDS) analysis; descriptive field in non-building analysis - designates the specific equipment or facility affected.	Building Type
Use Area	Designates the specific equipment or facility affected.	Use Area
Existing Technology	Equipment that is affected by the ERO	Equipment
Resulting Technology	Describes the ERO. See Section 2 of this document for complete descriptions of each ERO. Also indicates whether the ERO is to be done now or in the future (RI vs. ROF) for non-building EROs.	Description

Annual Energy and Demand Reduction Tables

Column Heading	Description	Unit
First Year Energy Savings	Energy savings that will be realized in the first year.	MBtu per year
First Year Demand Savings	Demand savings that will be realized in the first year.	kW-month per year
Full Implementation Energy Savings	Energy savings that will be realized once the ERO is fully implemented.	MBtu per year
Full Implementation Demand Savings	Demand Savings that will be realized once the ERO is fully implemented.	kW-month per year
Net Present Value	Reduction in life-cycle cost due to ERO. Equals present value of total savings less present value of installed cost.	1993 Constant dollars
Savings to Investment Ratio	Present value of total savings divided by present value of installed cost.	None
Discounted Payback Period	Present value of installed cost divided by annualized value of total savings.	Years.

Table 3.3. (contd)

Present Value of Costs and Savings Tables

Column Heading	Description	Unit
Present Value of Installed Cost	Present value of the labor and materials cost of implementing the ERO. Equals actual cost for immediate EROs, discounted cost for ROF EROs.	1993 Constant dollars
Present Value of Energy Savings	Present value of the energy cost savings that will be realized after implementation of ERO.	1993 Constant dollars
Present Value of Demand Savings	Present value of the electricity demand cost savings that will be realized after implementation of the ERO.	1993 Constant dollars
Present Value of O&M Savings	Present value of the stream of maintenance cost reductions attributable to the ERO. May be negative, indicating ERO has higher maintenance costs than the current equipment.	1993 Constant dollars
Present Value of Replacement Savings	Present value of the stream of replacement cost savings attributable to the ERO. May be negative, indicating that the ERO has higher replacement costs than the current equipment.	1993 Constant dollars
Present Value of Total Savings	Sum of energy, demand, O&M, and replacement savings associated with the ERO.	1993 Constant dollars
Net Present Value	Reduction in life-cycle cost due to ERO. Equals present value of total savings less present value of installed cost.	1993 Constant dollars
Savings to Investment Ratio	Present value of total savings divided by present value of installed cost.	None
Discounted Payback Period	Present value of installed cost divided by annualized value of total savings.	Years.

Table 3.3. (contd)

Annualized Values of Costs and Savings Tables

Column Heading	Description	Unit
Annualized Installed Cost	Annualized value of the labor and materials cost of implementing the ERO. Equals actual cost for immediate EROs, discounted cost for ROF EROs. Calculated from the present value.	1993 Constant dollars
Annualized Energy Savings	Annualized value of the energy cost savings that will be realized after implementation of ERO. Calculated from the present value.	1993 Constant dollars
Annualized Demand Savings	Annualized value of the electricity demand cost savings that will be realized after implementation of the ERO. Calculated from the present value.	1993 Constant dollars
Annualized O&M Savings	Annualized value of the stream of maintenance cost reductions attributable to the ERO. May be negative, indicating ERO has higher maintenance costs than the current equipment. Calculated from the present value.	1993 Constant dollars
Annualized Replacement Savings	Annualized value of the stream of replacement cost savings attributable to the ERO. May be negative, indicating that the ERO has higher replacement costs than the current equipment. Calculated from the present value.	1993 Constant dollars
Annualized Total Savings	Sum of energy, demand, O&M, and replacement savings associated with the ERO.	1993 Constant dollars
Annualized Net Savings	Annualized reduction in life-cycle cost due to ERO. Equals annualized total savings less annualized installed cost.	1993 Constant dollars
Savings to Investment Ratio	Annualized total savings divided by present value of installed cost.	None

Table 3.3. (contd)

Cumulative Annual Energy and Demand Reduction Tables

Column Heading	Description	Unit
Cumulative First Year Energy Savings	Energy savings that would be realized in the first year if all EROs with equal and higher SIRs were implemented.	MBtu per year
Cumulative First Year Demand Savings	Demand savings that would be realized in the first year if all EROs with equal and higher SIRs were implemented.	kW-month per year
Cumulative Full Implementation Energy Savings	Energy savings that would be realized once the ERO is fully implemented, if all EROs with equal and higher SIRs were implemented.	MBtu per year
Cumulative Full Implementation Demand Savings	Demand Savings that would be realized once the ERO is fully implemented, if all EROs with equal and higher SIRs were implemented.	kW-month per year
Cumulative Net Present Value	Reduction in life-cycle cost if all EROs with equal and higher SIRs were implemented. Equals cumulative value of total savings less cumulative value of installed cost.	1993 Constant dollars
Cumulative Savings to Investment Ratio	SIR of entire project if all EROs with equal and higher SIRs were implemented. Equals cumulative value of total savings divided by cumulative value of installed cost.	None
Cumulative Discounted Payback Period	Discounted payback of entire project if all EROs with equal and higher SIRs were implemented. Equals cumulative value of installed cost divided by annualized cumulative value of total savings.	Years.
Individual ERO Savings to Investment Ratio	Present value of total savings divided by present value of installed cost for individual ERO.	None

Table 3.3. (contd)

Cumulative Present Value of Costs and Savings Tables

Column Heading	Description	Unit
Cumulative Present Value of Installed Cost	Present value of the labor and materials cost of implementing entire project, if all EROs with equal and higher SIRs were implemented	1993 Constant dollars
Cumulative Present Value of Energy Savings	Present value of the energy cost savings that would be realized after implementation of ERO, if all EROs with equal and higher SIRs were implemented.	1993 Constant dollars
Cumulative Present Value of Demand Savings	Present value of the electricity demand cost savings that would be realized after implementation of the ERO, if all EROs with equal and higher SIRs were implemented.	1993 Constant dollars
Cumulative Present Value of O&M Savings	Present value of the stream of maintenance cost reductions, if all EROs with equal and higher SIRs were implemented.	1993 Constant dollars
Cumulative Present Value of Replacement Savings	Present value of the stream of replacement cost savings, if all EROs with equal and higher SIRs were implemented.	1993 Constant dollars
Cumulative Present Value of Total Savings	Sum of energy, demand, O&M, and replacement savings if all EROs with equal and higher SIRs were implemented	1993 Constant dollars
Cumulative Net Present Value	Reduction in life-cycle cost if all EROs with equal and higher SIRs were implemented. Equals cumulative value of total savings less cumulative value of installed cost.	1993 Constant dollars
Cumulative SIR	SIR of entire project if all EROs with equal and higher SIRs were implemented. Equals cumulative value of total savings divided by cumulative value of installed cost.	None
Cumulative Discounted Payback Period	Discounted payback of entire project if all EROs with equal and higher SIRs were implemented. Equals cumulative value of installed cost divided by annualized cumulative value of total savings.	Years.
Individual ERO SIR	Present value of total savings divided by present value of installed cost for individual ERO.	None

18.0% over total electricity consumption. The estimated annual fossil fuel consumption (natural gas, #2 fuel oil,and propane) at Fort Stewart is 249,365 MBtu. Full implementation of all fossil fuel EROs results in net conservation of 57,946 MBtu. This represents net conservation of 23.2% of total consumption. The end uses of chilled water and district hot water were not broken out by fuel. The estimated annual chilled water use is 9,271,891 ton-hours. Full implementation of all chilled water EROs results in a reduction of 1,640,154 ton-hours, or 17.7% of total consumption. The estimated annual district hot water use is 115,595 MBtu. Full implementation of all district hot water EROs results in a reduction of 37,596 MBtu, or 33% of total consumption.

For non-building EROs, the estimated annual electricity consumption at Fort Stewart is 149,500 MWh. Full implementation of all electric EROs results in a reduction of 13,700 MWh. This represents a reduction of approximately 9.2% over total electricity consumption. The estimated annual fossil fuel consumption (natural gas, #2 fuel oil, propane, gasoline, and diesel) at Fort Stewart is 255,875 MBtu. This total excludes wood chip and fuel oil #5 use, as well as any diesel and gasoline used for vehicles not addressed through EROs. Full implementation of all fossil fuel EROs results in conservation of 21,614 MBtu and a new load of 18,012 MBtu for a net reduction of 3,602 MBtu. This represents conservation of 8.4% of total consumption, new load of 7.0%, and an overall decrease of 1.4%.

The total cost-effective resource for building EROs would require an investment with a present value of over $10.7 million and would generate overall savings with a present value of $35.7 million. The net present value of the investment would be almost $25 million, with an overall SIR of 3.33 and a discounted payback of 4.7 years. The annualized value of the energy and demand savings would be over $1.8 million, or 20.3% of estimated annual energy costs (Level-2 calculated expenditures to be $9,133,936).

The total cost-effective resource for non-building EROs would require an investment with a present value of over $3.5 million, would generate energy and demand savings with a present value of over $10.3 million, and would generate overall savings with a present value of $12 million. The net present value of the investment would be over $8.5 million, with an overall SIR of 3.42 and a discounted payback of 4.6 years. The annualized value of the energy and demand savings would be $663,000, or 7.6% of estimated annual energy costs (see Table S.2 in Volume 2 for annual totals). 1990 expenditures from Volume 2, adjusted with prices used in the LCC analysis, were used to calculate this percentage. See Section 3.6 for an explanation of this adjustment process.

The cost-effective results have been aggregated by ERO category. The ERO category results are presented in Table 3.12, and the annualized values for the non-building EROs are presented in Table 3.13. For building EROs, hot water EROs represent the greatest efficiency resource, accounting for 31% of the total energy savings. Lighting and heating EROs also represent significant savings; each are approximately 25% of the total 200,571 MBtu savings available. Cost information broken out by ERO category is not available for building EROs at this time.

For non-building EROs, motors represent the greatest efficiency resource, accounting for $5.5 million of the total $8.5 million NPV and over $2.7 million of the total $3.5 million installed cost. The remaining non-building ERO categories have NPVs ranging from $0.8 million to $1.8 million, with the exception of the cooling EROs which are only marginally cost-effective with an NPV of $82,000. The highest SIR is represented by the transmission and distribution EROs.

The LCC results have also been combined into a fuel balance table, as presented in Table 3.15. For the buildings EROs, this table (Table 3.15a) shows the existing energy use, resulting energy use, and net conservation for each fuel, plus the end uses of chilled water and district hot water. The non-building ERO

table (Table 3.15b) shows the existing energy use, conservation, new load, resulting use, and net conservation for each fuel. Similar figures are also provided for demand. The new load columns are necessary due to the fuel-switch to natural gas. Experience at other bases has shown increased natural gas use to be a common result of minimum life-cycle cost analyses. The net conservation columns are the difference between conservation and new load. The resulting use columns are derived by subtracting net conservation from existing use.

3.6 Additional Notes

- The Section 3 tables report the LCC values for individual vehicle EROs. These do not include the costs of the construction of filling stations as it is difficult to allocate the cost of filling stations to individual EROs. If the vehicles EROs were to be implemented, a more detailed analysis would be required to determine the costs of the filling stations and to incorporate these costs into the LCC analysis.

- As mentioned in Section 3.5, total expenditures on energy during 1990, as found in Volume 2, were adjusted with current prices in order to estimate the percentage of dollar savings available. Table 3.4 lists 1990 expenditures, the adjustment factor used for the conversion, and the adjusted expenditures for each fuel type.

Table 3.4. Summary of Expenditure Adjustment Process

Fuel	1990 Expenditures	Adjustment Factor	Adjusted Expenditures
Diesel	$62,313	1	$62,313
Electricity	$7,040,000	0.0457/0.0471	$6,839,573
Fuel Oil #2	$272,232	0.69/0.56	$335,632
Fuel Oil #5	$297,421	1	$297,421
Gasoline	$112,966	1	$112,966
Natural Gas	$779,000	3.02/5.41	$434,556
Propane	$76,800	0.679/0.443	$117,815
Wood Chips	$580,000	1	$580,000
Totals	$9,220,732		$8,780,276

The adjustment factor is the ratio of the prices used in the LCC analysis to the prices used in the Volume 2 baseline report. Expenditures for diesel and gasoline were not reported in the Volume 2 document, so no adjustment was necessary. Expenditures for gasoline and diesel were calculated by using existing vehicle consumption of vehicles for which EROs were proposed, and then multiplying those consumption figures by the appropriate rates, as reported in Table 3.2. Prices for wood chips and fuel oil #5 were assumed to be the same, as no EROs were proposed for these fuels.

The electricity rate adjustment process was accomplished using Equations 3.19 through 3.21. Equation 3.19 presents the formula for calculating the electricity bill under the previous rate schedule; Equation 3.20 presents the current formula for calculating the electricity bill, and Equation 3.21 is the difference between the two bills. The electricity expenditure was adjusted by computing the difference and adding it to the 1990 expenditure.

$$E_0 = \$4{,}990 + \$8.52 \times kW + (\$0.0111 + FCR_0) \times kWh + \$0.27 \times excess\ kVAR \qquad (3.19)$$

where E_0 = Electricity expenditure 1990
kW = kW billed 1990
FCR_0 = Fuel cost recovery, 1990
kWh = kWh consumed 1990
excess kVAR = excess kVAR 1990

$$E_1 = \$4{,}990 + \$8.85 \times kW + (\$0.0115 + FCR_1) \times kWh + \$0.27 \times excess\ kVAR \qquad (3.20)$$

where E_1 = Electricity expenditure 1993
kW = kW billed 1990
FCR_1 = Fuel cost recovery, 1993
kWh = kWh consumed 1990
excess kVAR = excess kVAR 1990

$$\Delta E = \$1{,}155 + \$0.33 \times kW + (\$0.0004 + \Delta FCR) \times kWh \qquad (3.21)$$

where ΔE = Change in expenditure
kW = kW billed 1990
ΔFCR = Change in fuel cost recovery rate
kWh = kWh consumed 1990

The marginal effective electric rate in effect in 1990 was \$0.0111 per kWh; in 1993 it is \$0.0115. The effective demand rate in 1990 was \$8.52 per kW; in 1993 it is \$8.85. The fuel cost recovery factor in effect in 1990 was \$0.016045 per kWh; in 1993 it is \$0.013471 per kWh. The rate charged for excess reactive demand (kVAR) has not changed from \$0.27 per excess kVAR.

The natural gas rate was adjusted using the rate reported in Table 3.2 and adding the fixed customer charges (\$250 per month) to the total, which is why the rate in the adjustment factor does not match the rate reported in Table 3.2.

Table 3.5a
All Building EROs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Cooling	41	FH-2 to 4-09	2 to 4 Unit Buildings	electric air cool heat pump	none	0	NA	0	NA	0	NA	NA
Cooling	37	FH-2 to 4-12	2 to 4 Unit Buildings	electric air cool heat pump	none	0	NA	0	NA	0	NA	NA
Cooling	40	FH-2 to 4-07	2 to 4 Unit Buildings	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	39	FH-2 to 4-06	2 to 4 Unit Buildings	electric air cool heat pump	none	0	NA	0	NA	0	NA	NA
Cooling	36	FH-2 to 4-10	2 to 4 Unit Buildings	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	35	FH-2 to 4-01	2 to 4 Unit Buildings	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	38	FH-2 to 4-03	2 to 4 Unit Buildings	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	42	FH-5 or More-01	5 or More Unit Buildings	electric air cool heat pump	none	0	NA	0	NA	0	NA	NA
Cooling	8	Assembly-20	Assembly	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	0	Assembly-01	Assembly	electric air cool heat pump	none	0	NA	0	NA	0	NA	NA
Cooling	1	Assembly-10	Assembly	electric air cool heat pump	none	0	NA	0	NA	0	NA	NA
Cooling	12	Assembly-03	Assembly	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	4	Assembly-16	Assembly	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	9	Assembly-22	Assembly	electric air cool heat pump	none	0	NA	0	NA	0	NA	NA
Cooling	5	Assembly-18	Assembly	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	11	Assembly-24	Assembly	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	7	Assembly-02	Assembly	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	3	Assembly-15	Assembly	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	5	Assembly-18	Assembly	single conv chiller	none	0	NA	0	NA	0	NA	NA
Cooling	6	Assembly-19	Assembly	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	4	Assembly-16	Assembly	single conv chiller	none	0	NA	0	NA	0	NA	NA
Cooling	14	Assembly-05	Assembly	single conv chiller	Air-Cooled Reciprocating Chiller (20 to 75 tons cooling)	47	NA	47	NA	5,794	1.30	12.0
Cooling	2	Assembly-13	Assembly	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	10	Assembly-23	Assembly	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	17	Assembly-09	Assembly	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	34	Education-09	Education	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	30	Education-24	Education	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	19	Education-11	Education	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	24	Education-17	Education	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	26	Education-19	Education	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	22	Education-15	Education	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	28	Education-22	Education	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	23	Education-18	Education	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	20	Education-12	Education	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	27	Education-02	Education	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	33	Education-08	Education	single conv chiller	Air-Cooled Reciprocating Chiller (20 to 75 tons cooling)	106	NA	106	NA	43,905	1.73	9.1
Cooling	23	Education-16	Education	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	25	Education-18	Education	single conv chiller	Air-Cooled Reciprocating Chiller (20 to 75 tons cooling)	60	NA	60	NA	33,608	6.55	2.4
Cooling	32	Education-07	Education	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	33	Education-08	Education	package unit	Single Zone Packaged AC Unit (5.4167 to 11.25 tons cooling)	12	NA	12	NA	43,191	3.62	4.3
Cooling	32	Education-07	Education	package unit	Single Zone Packaged AC Unit (5.4167 to 11.25 tons cooling)	7	NA	7	NA	17,726	5.33	2.9
Cooling	21	Education-14	Education	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	31	Education-04	Education	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	29	Education-23	Education	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	52	Food Sales-01	Food Sales	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	54	Food Service-11	Food Service	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	62	Food Service-08	Food Service	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	57	Food Service-15	Food Service	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	60	Food Service-04	Food Service	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	55	Food Service-12	Food Service	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	58	Food Service-17	Food Service	single conv chiller	Centrifugal Liquid (Water) Chiller (200 to 500 tons cooling)	688	NA	688	NA	13,686	1.33	11.7
Cooling	61	Food Service-07	Food Service	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	67	Health Care-04	Health Care	single conv chiller	none	0	NA	0	NA	0	NA	NA
Cooling	67	Health Care-04	Health Care	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	66	Health Care-03	Health Care	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	69	Health Care-07	Health Care	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	65	Health Care-02	Health Care	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	68	Health Care-06	Health Care	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	79	Lodging-05	Lodging	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	75	Lodging-15	Lodging	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	73	Lodging-12	Lodging	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	76	Lodging-16	Lodging	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	77	Lodging-19	Lodging	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	72	Lodging-11	Lodging	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	80	Lodging-07	Lodging	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	78	Lodging-02	Lodging	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	74	Lodging-13	Lodging	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	148	Service-04	Mercantile & Service	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	147	Service-03	Mercantile & Service	package unit	none	0	NA	0	NA	0	NA	NA

Table 3.5a
All Building EROs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Cooling	146	Service-01	Mercantile & Service	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	152	Service-08	Mercantile & Service	single conv chiller	none	0	NA	0	NA	0	NA	NA
Cooling	151	Service-07	Mercantile & Service	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	150	Service-06	Mercantile & Service	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	149	Service-05	Mercantile & Service	electric air cool heat pump	none	0	NA	0	NA	0	NA	NA
Cooling	153	Service-09	Mercantile & Service	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	102	Office-31	Office	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	92	Office-02	Office	package unit	Single Zone Packaged AC Unit (5 4167 to 11 25 tons cooling)	16	NA	16	NA	4,439	1 53	10 2
Cooling	97	Office-26	Office	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	89	Office-16	Office	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	86	Office-14	Office	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	104	Office-35	Office	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	107	Office-04	Office	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	92	Office-02	Office	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	96	Office-38	Office	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	109	Office-08	Office	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	100	Office-03	Office	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	100	Office-03	Office	package unit	Single Zone Packaged AC Unit (11 25 to 20 tons cooling)	3	NA	3	NA	8,365	1 60	9 8
Cooling	82	Office-01	Office	package unit	Single Zone Packaged AC Unit (5 4167 to 11 25 tons cooling)	11	NA	11	NA	12,118	3 14	5 0
Cooling	99	Office-29	Office	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	96	Office-22	Office	package unit	Multizone Packaged AC Unit (20 to 150 tons cooling)	16	NA	16	NA	36,474	1 95	8 0
Cooling	87	Office-15	Office	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	105	Office-37	Office	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	82	Office-01	Office	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	90	Office-17	Office	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	87	Office-15	Office	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	110	Office-09	Office	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	85	Office-15	Office	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	101	Office-30	Office	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	84	Office-10	Office	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	103	Office-34	Office	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	91	Office-18	Office	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	105	Office-37	Office	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	98	Office-28	Office	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	108	Office-07	Office	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	94	Office-20	Office	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	96	Office-22	Office	chilled water coil	none	0	NA	0	NA	0	NA	NA
Cooling	95	Office-21	Office	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	124	Other-26	Other	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	116	Other-17	Other	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	120	Other-02	Other	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	130	Other-32	Other	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	111	Other-01	Other	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	113	Other-10	Other	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	122	Other-23	Other	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	134	Other-41	Other	single conv chiller	none	0	NA	0	NA	0	NA	NA
Cooling	136	Other-05	Other	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	119	Other-19	Other	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	128	Other-30	Other	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	139	Other-09	Other	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	114	Other 15	Other	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	121	Other-20	Other	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	137	Other-07	Other	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	122	Other-23	Other	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	131	Other-36	Other	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	126	Other-29	Other	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	115	Other-16	Other	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	133	Other-38	Other	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	126	Other-29	Other	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	144	Public Order-04	Public Order Safety	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	142	Public Order-02	Public Order Safety	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	141	Public Order-01	Public Order Safety	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	145	Public Order-05	Public Order Safety	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	48	FH-attached-01	Single Family Attached	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	50	FH-attached-04	Single Family Attached	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	49	FH-attached-03	Single Family Attached	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	51	FH-attached-05	Single Family Attached	electric air cool heat pump	none	0	NA	0	NA	0	NA	NA
Cooling	43	FH-Detached-04	Single Family Detached	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	46	FH-Detached-05	Single Family Detached	package unit	none	0	NA	0	NA	0	NA	NA

Table 3.5a
All Building EROs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (Mbtu)	First Year Demand Savings (kW-mo)	Full Implementation Energy Savings (Mbtu)	Full Implementation Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Cooling	43	FH-Detached-01	Single Family Detached	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	47	FH-Detached-07	Single Family Detached	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	44	FH-Detached-03	Single Family Detached	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	157	Warehouse-15	Warehouse & Storage	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	168	Warehouse-03	Warehouse & Storage	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	159	Warehouse-18	Warehouse & Storage	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	154	Warehouse-01	Warehouse & Storage	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	170	Warehouse-04	Warehouse & Storage	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	168	Warehouse-03	Warehouse & Storage	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	173	Warehouse-08	Warehouse & Storage	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	155	Warehouse-11	Warehouse & Storage	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	160	Warehouse-19	Warehouse & Storage	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	172	Warehouse-07	Warehouse & Storage	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	163	Warehouse-23	Warehouse & Storage	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	171	Warehouse-05	Warehouse & Storage	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	154	Warehouse-01	Warehouse & Storage	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	165	Warehouse-25	Warehouse & Storage	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	158	Warehouse-16	Warehouse & Storage	package unit	none	0	NA	0	NA	0	NA	NA
Cooling	162	Warehouse-21	Warehouse & Storage	package unit	none	0	NA	0	NA	0	NA	NA
Heating	38	FH-2 to 4-03	2 to 4 Unit Buildings	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	39	FH-2 to 4-06	2 to 4 Unit Buildings	electric air heat pump	none	0	NA	0	NA	0	NA	NA
Heating	37	FH-2 to 4-12	2 to 4 Unit Buildings	electric air heat pump	none	0	NA	0	NA	0	NA	NA
Heating	40	FH-2 to 4-07	2 to 4 Unit Buildings	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	36	FH-2 to 4-10	2 to 4 Unit Buildings	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	35	FH-2 to 4-01	2 to 4 Unit Buildings	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	41	FH-2 to 4-09	2 to 4 Unit Buildings	electric air heat pump	none	0	NA	0	NA	0	NA	NA
Heating	42	FH-5 or More-01	5 or More Unit Buildings	electric air heat pump	none	0	NA	0	NA	0	NA	NA
Heating	8	Assembly-20	Assembly	gas conv boiler	Add Automatic Electric Damper	32	NA	32	NA	1,774	11.14	1.4
Heating	4	Assembly-16	Assembly	hot water radiator	none	0	NA	0	NA	0	NA	NA
Heating	4	Assembly-16	Assembly	oil conv boiler	Add Automatic Electric Damper	38	NA	38	NA	3,191	10.53	1.5
Heating	12	Assembly-03	Assembly	oil conv boiler	Add Automatic Electric Damper	36	NA	36	NA	2,617	10.95	1.4
Heating	14	Assembly-05	Assembly	oil conv boiler	Add Automatic Electric Damper	14	NA	14	NA	1,032	9.82	1.6
Heating	2	Assembly-13	Assembly	hot water radiator	none	0	NA	0	NA	0	NA	NA
Heating	9	Assembly-22	Assembly	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	1	Assembly-10	Assembly	oil conv boiler	Add Automatic Electric Damper	11	NA	11	NA	611	6.99	2.2
Heating	16	Assembly-08	Assembly	other conv furn	Conventional Gas Furnace	2	NA	2	NA	547	2.79	5.6
Heating	7	Assembly-02	Assembly	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	13	Assembly-04	Assembly	other conv furn	Conventional Oil Furnace	18	NA	18	NA	461	1.13	13.8
Heating	16	Assembly-08	Assembly	electric baseboard	none	0	NA	0	NA	0	NA	NA
Heating	10	Assembly-23	Assembly	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	0	Assembly-01	Assembly	electric air heat pump	none	0	NA	0	NA	0	NA	NA
Heating	16	Assembly-08	Assembly	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	5	Assembly-18	Assembly	hot water radiator	none	0	NA	0	NA	0	NA	NA
Heating	3	Assembly-15	Assembly	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	13	Assembly-07	Assembly	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	5	Assembly-18	Assembly	other conv furn	Conventional Gas Furnace	67	NA	67	NA	12,903	7.89	2.0
Heating	11	Assembly-24	Assembly	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	3	Assembly-15	Assembly	oil conv furn	none	0	NA	0	NA	0	NA	NA
Heating	17	Assembly-09	Assembly	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	9	Assembly-22	Assembly	electric air heat pump	none	0	NA	0	NA	0	NA	NA
Heating	0	Assembly-01	Assembly	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	6	Assembly-19	Assembly	oil conv furn	none	0	NA	0	NA	0	NA	NA
Heating	1	Assembly-10	Assembly	electric air heat pump	none	0	NA	0	NA	0	NA	NA
Heating	32	Education-07	Education	oil conv furn	none	0	NA	0	NA	0	NA	NA
Heating	33	Education-08	Education	other conv furn	Conventional Gas Furnace	143	NA	143	NA	53,231	10.22	1.5
Heating	30	Education-24	Education	gas conv boiler	Add Automatic Electric Damper	35	NA	35	NA	2,219	13.90	1.1
Heating	28	Education-22	Education	other conv furn	Conventional Gas Furnace	12	NA	12	NA	5,469	11.13	1.4
Heating	32	Education-07	Education	other conv furn	Conventional Oil Furnace	24	NA	24	NA	3,754	3.46	4.6
Heating	29	Education-23	Education	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	31	Education-04	Education	other conv boiler	Gas Pulse Condensing Boiler	132	NA	132	NA	34,670	3.30	4.7
Heating	31	Education-04	Education	gas conv boiler	Add Automatic Electric Damper	29	NA	29	NA	1,423	7.32	2.1
Heating	33	Education-08	Education	oil conv boiler	Gas Pulse Condensing Boiler	54	NA	54	NA	1,446	1.34	11.7
Heating	25	Education-18	Education	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	22	Education-15	Education	other conv furn	High Efficiency LPG Furnace	67	NA	67	NA	43	1.04	15.0
Heating	28	Education-22	Education	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	24	Education-17	Education	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	21	Education-14	Education	oil conv furn	none	0	NA	0	NA	0	NA	NA
Heating	19	Education-11	Education	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	26	Education-19	Education	gas conv furn	none	0	NA	0	NA	0	NA	NA

Table 3.5a
All Building ERCs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Heating	18	Education-01	Education	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	20	Education-12	Education	oil conv boiler	Add Automatic Electric Damper	19	NA	19	NA	1,072	10.16	1.5
Heating	27	Education-02	Education	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	34	Education-09	Education	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	33	Education-08	Education	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	23	Education-16	Education	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	25	Education-18	Education	oil conv boiler	Add Automatic Electric Damper	16	NA	16	NA	1,395	13.24	1.2
Heating	21	Education-14	Education	other conv furn	Conventional Oil Furnace	13	NA	13	NA	1,418	3.70	4.2
Heating	24	Education-17	Education	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	32	Food Sales-01	Food Sales	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	63	Food Service-09	Food Service	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	62	Food Service-08	Food Service	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	58	Food Service-17	Food Service	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	53	Food Service-01	Food Service	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	60	Food Service-04	Food Service	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	56	Food Service-13	Food Service	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	61	Food Service-07	Food Service	hot water radiator	none	0	NA	0	NA	0	NA	NA
Heating	57	Food Service-15	Food Service	oil conv boiler	Add Automatic Electric Damper	2	NA	2	NA	37	1.82	11.8
Heating	59	Food Service-02	Food Service	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	54	Food Service-11	Food Service	hot water radiator	none	0	NA	0	NA	0	NA	NA
Heating	55	Food Service-12	Food Service	oil conv furn	none	0	NA	0	NA	0	NA	NA
Heating	66	Health Care-03	Health Care	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	67	Health Care-04	Health Care	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	68	Health Care-06	Health Care	hot water radiator	none	0	NA	0	NA	0	NA	NA
Heating	64	Health Care-01	Health Care	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	67	Health Care-04	Health Care	other conv boiler	Gas Pulse Condensing Boiler	48	NA	48	NA	17,754	3.56	4.4
Heating	65	Health Care-02	Health Care	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	69	Health Care-07	Health Care	hot water fan coil	New Conventional Individual Building Gas Boiler	-135	NA	-135	NA	4,481	1.87	8.4
Heating	79	Lodging-05	Lodging	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	73	Lodging-12	Lodging	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	70	Lodging-01	Lodging	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	78	Lodging-02	Lodging	oil conv furn	Conventional Gas Furnace	13	NA	13	NA	1,640	2.07	7.5
Heating	72	Lodging-11	Lodging	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	71	Lodging-10	Lodging	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	77	Lodging-19	Lodging	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	80	Lodging-07	Lodging	oil conv boiler	none	NA	NA	NA	NA	0	NA	NA
Heating	81	Lodging-08	Lodging	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	74	Lodging-13	Lodging	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	78	Lodging-02	Lodging	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	80	Lodging-07	Lodging	other conv furn	Conventional Oil Furnace	422	NA	422	NA	9,268	1.11	14.1
Heating	78	Lodging-02	Lodging	other conv furn	Conventional Gas Furnace	7	NA	7	NA	2,358	5.63	2.8
Heating	76	Lodging-16	Lodging	gas conv boiler	Add Automatic Electric Damper	39	NA	39	NA	2,391	10.25	1.5
Heating	75	Lodging-15	Lodging	gas conv boiler	Add Automatic Electric Damper	11	NA	11	NA	633	6.70	2.3
Heating	146	Service-01	Mercantile & Service	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	147	Service-03	Mercantile & Service	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	149	Service-05	Mercantile & Service	electric air heat pump	none	0	NA	0	NA	0	NA	NA
Heating	153	Service-09	Mercantile & Service	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	148	Service-04	Mercantile & Service	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	152	Service-08	Mercantile & Service	oil conv boiler	none	NA	NA	NA	NA	0	NA	NA
Heating	150	Service-06	Mercantile & Service	other conv furn	Conventional Gas Furnace	3	NA	3	NA	113	1.46	10.7
Heating	148	Service-04	Mercantile & Service	other conv furn	Conventional Gas Furnace	4	NA	4	NA	1,127	3.63	4.3
Heating	150	Service-06	Mercantile & Service	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	146	Service-01	Mercantile & Service	other conv furn	Conventional Gas Furnace	3	NA	3	NA	784	2.64	5.9
Heating	151	Service-07	Mercantile & Service	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	100	Office-03	Office	oil conv boiler	Add Automatic Electric Damper	44	NA	44	NA	2,991	6.39	2.4
Heating	102	Office-31	Office	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	104	Office-33	Office	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	103	Office-34	Office	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	83	Office-01g	Office	other conv furn	Conventional Oil Furnace	61	NA	61	NA	65	1.11	14.1
Heating	92	Office-02	Office	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	100	Office-03	Office	other conv furn	Conventional Oil Furnace	20	NA	20	NA	2,759	2.45	6.3
Heating	99	Office-29	Office	oil conv furn	none	0	NA	0	NA	0	NA	NA
Heating	107	Office-04	Office	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	109	Office-08	Office	oil conv boiler	Add Automatic Electric Damper	33	NA	33	NA	2,514	18.22	0.9
Heating	91	Office-18	Office	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	84	Office-10	Office	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	82	Office-01	Office	other conv furn	Conventional Gas Furnace	5	NA	5	NA	2,217	2.63	3.9
Heating	95	Office-21	Office	oil conv boiler	Add Automatic Electric Damper	25	NA	25	NA	1,703	6.31	1.7
Heating	110	Office-09	Office	other conv furn	Conventional Gas Furnace	4	NA	4	NA	1,196	3.17	4.6

Table 3.5a
All Building EROs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW/mo)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW/mo)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Heating	92	Office-02	Office	oil conv boiler	Add Automatic Electric Damper	8	NA	8	NA	161	1.35	11.6
Heating	105	Office-37	Office	oil conv boiler	Add Automatic Electric Damper	3	NA	3	NA	167	3.01	5.2
Heating	87	Office-15	Office	oil conv furn	Conventional Gas Furnace	16	NA	16	NA	419	1.12	13.9
Heating	110	Office-09	Office	oil conv furn	Conventional Gas Furnace	9	NA	9	NA	423	1.24	12.6
Heating	90	Office-17	Office	oil conv boiler	Add Automatic Electric Damper	19	NA	19	NA	1,070	10.99	1.5
Heating	110	Office-09	Office	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	105	Office-37	Office	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	96	Office-22	Office	oil conv boiler	Add Automatic Electric Damper	13	NA	13	NA	1,195	11.52	1.4
Heating	107	Office-04	Office	oil conv boiler	Gas Pulse Condensing Boiler	28	NA	28	NA	1,153	1.25	12.5
Heating	85	Office-13	Office	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	96	Office-22	Office	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	92	Office-02	Office	other conv furn	Conventional Gas Furnace	12	NA	12	NA	3,166	2.82	5.5
Heating	86	Office-14	Office	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	101	Office-30	Office	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	89	Office-16	Office	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	107	Office-04	Office	other conv furn	Conventional Gas Furnace	32	NA	32	NA	11,147	6.46	2.4
Heating	84	Office-10	Office	other conv furn	Conventional Gas Furnace	20	NA	20	NA	7,162	8.15	1.9
Heating	108	Office-07	Office	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	98	Office-28	Office	oil conv furn	none	0	NA	0	NA	0	NA	NA
Heating	94	Office-20	Office	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	97	Office-26	Office	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	82	Office-01	Office	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	82	Office-01	Office	electric air heat pump	none	0	NA	0	NA	0	NA	NA
Heating	98	Office-28	Office	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	93	Office-02g	Office	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	87	Office-15	Office	other conv furn	Conventional Gas Furnace	14	NA	14	NA	3,854	3.05	3.1
Heating	88	Office-15ng	Office	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	106	Office-38	Office	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	98	Office-28	Office	electric forced air furN/Ace	Conventional Oil Furnace	3	NA	3	NA	347	1.74	9.0
Heating	82	Office-01	Office	oil conv furn	none	0	NA	0	NA	0	NA	NA
Heating	130	Other-32	Other	oil conv boiler	Add Automatic Electric Damper	7	NA	7	NA	339	2.14	7.3
Heating	140	Other-09g	Other	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	137	Other-07	Other	oil conv boiler	Add Automatic Electric Damper	7	NA	7	NA	417	4.30	3.5
Heating	139	Other-09	Other	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	122	Other-23	Other	other conv furn	Conventional Gas Furnace	4	NA	4	NA	294	2.79	5.6
Heating	111	Other-01	Other	oil conv furn	Conventional Gas Furnace	5	NA	5	NA	310	1.37	11.4
Heating	126	Other-29	Other	oil conv furn	none	0	NA	0	NA	0	NA	NA
Heating	139	Other-09	Other	oil conv furn	Conventional Gas Furnace	3	NA	3	NA	211	1.43	10.8
Heating	138	Other-08	Other	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	112	Other-01g	Other	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	134	Other-41	Other	oil conv boiler	Add Automatic Electric Damper	15	NA	15	NA	1,264	7.38	2.1
Heating	118	Other-18	Other	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	120	Other-02	Other	oil conv furn	Conventional Gas Furnace	3	NA	3	NA	428	1.90	8.2
Heating	120	Other-02	Other	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	130	Other-32	Other	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	111	Other-01	Other	other conv furn	Conventional Gas Furnace	19	NA	19	NA	5,547	3.63	4.3
Heating	137	Other-07	Other	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	114	Other-15	Other	oil conv furn	none	0	NA	0	NA	0	NA	NA
Heating	133	Other-42	Other	gas conv boiler	Add Automatic Electric Damper	16	NA	16	NA	906	5.52	2.4
Heating	115	Other-16	Other	oil conv boiler	none	0	NA	0	NA	0	NA	NA
Heating	121	Other-20	Other	other conv furn	Conventional Gas Furnace	14	NA	14	NA	4,207	3.32	4.4
Heating	116	Other-17	Other	other conv furn	Conventional Gas Furnace	4	NA	4	NA	1,089	2.44	6.4
Heating	139	Other-09	Other	other conv furn	Conventional Gas Furnace	17	NA	17	NA	5,069	3.69	4.2
Heating	117	Other-17ng	Other	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating	131	Other-36	Other	oil conv boiler	none	NA	NA	NA	NA	0	NA	NA
Heating	113	Other-10	Other	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	132	Other-37	Other	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	128	Other-30	Other	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	136	Other-45	Other	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	121	Other-20	Other	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	122	Other-23	Other	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	116	Other-17	Other	electric baseboard	none	0	NA	0	NA	0	NA	NA
Heating	123	Other-24	Other	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	127	Other-33	Other	oil conv boiler	Add Automatic Electric Damper	2	NA	2	NA	99	1.72	9.1
Heating	129	Other-31	Other	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating	119	Other-19	Other	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	116	Other-17	Other	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	130	Other-32	Other	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating	133	Other-38	Other	hot water fan coil	none	0	NA	0	NA	0	NA	NA

Table 3.5a
All Building ERCs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW max)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW max)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Heating		114 Other-15	Other	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		124 Other-26	Other	oil conv boiler	Add Automatic Electric Damper	2	NA	2	NA	33	1.31	11.9
Heating		122 Other-23	Other	oil conv furn	Conventional Gas Furnace	11	NA	11	NA	18	1.04	15.1
Heating		123 Other-24	Other	oil conv furn	Conventional Gas Furnace	5	NA	5	NA	6	1.03	15.2
Heating		116 Other-17	Other	oil conv furn	none	0	NA	0	NA	0	NA	NA
Heating		126 Other-29	Other	electric baseboard	none	0	NA	0	NA	0	NA	NA
Heating		131 Other-36	Other	hot water fan coil	none	0	NA	0	NA	0	NA	NA
Heating		142 Public Order-02	Public Order Safety	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating		145 Public Order-05	Public Order Safety	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		144 Public Order-04	Public Order Safety	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		143 Public Order-03	Public Order Safety	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		141 Public Order-01	Public Order Safety	oil conv furn	Conventional Gas Furnace	7	NA	7	NA	1,117	2.98	5.2
Heating		48 FH-attached-01	Single Family Attached	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		49 FH-attached-02	Single Family Attached	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		51 FH-attached-03	Single Family Attached	electric air heat pump	none	0	NA	0	NA	0	NA	NA
Heating		50 FH-attached-04	Single Family Attached	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		46 FH-Detached-05	Single Family Detached	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		43 FH-Detached-01	Single Family Detached	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		44 FH-Detached-03	Single Family Detached	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating		47 FH-Detached-07	Single Family Detached	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		45 FH-Detached-04	Single Family Detached	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		168 Warehouse-03	Warehouse & Storage	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		163 Warehouse-23	Warehouse & Storage	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		165 Warehouse-25	Warehouse & Storage	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating		160 Warehouse-19	Warehouse & Storage	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		158 Warehouse-16	Warehouse & Storage	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		155 Warehouse-11	Warehouse & Storage	oil conv furn	none	0	NA	0	NA	0	NA	NA
Heating		169 Warehouse-30	Warehouse & Storage	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		168 Warehouse-03	Warehouse & Storage	other conv furn	Conventional Gas Furnace	3	NA	3	NA	413	1.39	11.2
Heating		163 Warehouse-23	Warehouse & Storage	oil conv furn	none	0	NA	0	NA	0	NA	NA
Heating		164 Warehouse-24	Warehouse & Storage	hot water radiator	none	0	NA	0	NA	0	NA	NA
Heating		171 Warehouse-05	Warehouse & Storage	oil conv boiler	none	NA	NA	NA	NA	0	NA	NA
Heating		168 Warehouse-03	Warehouse & Storage	oil conv boiler	none	NA	NA	NA	NA	0	NA	NA
Heating		170 Warehouse-04	Warehouse & Storage	other conv furn	Conventional Gas Furnace	16	NA	16	NA	4,197	2.76	5.7
Heating		154 Warehouse-01	Warehouse & Storage	oil conv furn	none	0	NA	0	NA	0	NA	NA
Heating		154 Warehouse-01	Warehouse & Storage	other conv furn	Conventional Gas Furnace	15	NA	15	NA	1,792	1.41	11.1
Heating		157 Warehouse-15	Warehouse & Storage	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		162 Warehouse-21	Warehouse & Storage	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		159 Warehouse-18	Warehouse & Storage	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating		167 Warehouse-29	Warehouse & Storage	oil conv furn	none	0	NA	0	NA	0	NA	NA
Heating		170 Warehouse-04	Warehouse & Storage	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		156 Warehouse-12	Warehouse & Storage	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		163 Warehouse-23	Warehouse & Storage	other conv furn	none	0	NA	0	NA	0	NA	NA
Heating		173 Warehouse-08	Warehouse & Storage	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		165 Warehouse-25	Warehouse & Storage	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		157 Warehouse-15	Warehouse & Storage	other conv furn	Conventional Gas Furnace	1	NA	1	NA	61	1.18	13.2
Heating		172 Warehouse-07	Warehouse & Storage	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		166 Warehouse-26	Warehouse & Storage	gas conv furn	none	0	NA	0	NA	0	NA	NA
Heating		154 Warehouse-01	Warehouse & Storage	gas conv furn	none	0	NA	0	NA	0	NA	NA
Hot Water		40 FH-2 to 4-07	2 to 4 Unit Buildings	gas shw heater	0.85 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	5,027	NA	5,027	NA	3,856	1.40	11.2
Hot Water		38 FH-2 to 4-03	2 to 4 Unit Buildings	electric shw heater	0.85 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	22	NA	22	NA	5,323	79.94	0.8
Hot Water		39 FH-2 to 4-06	2 to 4 Unit Buildings	electric shw heater	Better Elec. WH (RES), Ins. Pipe, LFSHs, Aer., Lower Tank Temp	2,131	NA	2,131	NA	26,338	6.21	2.5
Hot Water		38 FH-2 to 4-03	2 to 4 Unit Buildings	gas shw heater	Wrap Old Gas Tank w. Ins., Ins. Pipe, LFSHs, Aerators	2,978	NA	2,978	NA	28,963	3.24	4.8
Hot Water		36 FH-2 to 4-10	2 to 4 Unit Buildings	gas shw heater	Wrap Old Gas Tank w. Ins., Ins. Pipe, LFSHs, Aerators	5,556	NA	5,556	NA	48,637	2.63	5.9
Hot Water		41 FH-2 to 4-09	2 to 4 Unit Buildings	electric shw heater	Better Elec. WH (RES), Ins. Pipe, LFSHs, Aer., Lower Tank Temp	190	NA	190	NA	1,867	2.99	5.2
Hot Water		35 FH-2 to 4-01	2 to 4 Unit Buildings	electric shw heater	0.85 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	632	NA	632	NA	28,556	11.44	1.4
Hot Water		37 FH-2 to 4-12	2 to 4 Unit Buildings	electric shw heater	Better Elec. WH (RES), Ins. Pipe, LFSHs, Aer., Lower Tank Temp	3,485	NA	3,485	NA	87,973	8.07	1.9
Hot Water		36 FH-2 to 4-10	2 to 4 Unit Buildings	electric shw heater	0.85 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	312	NA	312	NA	15,194	12.33	1.3
Hot Water		35 FH-2 to 4-01	2 to 4 Unit Buildings	gas shw heater	0.85 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	32	NA	32	NA	57	1.68	9.3
Hot Water		42 FH-5 or More-01	5 or More Unit Buildings	electric shw heater	Better Elec. WH (RES), Ins. Pipe, LFSHs, Aer., Lower Tank Temp	478	NA	478	NA	14,415	3.46	4.5
Hot Water		10 Assembly-23	Assembly	hot water central heat	none	0	NA	0	NA	0	NA	NA
Hot Water		6 Assembly-19	Assembly	oil shw heater	Wrap Old Oil Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	91	NA	91	NA	1,273	2.61	6.9
Hot Water		5 Assembly-18	Assembly	hot water central heat	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	925	NA	925	NA	95,171	16.90	1.4
Hot Water		4 Assembly-16	Assembly	oil central boiler	Oil. Wrap Tank w. Insulation, LFSHs, Aerators	845	NA	845	NA	91,426	12.62	0.2
Hot Water		9 Assembly-22	Assembly	electric shw heater	Wrap Old Electric Tank w. Ins., Ins. Pipe, LFSHs, Aerators	2	NA	2	NA	39	1.91	10.3
Hot Water		13 Assembly-04	Assembly	other shw heater	Better Elec. WH (COAL), Ins. Pipe, LFSHs, Aer., Lower Tank Temp	112	NA	112	NA	294	1.11	14.1
Hot Water		17 Assembly-09	Assembly	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	87	NA	87	NA	683	2.25	6.9
Hot Water		11 Assembly-24	Assembly	hot water central heat	none	0	NA	0	NA	0	NA	NA
Hot Water		14 Assembly-05	Assembly	oil central boiler	Oil. Wrap Tank w. Insulation, LFSHs, Aerators	210	NA	210	NA	17,929	1.91	0.2

Table 3.5a
All Building EBCs: Annual Energy and Demand Reductions

End Use	Bldg Set No.	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback
Hot Water		6 Assembly-01	Assembly	other elec heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	121	NA	121	NA	2,951	4.17	3.8
Hot Water		9 Assembly-22	Assembly	gas elec heater	none	0	NA	0	NA	0	NA	NA
Hot Water		8 Assembly-20	Assembly	gas elec heater	none	0	NA	0	NA	0	NA	NA
Hot Water		1 Assembly-10	Assembly	electric elec heater	Wrap Old Electric Tank w. Ins., Ins. Pipe, LFSHs, Aerators	12	NA	12	NA	801	6.14	2.9
Hot Water		12 Assembly-05	Assembly	oil central boiler	Oil: Wrap Tank w. Insulation, LFSHs, Aerators	238	NA	238	NA	18,551	30.40	0.4
Hot Water		2 Assembly-13	Assembly	hot water central heater	none	0	NA	0	NA	0	NA	NA
Hot Water		5 Assembly-18	Assembly	other elec heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	57	NA	57	NA	1,347	3.70	4.2
Hot Water		4 Assembly-16	Assembly	hot water central heater	none	0	NA	0	NA	0	NA	NA
Hot Water		3 Assembly-10	Assembly	oil central boiler	Oil: Wrap Tank w. Insulation, LFSHs, Aerators	67	NA	67	NA	4,111	40.00	0.3
Hot Water		7 Assembly-02	Assembly	gas elec heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	11	NA	11	NA	90	2.29	6.8
Hot Water		19 Education-11	Education	hot water central heater	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	9	NA	9	NA	1,466	3.12	3.1
Hot Water		20 Education-12	Education	oil central boiler	Oil: Wrap Tank w. Insulation, LFSHs, Aerators	108	NA	108	NA	6,641	36.34	0.3
Hot Water		32 Education-07	Education	oil central boiler	Oil: Wrap Tank w. Insulation, LFSHs, Aerators	254	NA	254	NA	15,911	40.30	0.3
Hot Water		24 Education-17	Education	hot water central heater	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	121	NA	121	NA	13,361	8.74	1.8
Hot Water		33 Education-08	Education	other elec heater	0.76 Gas WH (COML), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	246	NA	246	NA	7,765	7.58	3.8
Hot Water		26 Education-19	Education	gas elec heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	145	NA	145	NA	855	1.69	9.2
Hot Water		27 Education-02	Education	gas elec heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	64	NA	64	NA	662	3.78	4.1
Hot Water		33 Education-08	Education	oil central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	118	NA	118	NA	6,466	14.69	1.1
Hot Water		34 Education-09	Education	hot water central heater	none	0	NA	0	NA	0	NA	NA
Hot Water		32 Education-07	Education	other elec heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	25	NA	25	NA	555	8.05	1.9
Hot Water		24 Education-17	Education	gas elec heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	27	NA	27	NA	173	1.85	8.4
Hot Water		33 Education-08	Education	gas elec heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	49	NA	49	NA	315	3.49	4.0
Hot Water		31 Education-04	Education	other elec heater	0.76 Gas WH (COML), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	107	NA	107	NA	3,116	2.41	6.5
Hot Water		22 Education-15	Education	other elec heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	8	NA	8	NA	191	3.46	4.0
Hot Water		29 Education-23	Education	hot water central heater	none	0	NA	0	NA	0	NA	NA
Hot Water		30 Education-24	Education	gas elec heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	139	NA	139	NA	836	1.62	9.6
Hot Water		23 Education-18	Education	hot water central heater	none	0	NA	0	NA	0	NA	NA
Hot Water		18 Education-01	Education	other elec heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	74	NA	74	NA	1,485	5.30	2.8
Hot Water		25 Education-16	Education	oil central boiler	Oil: Wrap Tank w. Insulation, LFSHs, Aerators	107	NA	107	NA	10,072	70.40	0.2
Hot Water		28 Education-22	Education	gas elec heater	none	0	NA	0	NA	0	NA	NA
Hot Water		31 Education-04	Education	gas elec heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	109	NA	109	NA	1,088	3.67	4.3
Hot Water		21 Education-14	Education	oil central boiler	Oil: Wrap Tank w. Insulation, LFSHs, Aerators	41	NA	41	NA	4,016	58.29	0.3
Hot Water		52 Food Sales-01	Food Sales	gas elec heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	173	NA	173	NA	1,313	2.17	7.2
Hot Water		56 Food Service-13	Food Service	gas elec heater	none	0	NA	0	NA	0	NA	NA
Hot Water		55 Food Service-12	Food Service	oil elec heater	Wrap Old Oil Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	96	NA	96	NA	189	1.96	11.3
Hot Water		53 Food Service-01	Food Service	other elec heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	118	NA	118	NA	2,091	4.18	3.7
Hot Water		57 Food Service-15	Food Service	oil central boiler	Oil: Wrap Tank w. Insulation, LFSHs, Aerators	529	NA	529	NA	31,689	68.56	0.2
Hot Water		58 Food Service-17	Food Service	gas central boiler	Gas: Wrap Tank w. Insulation, LFSHs, Aerators	1,826	NA	1,826	NA	121,994	47.37	0.3
Hot Water		59 Food Service-02	Food Service	other elec heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	258	NA	258	NA	6,380	4.18	3.7
Hot Water		60 Food Service-04	Food Service	other elec heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	1,825	NA	1,825	NA	44,571	4.18	3.7
Hot Water		54 Food Service-11	Food Service	hot water central heater	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	2,246	NA	2,246	NA	199,977	9.93	1.0
Hot Water		61 Food Service-07	Food Service	hot water central heater	none	0	NA	0	NA	0	NA	NA
Hot Water		63 Food Service-09	Food Service	other elec heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	152	NA	152	NA	3,744	4.28	3.6
Hot Water		62 Food Service-08	Food Service	other elec heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	1,557	NA	1,557	NA	37,882	4.29	3.6
Hot Water		69 Health Care-07	Health Care	hot water central heater	Conventional Gas Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	10,622	NA	10,622	NA	462,779	10.93	1.0
Hot Water		65 Health Care-02	Health Care	other elec heater	0.76 Gas WH (COML), Insulate Pipe, Low Flow SHs, Aerators	25	NA	25	NA	545	1.29	21.1
Hot Water		67 Health Care-04	Health Care	hot water central heater	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	107	NA	107	NA	12,224	8.10	1.9
Hot Water		68 Health Care-06	Health Care	hot water central heater	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	526	NA	526	NA	31,255	7.41	2.1
Hot Water		66 Health Care-03	Health Care	hot water central heater	none	0	NA	0	NA	0	NA	NA
Hot Water		67 Health Care-04	Health Care	other elec heater	0.76 Gas WH (COML), Insulate Pipe, Low Flow SHs, Aerators	45	NA	45	NA	1,044	2.63	9.2
Hot Water		78 Lodging-02	Lodging	gas elec heater	Wrap Old Gas Tank w. Ins., Ins. Pipe, LFSHs, Aerators	146	NA	146	NA	1,523	3.80	4.1
Hot Water		75 Lodging-15	Lodging	gas central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	103	NA	103	NA	4,461	3.96	4.0
Hot Water		73 Lodging-12	Lodging	hot water central heater	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	617	NA	617	NA	78,469	20.25	0.8
Hot Water		74 Lodging-13	Lodging	hot water central heater	none		NA		NA	0	NA	NA
Hot Water		72 Lodging-11	Lodging	hot water central heater	none	0	NA		NA	0	NA	NA
Hot Water		79 Lodging-05	Lodging	hot water central heater	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	796	NA	796	NA	12,643	4.42	3.3
Hot Water		78 Lodging-02	Lodging	oil central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	546	NA	546	NA	37,529	23.33	[illegible]
Hot Water		76 Lodging-16	Lodging	gas central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	466	NA	466	NA	28,635	11.47	1.4
Hot Water		77 Lodging-19	Lodging	hot water central heater	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	596	NA	596	NA	155,118	10.67	1.4
Hot Water		147 Service-03	Mercantile & Service	hot water central heater	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	290	NA	290	NA	22,711	6.28	1.4
Hot Water		150 Service-06	Mercantile & Service	gas elec heater	none		NA		NA	0	NA	NA
Hot Water		151 Service-07	Mercantile & Service	hot water central heater	none	0	NA		NA	0	NA	NA
Hot Water		152 Service-08	Mercantile & Service	oil central boiler	Oil: Wrap Tank w. Insulation, LFSHs, Aerators	228	NA	228	NA	20,823	47.34	0.2
Hot Water		146 Service-01	Mercantile & Service	gas elec heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	8	NA	8	NA	164	2.00	5.8
Hot Water		83 Office-02	Office	other elec heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	22	NA	22	NA	962	3.56	4.4
Hot Water		97 Office-26	Office	hot water central heater	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	[illegible]	NA	[illegible]	NA	25,887	[illegible]	[illegible]
Hot Water		109 Office-38	Office	other elec heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	[illegible]	NA		NA	178	[illegible]	[illegible]
Hot Water		107 Office-36	Office	other elec heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	[illegible]	NA		NA	[illegible]	[illegible]	[illegible]
Hot Water		105 Office-33	Office	oil central boiler	Oil: Wrap Tank w. Insulation, LFSHs, Aerators	[illegible]	NA	[illegible]	NA	[illegible]	[illegible]	[illegible]

Table 3.5a
All Building EROs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Hot Water	85	Office-13	Office	hot water central hxer	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	32	NA	32	NA	469	3.19	4.9
Hot Water	82	Office-01	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	19	NA	19	NA	525	8.09	1.9
Hot Water	89	Office-16	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	17	NA	17	NA	430	4.47	3.5
Hot Water	88	Office-15ng	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	137	NA	137	NA	3,381	4.28	3.7
Hot Water	98	Office-28	Office	oil central boiler	Oil Wrap Tank w. Insulation, LFSHs, Aerators	32	NA	32	NA	3,052	59.69	0.3
Hot Water	90	Office-17	Office	oil central boiler	Oil Wrap Tank w. Insulation, LFSHs, Aerators	99	NA	99	NA	2,355	46.92	0.4
Hot Water	86	Office-14	Office	hot water central hxer	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	180	NA	180	NA	2,730	4.00	3.9
Hot Water	82	Office-01	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	19	NA	19	NA	188	3.54	4.4
Hot Water	92	Office-02	Office	oil shw heater	Wrap Old Oil Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	19	NA	19	NA	306	3.53	4.4
Hot Water	104	Office-35	Office	hot water central hxer	none	0	NA	0	NA	0	NA	NA
Hot Water	93	Office-02g	Office	other shw heater	Better Elec. WH (COM), Ins. Pipe, LFSHs, Aer., Lower Tank Temp	24	NA	24	NA	55	1.30	14.2
Hot Water	92	Office-02	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	4	NA	4	NA	55	1.69	9.3
Hot Water	94	Office-20	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	12	NA	12	NA	35	1.26	12.4
Hot Water	103	Office-34	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	6	NA	6	NA	12	1.17	13.4
Hot Water	87	Office-15	Office	oil central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	148	NA	148	NA	8,737	6.69	2.3
Hot Water	105	Office-37	Office	oil central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	64	NA	64	NA	9,934	17.42	0.9
Hot Water	84	Office-10	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	10	NA	10	NA	95	2.98	5.2
Hot Water	96	Office-22	Office	hot water central hxer	none	0	NA	0	NA	0	NA	NA
Hot Water	91	Office-18	Office	hot water central hxer	none	0	NA	0	NA	0	NA	NA
Hot Water	109	Office-08	Office	oil central boiler	Oil Wrap Tank w. Insulation, LFSHs, Aerators	144	NA	144	NA	11,262	37.10	0.4
Hot Water	105	Office-37	Office	hot water central hxer	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	73	NA	73	NA	11,355	10.58	1.5
Hot Water	101	Office-30	Office	gas shw heater	none	0	NA	0	NA	0	NA	NA
Hot Water	96	Office-22	Office	oil central boiler	Oil Wrap Tank w. Insulation, LFSHs, Aerators	48	NA	48	NA	4,482	65.90	0.2
Hot Water	107	Office-04	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	8	NA	8	NA	58	2.03	7.6
Hot Water	95	Office-21	Office	oil central boiler	Oil Wrap Tank w. Insulation, LFSHs, Aerators	67	NA	67	NA	6,291	65.19	0.2
Hot Water	110	Office-09	Office	oil shw heater	Wrap Old Oil Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	11	NA	11	NA	175	3.30	4.7
Hot Water	102	Office-31	Office	hot water central hxer	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	25	NA	25	NA	4,306	7.08	2.2
Hot Water	100	Office-03	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	11	NA	11	NA	295	5.15	3.0
Hot Water	84	Office-10	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	10	NA	10	NA	279	6.81	2.3
Hot Water	92	Office-02	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	25	NA	25	NA	193	2.21	7.1
Hot Water	82	Office-01	Office	oil central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	275	NA	275	NA	33,382	13.08	1.2
Hot Water	107	Office-04	Office	oil central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	46	NA	46	NA	5,636	15.68	1.0
Hot Water	87	Office-15	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	21	NA	21	NA	148	2.01	7.8
Hot Water	108	Office-07	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	22	NA	22	NA	161	2.10	7.5
Hot Water	123	Other-24	Other	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	9	NA	9	NA	49	1.58	9.9
Hot Water	133	Other-38	Other	hot water central hxer	none	0	NA	0	NA	0	NA	NA
Hot Water	120	Other-02	Other	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	17	NA	17	NA	113	1.90	8.2
Hot Water	128	Other-30	Other	gas shw heater	none	0	NA	0	NA	0	NA	NA
Hot Water	129	Other-31	Other	hot water central hxer	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	0	NA	0	NA	833	3.85	4.1
Hot Water	135	Other-42	Other	gas shw heater	none	0	NA	0	NA	0	NA	NA
Hot Water	115	Other-1[illegible]	Other	oil central boiler	none	0	NA	0	NA	0	NA	NA
Hot Water	130	Other-32	Other	oil central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	91	NA	91	NA	19,999	20.25	0.8
Hot Water	130	Other-32	Other	hot water central hxer	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	43	NA	43	NA	21,307	9.81	1.6
Hot Water	113	Other-10	Other	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	22	NA	22	NA	198	2.68	5.8
Hot Water	119	Other-19	Other	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	10	NA	10	NA	66	1.90	8.2
Hot Water	112	Other-01g	Other	oil shw heater	0.80 Oil WH (COM), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	2,378	NA	2,378	NA	35,788	5.38	4.6
Hot Water	139	Other-09	Other	oil central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	21	NA	21	NA	357	7.87	2.0
Hot Water	124	Other-26	Other	oil central boiler	Oil Wrap Tank w. Insulation, LFSHs, Aerators	17	NA	17	NA	1,447	41.19	0.4
Hot Water	127	Other-03	Other	oil central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	16	NA	16	NA	2,320	10.81	1.4
Hot Water	134	Other-41	Other	oil central boiler	Oil Wrap Tank w. Insulation, LFSHs, Aerators	99	NA	99	NA	9,316	55.89	0.3
Hot Water	131	Other-36	Other	oil central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	96	NA	96	NA	8,633	23.48	0.7
Hot Water	131	Other-36	Other	hot water central hxer	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	21	NA	21	NA	8,499	12.01	1.3
Hot Water	117	Other-17ng	Other	oil shw heater	0.80 Oil WH (COM), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	7,505	NA	7,505	NA	137,984	6.17	2.5
Hot Water	125	Other-27	Other	oil central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	92	NA	92	NA	6,712	20.46	0.7
Hot Water	137	Other-07	Other	oil central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	58	NA	58	NA	5,996	22.04	0.7
Hot Water	138	Other-08	Other	hot water central hxer	none	0	NA	0	NA	0	NA	NA
Hot Water	116	Other-17	Other	oil central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	27	NA	27	NA	1,613	4.40	3.6
Hot Water	145	Public Order-05	Public Order Safety	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	46	NA	46	NA	305	1.88	8.5
Hot Water	50	FH-attached-04	Single Family Attached	gas shw heater	none	0	NA	0	NA	0	NA	NA
Hot Water	49	FH-attached-03	Single Family Attached	gas shw heater	none	0	NA	0	NA	0	NA	NA
Hot Water	51	FH-attached-05	Single Family Attached	electric shw heater	Wrap Old Electric Tank w. Ins., Ins. Pipe, LFSHs, Aerators	1,168	NA	1,168	NA	66,992	5.25	3.0
Hot Water	48	FH-attached-01	Single Family Attached	electric shw heater	0.76 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	97	NA	97	NA	56,675	4.88	3.2
Hot Water	43	FH-Detached-01	Single Family Detached	gas shw heater	0.85 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	89	NA	89	NA	123	2.04	7.6
Hot Water	46	FH-Detached-05	Single Family Detached	gas shw heater	Wrap Old Gas Tank w. Ins., Ins. Pipe, LFSHs, Aerators	33	NA	33	NA	16	1.04	15.1
Hot Water	47	FH-Detached-07	Single Family Detached	gas shw heater	none	0	NA	0	NA	0	NA	NA
Hot Water	43	FH-Detached-01	Single Family Detached	electric shw heater	0.85 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	41	NA	41	NA	1,977	14.96	1.1
Hot Water	45	FH-Detached-04	Single Family Detached	gas shw heater	none	[illegible]	NA	[illegible]	NA	0	NA	NA
Hot Water	44	FH-Detached-03	Single Family Detached	other shw heater	0.85 LPG WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	[illegible]	NA	[illegible]	NA	82	2.27	[illegible]
Hot Water	165	Warehouse-25	Warehouse & Storage	gas shw heater	none	[illegible]	NA	[illegible]	NA	[illegible]	NA	NA

Table 3.5a
All Building ERUs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	User Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW mo)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback
Hot Water		168 Warehouse-03	Warehouse & Storage	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	29	NA	29	NA	174	1.75	9.0
Hot Water		168 Warehouse-03	Warehouse & Storage	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	20	NA	20	NA	3,325	14.14	1.1
Hot Water		164 Warehouse-24	Warehouse & Storage	hot water central heat	none	0	NA	0	NA	0	NA	NA
Hot Water		171 Warehouse-03	Warehouse & Storage	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	5	NA	5	NA	379	38.91	0.4
Hot Water		163 Warehouse-23	Warehouse & Storage	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	7	NA	7	NA	1,642	6.78	2.3
Lights		39 FH-2 to 4-06	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	173	NA	173	NA	81,084	2.81	5.6
Lights		41 FH-2 to 4-09	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	40	NA	40	NA	18,745	2.81	5.6
Lights		37 FH-2 to 4-12	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	59	NA	59	NA	18,466	2.59	6.3
Lights		40 FH-2 to 4-07	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	221	NA	221	NA	95,830	3.51	4.5
Lights		40 FH-2 to 4-07	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL173 CFL 27 INTEGRAL UNIT	231	NA	231	NA	138,198	6.27	2.3
Lights		36 FH-2 to 4-10	2 to 4 Unit Buildings	IN9 INC 2-75 CEIL	none	0	NA	0	NA	0	NA	NA
Lights		35 FH-2 to 4-01	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	88	NA	88	NA	44,435	2.95	5.5
Lights		40 FH-2 to 4-07	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	23	NA	23	NA	13,081	5.02	2.6
Lights		36 FH-2 to 4-10	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL173 CFL 27 INTEGRAL UNIT	128	NA	128	NA	77,284	6.32	2.5
Lights		39 FH-2 to 4-06	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	41	NA	41	NA	12,619	1.95	8.1
Lights		40 FH-2 to 4-07	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	62	NA	62	NA	18,436	1.90	8.2
Lights		36 FH-2 to 4-10	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	236	NA	236	NA	111,082	2.84	5.5
Lights		37 FH-2 to 4-12	2 to 4 Unit Buildings	FL3 FL 1X4 1F40T12 STD1	none	0	NA	0	NA	0	NA	NA
Lights		38 FH-2 to 4-03	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	91	NA	91	NA	35,291	2.13	7.3
Lights		36 FH-2 to 4-10	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	289	NA	289	NA	129,913	3.38	4.4
Lights		41 FH-2 to 4-09	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	40	NA	40	NA	15,523	2.14	7.3
Lights		38 FH-2 to 4-03	2 to 4 Unit Buildings	IN9 INC 2-75 CEIL	none	0	NA	0	NA	0	NA	NA
Lights		35 FH-2 to 4-01	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL173 CFL 27 INTEGRAL UNIT	25	NA	25	NA	15,906	6.38	2.4
Lights		35 FH-2 to 4-01	2 to 4 Unit Buildings	IN9 INC 2-75 CEIL	none	0	NA	0	NA	0	NA	NA
Lights		40 FH-2 to 4-07	2 to 4 Unit Buildings	IN9 INC 2-75 CEIL	none	0	NA	0	NA	0	NA	NA
Lights		37 FH-2 to 4-12	2 to 4 Unit Buildings	IN9 INC 2-75 CEIL	none	0	NA	0	NA	0	NA	NA
Lights		38 FH-2 to 4-03	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL173 CFL 27 INTEGRAL UNIT	13	NA	13	NA	8,037	6.34	2.4
Lights		38 FH-2 to 4-03	2 to 4 Unit Buildings	IN10 INC 3-75 CEIL	none	0	NA	0	NA	0	NA	NA
Lights		36 FH-2 to 4-10	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	13	NA	13	NA	8,699	6.75	2.3
Lights		35 FH-2 to 4-01	2 to 4 Unit Buildings	IN10 INC 3-75 CEIL	none	0	NA	0	NA	0	NA	NA
Lights		37 FH-2 to 4-12	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	324	NA	324	NA	165,686	2.46	5.3
Lights		40 FH-2 to 4-07	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	427	NA	427	NA	202,301	2.81	5.6
Lights		37 FH-2 to 4-12	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	111	NA	111	NA	41,446	2.12	7.4
Lights		36 FH-2 to 4-10	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	80	NA	80	NA	22,736	1.80	8.4
Lights		41 FH-2 to 4-09	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	9	NA	9	NA	4,423	3.38	2.9
Lights		38 FH-2 to 4-03	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	38	NA	38	NA	11,441	1.91	8.2
Lights		35 FH-2 to 4-01	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	31	NA	31	NA	10,618	2.02	7.7
Lights		37 FH-2 to 4-12	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL173 CFL 27 INTEGRAL UNIT	20	NA	20	NA	13,722	7.09	2.2
Lights		38 FH-2 to 4-03	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	21	NA	21	NA	11,119	5.78	2.7
Lights		38 FH-2 to 4-03	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	137	NA	137	NA	64,973	2.82	5.5
Lights		41 FH-2 to 4-09	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	9	NA	9	NA	2,302	1.82	8.6
Lights		37 FH-2 to 4-12	2 to 4 Unit Buildings	FL4 FL 1X4 2F40T12 STD2	FL52 FL 1X4 2F32T8 ELC2	46	NA	46	NA	3,566	1.21	12.9
Lights		39 FH-2 to 4-06	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	39	NA	39	NA	20,945	5.81	2.7
Lights		39 FH-2 to 4-06	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	173	NA	173	NA	67,110	2.14	7.3
Lights		42 FH-5 or More-01	5 or More Unit Buildings	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	41	NA	41	NA	16,054	2.15	7.3
Lights		42 FH-5 or More-01	5 or More Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	36	NA	36	NA	16,380	2.91	7.8
Lights		42 FH-5 or More-01	5 or More Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	124	NA	124	NA	61,193	2.89	5.4
Lights		42 FH-5 or More-01	5 or More Unit Buildings	FL4 FL 1X4 2F40T12 STD2	FL52 FL 1X4 2F32T8 ELC2	31	NA	31	NA	2,120	1.17	13.4
Lights		42 FH-5 or More-01	5 or More Unit Buildings	FL3 FL 1X4 1F40T12 STD1	none	0	NA	0	NA	0	NA	NA
Lights		8 Assembly-20	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL103 FL 2X4 2F40T12ES ELC2	44	NA	44	NA	11,729	1.89	8.3
Lights		3 Assembly-15	Assembly	FL79 FL 2X4 4F40T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights		6 Assembly-19	Assembly	EX1 EXIT INC (2x26)	EX6 EXIT LED	35	NA	35	NA	11,675	3.16	4.9
Lights		15 Assembly-07	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	7	NA	7	NA	1,919	2.42	6.3
Lights		13 Assembly-07	Assembly	FL81 FL 2X4 2F40T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights		7 Assembly-02	Assembly	EX1 EXIT INC (2x26)	EX6 EXIT LED	8	NA	8	NA	1,032	3.14	4.9
Lights		0 Assembly-01	Assembly	FL81 FL 2X4 2F40T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights		13 Assembly-04	Assembly	FL79 FL 2X4 4F40T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights		13 Assembly-04	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	57	NA	57	NA	16,709	1.46	10.5
Lights		9 Assembly-22	Assembly	EX1 EXIT INC (2x26)	EX6 EXIT LED	35	NA	35	NA	9,846	2.82	5.3
Lights		9 Assembly-22	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL103 FL 2X4 2F40T12ES ELC2	18	NA	18	NA	1,936	1.19	13.5
Lights		14 Assembly-05	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL103 FL 2X4 2F40T12ES ELC2	9	NA	9	NA	1,489	1.48	10.6
Lights		12 Assembly-03	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	28	NA	28	NA	8,326	1.25	7.7
Lights		2 Assembly-13	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	11	NA	11	NA	2,423	1.95	8.5
Lights		16 Assembly-08	Assembly	FL81 FL 2X4 2F40T12ES STD2	none	0	NA		NA	0	NA	NA
Lights		6 Assembly-19	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	34	NA	34	NA	9,964	2.37	6.1
Lights		16 Assembly-23	Assembly	FL81 FL 2X4 2F40T12ES STD2	none	0	NA		NA	0	NA	NA
Lights		16 Assembly-08	Assembly	EX1 EXIT INC (2x26)	EX6 EXIT LED	7	NA		NA	2,051	2.47	5.4
Lights		12 Assembly-03	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL103 FL 2X4 2F40T12ES ELC2	27	NA		NA	3,910	1.36	11.5
Lights		7 Assembly-02	Assembly	FL81 FL 2X4 2F40T12ES STD2	none		NA		NA		NA	NA

Table 3.5a
All Building EIRCs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW max)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW max)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Lights		13 Assembly-04	Assembly	FL81 FL 2X4 2F40/T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights		3 Assembly-15	Assembly	FL81 FL 2X4 2F40/T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights		0 Assembly-01	Assembly	FL79 FL 2X4 4F40/T12ES STD2	FL232 FL 2X4 3F40/T12 ELC'3	18	NA	18	NA	334	1.04	15.0
Lights		14 Assembly-05	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	14	NA	14	NA	4,990	5.27	4.8
Lights		2 Assembly-13	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	17	NA	17	NA	4,936	2.92	5.4
Lights		11 Assembly-24	Assembly	FL79 FL 2X4 4F40/T12ES STD2	FL232 FL 2X4 3F40/T12 ELC'3	16	NA	16	NA	4,593	2.17	7.2
Lights		2 Assembly-13	Assembly	FL81 FL 2X4 2F40/T12ES STD2	FL105 FL 2X4 2F40/T12ES ELC'2	8	NA	8	NA	576	1.16	13.5
Lights		17 Assembly-09	Assembly	FL79 FL 2X4 4F40/T12ES STD2	FL232 FL 2X4 3F40/T12 ELC'3	18	NA	18	NA	3,973	1.87	8.4
Lights		3 Assembly-15	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	9	NA	9	NA	2,629	2.97	5.5
Lights		12 Assembly-03	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	38	NA	38	NA	12,303	3.09	5.1
Lights		15 Assembly-07	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1	NA	1	NA	576	2.63	5.9
Lights		7 Assembly-02	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	11	NA	11	NA	3,930	2.39	6.5
Lights		10 Assembly-23	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	10	NA	10	NA	2,991	2.98	5.2
Lights		6 Assembly-19	Assembly	FL81 FL 2X4 2F40/T12ES STD2	FL105 FL 2X4 2F40/T12ES ELC'2	24	NA	24	NA	3,897	1.51	10.3
Lights		14 Assembly-05	Assembly	FL79 FL 2X4 4F40/T12ES STD2	FL232 FL 2X4 3F40/T12 ELC'3	13	NA	13	NA	3,734	2.30	6.2
Lights		1 Assembly-10	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	18	NA	18	NA	5,085	2.84	5.5
Lights		9 Assembly-22	Assembly	FL79 FL 2X4 4F40/T12ES STD2	FL232 FL 2X4 3F40/T12 ELC'3	26	NA	26	NA	5,384	1.91	8.2
Lights		4 Assembly-16	Assembly	FL81 FL 2X4 2F40/T12ES STD2	FL105 FL 2X4 2F40/T12ES ELC'2	28	NA	28	NA	3,571	1.48	10.5
Lights		10 Assembly-23	Assembly	FL79 FL 2X4 4F40/T12ES STD2	FL232 FL 2X4 3F40/T12 ELC'3	5	NA	5	NA	820	1.48	10.6
Lights		1 Assembly-10	Assembly	FL81 FL 2X4 2F40/T12ES STD2	FL105 FL 2X4 2F40/T12ES ELC'2	10	NA	10	NA	1,128	1.29	12.1
Lights		16 Assembly-08	Assembly	FL79 FL 2X4 4F40/T12ES STD2	FL232 FL 2X4 3F40/T12 ELC'3	3	NA	3	NA	30	1.02	15.3
Lights		1 Assembly-10	Assembly	FL79 FL 2X4 4F40/T12ES STD2	FL232 FL 2X4 3F40/T12 ELC'3	14	NA	14	NA	3,545	2.13	7.3
Lights		11 Assembly-24	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	22	NA	22	NA	7,758	3.24	4.8
Lights		17 Assembly-09	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	26	NA	26	NA	7,458	2.83	5.5
Lights		13 Assembly-04	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	24	NA	24	NA	7,331	2.97	5.3
Lights		3 Assembly-15	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	24	NA	24	NA	6,460	1.82	8.6
Lights		16 Assembly-08	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	24	NA	24	NA	5,995	1.93	8.1
Lights		7 Assembly-02	Assembly	FL79 FL 2X4 4F40/T12ES STD2	FL232 FL 2X4 3F40/T12 ELC'3	1	NA	1	NA	78	1.14	15.7
Lights		4 Assembly-16	Assembly	FL79 FL 2X4 4F40/T12ES STD2	FL232 FL 2X4 3F40/T12 ELC'3	46	NA	46	NA	13,187	2.43	6.4
Lights		15 Assembly-07	Assembly	FL79 FL 2X4 4F40/T12ES STD2	FL232 FL 2X4 3F40/T12 ELC'3	1	NA	1	NA	86	1.32	11.8
Lights		11 Assembly-24	Assembly	FL81 FL 2X4 2F40/T12ES STD2	FL105 FL 2X4 2F40/T12ES ELC'2	11	NA	11	NA	1,336	1.28	12.2
Lights		17 Assembly-09	Assembly	FL81 FL 2X4 2F40/T12ES STD2	FL105 FL 2X4 2F40/T12ES ELC'2	13	NA	13	NA	798	1.14	13.7
Lights		5 Assembly-18	Assembly	FL81 FL 2X4 2F40/T12ES STD2	FL105 FL 2X4 2F40/T12ES ELC'2	35	NA	35	NA	6,008	1.42	11.0
Lights		0 Assembly-01	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	46	NA	46	NA	12,198	2.71	5.8
Lights		1 Assembly-10	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	124	NA	124	NA	46,741	3.87	4.9
Lights		6 Assembly-19	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	305	NA	305	NA	141,033	5.47	2.9
Lights		12 Assembly-03	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	234	NA	234	NA	107,362	4.11	3.8
Lights		4 Assembly-16	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	33	NA	33	NA	18,724	3.29	4.7
Lights		5 Assembly-18	Assembly	FL79 FL 2X4 4F40/T12ES STD2	FL232 FL 2X4 3F40/T12 ELC'3	30	NA	30	NA	14,857	2.30	6.8
Lights		10 Assembly-23	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	43	NA	43	NA	15,244	2.72	5.7
Lights		9 Assembly-22	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	233	NA	233	NA	77,977	3.46	4.5
Lights		17 Assembly-09	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	164	NA	164	NA	52,214	3.29	4.9
Lights		0 Assembly-01	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	166	NA	166	NA	48,482	2.16	7.2
Lights		8 Assembly-20	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	66	NA	66	NA	23,224	3.48	4.5
Lights		8 Assembly-20	Assembly	FL79 FL 2X4 4F40/T12ES STD2	FL232 FL 2X4 3F40/T12 ELC'3	70	NA	70	NA	23,791	3.24	4.8
Lights		11 Assembly-24	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	148	NA	148	NA	63,134	4.19	3.8
Lights		14 Assembly-05	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	121	NA	121	NA	32,633	3.48	3.1
Lights		4 Assembly-16	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	364	NA	364	NA	174,358	4.64	3.4
Lights		5 Assembly-18	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	449	NA	449	NA	193,424	4.27	3.7
Lights		5 Assembly-18	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	63	NA	63	NA	21,674	3.13	5.0
Lights		8 Assembly-20	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	533	NA	533	NA	302,077	6.30	2.4
Lights		2 Assembly-13	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	302	NA	302	NA	36,613	3.42	4.6
Lights		34 Education-09	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	10	NA	10	NA	3,045	2.99	5.4
Lights		19 Education-11	Education	FL79 FL 2X4 4F40/T12ES STD2	FL232 FL 2X4 3F40/T12 ELC'3	16	NA	16	NA	2,994	1.62	9.7
Lights		31 Education-04	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	43	NA	43	NA	14,458	3.19	4.9
Lights		26 Education-19	Education	FL79 FL 2X4 4F40/T12ES STD2	FL232 FL 2X4 3F40/T12 ELC'3	120	NA	120	NA	14,989	1.86	12.9
Lights		27 Education-02	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	11	NA	11	NA	5,462	3.07	5.1
Lights		29 Education-23	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	12	NA	12	NA	3,714	2.93	5.3
Lights		20 Education-12	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	13	NA	13	NA	3,853	2.98	5.2
Lights		18 Education-01	Education	FL79 FL 2X4 4F40/T12ES STD2	none	0	NA		NA	0	NA	NA
Lights		19 Education-11	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	6	NA	6	NA	1,785	2.86	5.3
Lights		23 Education-18	Education	FL79 FL 2X4 4F40/T12ES STD2	FL232 FL 2X4 3F40/T12 ELC'3	241	NA	41	NA	46,394	1.63	9.4
Lights		23 Education-16	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	2	NA		NA	668	2.91	5.4
Lights		33 Education-08	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	61	NA		NA	19,117	3.04	5.1
Lights		36 Education-24	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	78	NA	8	NA	21,396	[illegible]	5.6
Lights		32 Education-07	Education	FL79 FL 2X4 4F40/T12ES STD2	FL232 FL 2X4 3F40/T12 ELC'3	63	NA	13	NA	13,682	1.75	8.7
Lights		25 Education-18	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	62	NA	12	NA	27,438	[illegible]	5.9
Lights		31 Education-04	Education	FL79 FL 2X4 4F40/T12ES STD2	FL232 FL 2X4 3F40/T12 ELC'3	118	NA	118	NA	36,685	1.47	8.1
Lights		22 Education-13	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	4	NA	4	NA	844	[illegible]	5.6

Table 3.5a
All Building EROs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW/mo)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW/mo)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Lights		21 Education-14	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	8	NA	8	NA	2,395	2.87	5.4
Lights		24 Education-17	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	75	NA	75	NA	13,302	1.63	9.6
Lights		23 Education-16	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	6	NA	6	NA	1,287	1.73	9.0
Lights		33 Education-08	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	172	NA	172	NA	36,591	1.77	8.8
Lights		22 Education-15	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	8	NA	8	NA	1,841	1.78	8.8
Lights		18 Education-01	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	18	NA	18	NA	4,223	2.51	6.2
Lights		26 Education-19	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	63	NA	63	NA	18,868	2.94	5.3
Lights		32 Education-07	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	22	NA	22	NA	6,358	2.83	5.5
Lights		24 Education-17	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	27	NA	27	NA	7,561	2.81	5.6
Lights		28 Education-22	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	22	NA	22	NA	6,236	2.79	5.6
Lights		29 Education-23	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	37	NA	37	NA	7,897	1.81	8.6
Lights		21 Education-14	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	23	NA	23	NA	5,434	1.84	8.3
Lights		20 Education-12	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	37	NA	37	NA	9,629	1.98	7.9
Lights		30 Education-24	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	154	NA	154	NA	12,[illegible]	1.20	13.0
Lights		28 Education-22	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	64	NA	64	NA	12,29[illegible]	1.70	9.2
Lights		27 Education-02	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	30	NA	30	NA	7,293	1.88	8.3
Lights		34 Education-09	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	31	NA	31	NA	6,473	1.80	8.7
Lights		32 Food Sales-01	Food Sales	FL62 FL 1X8 2F96T12 STD2	FL131 FL 1X8 2F96T12ES ELC2 REF	543	NA	543	NA	130,973	2.23	6.9
Lights		32 Food Sales-01	Food Sales	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	385	NA	385	NA	127,769	3.93	4.0
Lights		32 Food Sales-01	Food Sales	HS17 HPS 250 PEND	LS3 LPS 135 PEND	152	NA	152	NA	22,823	1.71	9.1
Lights		32 Food Sales-01	Food Sales	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	10	NA	10	NA	3,814	3.35	4.7
Lights		61 Food Service-07	Food Service	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	6	NA	6	NA	500	1.23	12.7
Lights		58 Food Service-17	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	30	NA	30	NA	10,876	3.32	4.7
Lights		53 Food Service-01	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5	NA	5	NA	1,623	3.06	5.1
Lights		34 Food Service-11	Food Service	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	40	NA	40	NA	6,676	1.52	10.3
Lights		53 Food Service-01	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	8	NA	8	NA	1,291	1.45	10.8
Lights		62 Food Service-08	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	63	NA	63	NA	20,740	3.11	5.0
Lights		36 Food Service-13	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	8	NA	8	NA	2,180	2.34	6.2
Lights		58 Food Service-17	Food Service	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	34	NA	34	NA	6,423	1.64	9.5
Lights		63 Food Service-09	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	10	NA	10	NA	1,397	1.39	11.2
Lights		34 Food Service-11	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	121	NA	121	NA	33,008	2.59	6.0
Lights		62 Food Service-08	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	96	NA	96	NA	13,801	1.39	11.3
Lights		36 Food Service-13	Food Service	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	3	NA	3	NA	376	1.45	10.8
Lights		53 Food Service-12	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	3	NA	3	NA	1,143	3.73	4.2
Lights		58 Food Service-17	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	103	NA	103	NA	32,939	2.93	5.3
Lights		36 Food Service-13	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	3	NA	3	NA	800	3.06	5.1
Lights		60 Food Service-04	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	78	NA	78	NA	23,122	2.92	5.4
Lights		53 Food Service-12	Food Service	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	3	NA	3	NA	615	1.69	9.3
Lights		60 Food Service-04	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	116	NA	116	NA	17,408	1.40	11.2
Lights		61 Food Service-07	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	20	NA	20	NA	4,586	2.22	7.0
Lights		63 Food Service-09	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	6	NA	6	NA	1,898	2.94	5.3
Lights		57 Food Service-15	Food Service	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	13	NA	13	NA	2,587	1.66	9.4
Lights		53 Food Service-12	Food Service	MH33 MH 70 HE PEND	none	0	NA	0	NA	0	NA	NA
Lights		53 Food Service-01	Food Service	MH33 MH 70 HE PEND	none	0	NA	0	NA	0	NA	NA
Lights		61 Food Service-07	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	7	NA	7	NA	2,398	3.52	4.4
Lights		36 Food Service-13	Food Service	MH33 MH 70 HE PEND	none	0	NA	0	NA	0	NA	NA
Lights		53 Food Service-01	Food Service	FL81 FL 2X4 2F40T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights		60 Food Service-04	Food Service	FL81 FL 2X4 2F40T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights		62 Food Service-08	Food Service	MH33 MH 70 HE PEND	none	0	NA	0	NA	0	NA	NA
Lights		54 Food Service-11	Food Service	MH33 MH 70 HE PEND	none	0	NA	0	NA	0	NA	NA
Lights		59 Food Service-02	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	11	NA	11	NA	3,713	3.16	4.9
Lights		61 Food Service-07	Food Service	MH33 MH 70 HE PEND	none	0	NA	0	NA	0	NA	NA
Lights		57 Food Service-15	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	39	NA	39	NA	14,289	3.13	5.0
Lights		57 Food Service-15	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	12	NA	12	NA	4,906	3.66	4.3
Lights		59 Food Service-02	Food Service	MH33 MH 70 HE PEND	none	0	NA	0	NA	0	NA	NA
Lights		63 Food Service-09	Food Service	MH33 MH 70 HE PEND	none	0	NA	0	NA	0	NA	NA
Lights		57 Food Service-15	Food Service	MH33 MH 70 HE PEND	none	0	NA	0	NA	0	NA	NA
Lights		62 Food Service-08	Food Service	FL81 FL 2X4 2F40T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights		63 Food Service-09	Food Service	FL81 FL 2X4 2F40T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights		59 Food Service-02	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	17	NA	17	NA	2,823	1.45	10.8
Lights		59 Food Service-02	Food Service	FL81 FL 2X4 2F40T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights		60 Food Service-04	Food Service	MH33 MH 70 HE PEND	none	0	NA	0	NA	0	NA	NA
Lights		54 Food Service-11	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	36	NA	36	NA	15,041	3.48	4.5
Lights		58 Food Service-17	Food Service	MH33 MH 70 HE PEND	none	0	NA	0	NA	0	NA	NA
Lights		55 Food Service-12	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	9	NA	9	NA	3,211	3.11	5.0
Lights		64 Health Care-01	Health Care	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	4	NA	4	NA	764	2.07	7.3
Lights		66 Health Care-03	Health Care	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	6	NA	6	NA	10,024	2.86	5.5
Lights		67 Health Care-04	Health Care	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	26	NA	26	NA	5,119	1.76	9.2
Lights		67 Health Care-04	Health Care	IN3 INC 60 CEIL	FL181 CFL 13 - BIST UNIT	589	NA	589	NA	121,440	4.33	3.5

Table 3.5a
All Building EROs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Lights	67	Health Care-04	Health Care	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	178	NA	178	NA	55,590	2.96	5.3
Lights	65	Health Care-02	Health Care	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	23	NA	23	NA	6,228	2.01	7.8
Lights	68	Health Care-06	Health Care	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	25	NA	25	NA	4,390	1.61	9.7
Lights	69	Health Care-07	Health Care	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	4,838	NA	4,838	NA	1,587,520	4.21	3.7
Lights	66	Health Care-03	Health Care	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	59	NA	59	NA	22,379	4.42	3.5
Lights	69	Health Care-07	Health Care	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	700	NA	700	NA	171,461	2.34	6.7
Lights	69	Health Care-07	Health Care	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	158	NA	158	NA	59,125	3.42	4.6
Lights	65	Health Care-02	Health Care	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	2	NA	2	NA	653	3.13	5.0
Lights	66	Health Care-03	Health Care	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	5	NA	5	NA	968	1.70	9.2
Lights	65	Health Care-02	Health Care	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	3	NA	3	NA	437	1.27	12.3
Lights	68	Health Care-06	Health Care	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	9	NA	9	NA	3,157	3.29	4.8
Lights	64	Health Care-01	Health Care	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	7	NA	7	NA	1,586	2.83	5.5
Lights	68	Health Care-06	Health Care	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	277	NA	277	NA	107,578	4.16	3.8
Lights	66	Health Care-03	Health Care	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	2	NA	2	NA	349	3.06	5.1
Lights	67	Health Care-04	Health Care	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	9	NA	9	NA	3,336	3.39	4.6
Lights	68	Health Care-06	Health Care	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	171	NA	171	NA	50,775	2.82	5.5
Lights	69	Health Care-07	Health Care	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	7,862	NA	7,862	NA	3,359,582	6.57	2.4
Lights	65	Health Care-02	Health Care	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	33	NA	33	NA	14,219	5.24	3.0
Lights	64	Health Care-01	Health Care	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1	NA	1	NA	35	1.19	13.1
Lights	73	Lodging-12	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	95	NA	95	NA	30,490	3.06	5.1
Lights	74	Lodging-13	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	25	NA	25	NA	8,962	4.62	3.4
Lights	81	Lodging-08	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	15	NA	15	NA	4,554	2.93	5.3
Lights	77	Lodging-19	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	37	NA	37	NA	12,201	4.32	3.6
Lights	74	Lodging-13	Lodging	FL5 FL 1X4 1F40T12 STD1	none	0	NA	0	NA	0	NA	NA
Lights	72	Lodging-11	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	755	NA	755	NA	245,563	3.10	5.0
Lights	76	Lodging-16	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	12	NA	12	NA	4,434	4.88	3.2
Lights	73	Lodging-12	Lodging	IN15 INC 60 TABLE LAMP	FL181 CFL 13 + BLST UNIT	24	NA	24	NA	6,501	2.37	6.6
Lights	71	Lodging-10	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	223	NA	223	NA	58,969	2.71	5.8
Lights	73	Lodging-12	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	20	NA	20	NA	6,646	4.34	3.6
Lights	75	Lodging-15	Lodging	FL5 FL 1X4 1F40T12 STD1	FL29 FL 1X4 1F40T12 ELC1	4	NA	4	NA	156	1.08	14.5
Lights	76	Lodging-16	Lodging	FL5 FL 1X4 1F40T12 STD1	none	0	NA	0	NA	0	NA	NA
Lights	72	Lodging-11	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	160	NA	160	NA	44,406	3.82	4.1
Lights	80	Lodging-07	Lodging	FL5 FL 1X4 1F40T12 STD1	none	0	NA	0	NA	0	NA	NA
Lights	78	Lodging-02	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	4	NA	4	NA	1,592	4.66	3.4
Lights	72	Lodging-11	Lodging	FL5 FL 1X4 1F40T12 STD1	none	0	NA	0	NA	0	NA	NA
Lights	70	Lodging-01	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	7	NA	7	NA	1,787	2.73	5.7
Lights	74	Lodging-13	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	119	NA	119	NA	37,863	3.06	5.1
Lights	74	Lodging-13	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	27	NA	27	NA	9,625	4.67	3.3
Lights	75	Lodging-15	Lodging	IN15 INC 60 TABLE LAMP	FL181 CFL 13 + BLST UNIT	5	NA	5	NA	1,583	2.85	5.5
Lights	76	Lodging-16	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	12	NA	12	NA	4,787	4.95	3.2
Lights	75	Lodging-15	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	17	NA	17	NA	5,394	3.10	5.0
Lights	79	Lodging-05	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	133	NA	133	NA	38,620	2.88	5.4
Lights	78	Lodging-02	Lodging	FL5 FL 1X4 1F40T12 STD1	none	0	NA	0	NA	0	NA	NA
Lights	73	Lodging-12	Lodging	FL5 FL 1X4 1F40T12 STD1	none	0	NA	0	NA	0	NA	NA
Lights	75	Lodging-15	Lodging	IN23 INC 60 WALL	FL181 CFL 13 + BLST UNIT	5	NA	5	NA	1,416	2.75	5.7
Lights	79	Lodging-05	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	30	NA	30	NA	8,184	3.79	4.1
Lights	77	Lodging-19	Lodging	FL5 FL 1X4 1F40T12 STD1	none	0	NA	0	NA	0	NA	NA
Lights	79	Lodging-05	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	28	NA	28	NA	8,122	3.93	4.0
Lights	78	Lodging-02	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	21	NA	21	NA	7,242	3.24	4.8
Lights	81	Lodging-08	Lodging	FL5 FL 1X4 1F40T12 STD1	none	0	NA	0	NA	0	NA	NA
Lights	71	Lodging-10	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	21	NA	21	NA	2,539	1.55	10.1
Lights	70	Lodging-01	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	1	NA	1	NA	101	1.69	9.2
Lights	80	Lodging-07	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	37	NA	37	NA	6,832	1.85	8.5
Lights	71	Lodging-10	Lodging	FL5 FL 1X4 1F40T12 STD1	none	0	NA	0	NA	0	NA	NA
Lights	79	Lodging-05	Lodging	FL5 FL 1X4 1F40T12 STD1	none	0	NA	0	NA	0	NA	NA
Lights	70	Lodging-01	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	1	NA	1	NA	93	1.67	9.3
Lights	80	Lodging-07	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	367	NA	367	NA	110,936	2.95	5.3
Lights	72	Lodging-11	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	170	NA	170	NA	51,849	4.11	3.8
Lights	77	Lodging-19	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	166	NA	166	NA	51,977	3.02	5.2
Lights	77	Lodging-19	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	35	NA	35	NA	11,335	4.27	3.7
Lights	70	Lodging-01	Lodging	FL5 FL 1X4 1F40T12 STD1	none	0	NA	0	NA	0	NA	NA
Lights	71	Lodging-10	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	23	NA	23	NA	2,766	1.36	10.0
Lights	80	Lodging-07	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	35	NA	35	NA	6,775	1.89	8.3
Lights	76	Lodging-16	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	55	NA	55	NA	17,693	3.07	5.1
Lights	81	Lodging-08	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	1	NA	1	NA	463	2.46	6.3
Lights	81	Lodging-08	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	2	NA	2	NA	489	2.43	6.4
Lights	78	Lodging-02	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	5	NA	5	NA	1,698	4.68	3.3
Lights	153	Service-09	Mercantile & Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1	NA	1	NA	494	3.59	4.4
Lights	153	Service-09	Mercantile & Service	MV3 MERC 100 PLND	none	0	NA	0	NA	0	NA	NA

Table 3.5a
All Building EROs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Lights	146	Service-01	Mercantile & Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	87	NA	87	NA	28,316	3.33	4.7
Lights	151	Service-07	Mercantile & Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	3	NA	3	NA	1,039	3.12	5.0
Lights	149	Service-05	Mercantile & Service	MV3: MERC 100 PEND	none	0	NA	0	NA	0	NA	NA
Lights	148	Service-04	Mercantile & Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	2	NA	2	NA	638	3.33	4.7
Lights	153	Service-09	Mercantile & Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	20	NA	20	NA	7,365	3.60	4.3
Lights	150	Service-06	Mercantile & Service	MV3: MERC 100 PEND	none	0	NA	0	NA	0	NA	NA
Lights	146	Service-01	Mercantile & Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	5	NA	5	NA	1,740	3.12	5.0
Lights	150	Service-06	Mercantile & Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	52	NA	52	NA	17,136	2.88	5.4
Lights	149	Service-05	Mercantile & Service	IN39: INC 150 FLD	HS31: HPS 70 FLD	107	NA	107	NA	75,935	3.51	4.4
Lights	150	Service-06	Mercantile & Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	4	NA	4	NA	1,534	3.49	4.5
Lights	146	Service-01	Mercantile & Service	MV3: MERC 100 PEND	none	0	NA	0	NA	0	NA	NA
Lights	151	Service-07	Mercantile & Service	IN39: INC 150 FLD	HS31: HPS 70 FLD	237	NA	237	NA	149,967	3.24	4.8
Lights	150	Service-06	Mercantile & Service	IN39: INC 150 FLD	HS31: HPS 70 FLD	236	NA	236	NA	153,705	2.82	5.5
Lights	152	Service-08	Mercantile & Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	21	NA	21	NA	7,996	3.47	4.5
Lights	148	Service-04	Mercantile & Service	IN39: INC 150 FLD	HS31: HPS 70 FLD	133	NA	133	NA	90,315	3.40	4.6
Lights	149	Service-05	Mercantile & Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	23	NA	23	NA	8,736	3.67	4.3
Lights	149	Service-05	Mercantile & Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1	NA	1	NA	528	3.39	4.6
Lights	152	Service-08	Mercantile & Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	343	NA	343	NA	112,570	3.34	4.7
Lights	152	Service-08	Mercantile & Service	IN39: INC 150 FLD	HS31: HPS 70 FLD	1,568	NA	1,568	NA	1,028,712	3.32	4.7
Lights	151	Service-07	Mercantile & Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	52	NA	52	NA	15,812	3.18	4.9
Lights	147	Service-03	Mercantile & Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	10	NA	10	NA	3,583	3.21	4.9
Lights	146	Service-01	Mercantile & Service	IN39: INC 150 FLD	HS31: HPS 70 FLD	397	NA	397	NA	260,929	3.32	4.7
Lights	147	Service-03	Mercantile & Service	HS19: HPS 400 PEND	none	0	NA	0	NA	0	NA	NA
Lights	148	Service-04	Mercantile & Service	MV3: MERC 100 PEND	none	0	NA	0	NA	0	NA	NA
Lights	151	Service-07	Mercantile & Service	MV3: MERC 100 PEND	none	0	NA	0	NA	0	NA	NA
Lights	148	Service-04	Mercantile & Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	29	NA	29	NA	10,168	3.50	4.5
Lights	153	Service-09	Mercantile & Service	IN39: INC 150 FLD	HS31: HPS 70 FLD	92	NA	92	NA	64,076	3.45	4.5
Lights	152	Service-08	Mercantile & Service	MV3: MERC 100 PEND	none	0	NA	0	NA	0	NA	NA
Lights	106	Office-38	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	149	NA	149	NA	45,283	2.65	5.9
Lights	100	Office-03	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	6	NA	6	NA	807	1.56	10.0
Lights	99	Office-29	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	0	NA	0	NA	0	1.00	15.6
Lights	97	Office-26	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	347	NA	347	NA	66,786	2.00	7.8
Lights	103	Office-34	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	0	NA	0	NA	46	1.46	10.7
Lights	94	Office-20	Office	FL62: FL 1X8 2F96T12 STD2	none	0	NA	0	NA	0	NA	NA
Lights	98	Office-28	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	15	NA	15	NA	2,430	2.13	7.4
Lights	108	Office-07	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	92	NA	92	NA	17,029	1.99	7.9
Lights	106	Office-38	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	36	NA	36	NA	14,447	3.61	4.3
Lights	98	Office-28	Office	FL82: FL 1X4 2F40T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights	99	Office-29	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	6	NA	6	NA	899	1.84	8.5
Lights	89	Office-16	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	23	NA	23	NA	2,400	1.37	11.4
Lights	52	Office-02	Office	FL116: FL 1X8 2F96T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights	93	Office-02g	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	25	NA	25	NA	2,617	1.39	11.2
Lights	96	Office-22	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	52	NA	52	NA	2,737	1.20	13.1
Lights	97	Office-26	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	87	NA	87	NA	29,427	3.18	4.9
Lights	102	Office-31	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	10	NA	10	NA	3,149	3.10	5.0
Lights	110	Office-09	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	9	NA	9	NA	3,414	3.44	4.5
Lights	94	Office-20	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	16	NA	16	NA	3,366	2.49	6.3
Lights	94	Office-20	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	20	NA	20	NA	7,392	3.35	4.7
Lights	104	Office-35	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	81	NA	81	NA	14,678	2.29	6.8
Lights	109	Office-08	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	86	NA	86	NA	12,504	1.52	10.3
Lights	85	Office-13	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	44	NA	44	NA	7,050	1.87	8.4
Lights	87	Office-15	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	29	NA	29	NA	697	1.08	14.5
Lights	83	Office-01g	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	13	NA	13	NA	4,076	3.06	5.1
Lights	106	Office-38	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	5	NA	5	NA	759	1.63	9.6
Lights	100	Office-03	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	264	NA	264	NA	47,040	1.93	8.0
Lights	83	Office-01g	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	38	NA	38	NA	4,429	1.41	11.1
Lights	95	Office-21	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	24	NA	24	NA	4,015	1.89	8.3
Lights	84	Office-10	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	7	NA	7	NA	2,630	3.38	4.6
Lights	93	Office-02g	Office	FL116: FL 1X8 2F96T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights	90	Office-17	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	6	NA	6	NA	2,288	3.30	4.7
Lights	95	Office-21	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	1	NA	1	NA	39	1.19	13.1
Lights	96	Office-22	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	415	NA	415	NA	59,834	1.77	8.8
Lights	82	Office-01	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	212	NA	212	NA	35,252	1.86	8.4
Lights	104	Office-35	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	102	NA	102	NA	35,447	3.24	4.8
Lights	100	Office-03	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	35	NA	35	NA	12,936	3.39	4.6
Lights	99	Office-29	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	6	NA	6	NA	2,073	3.35	4.7
Lights	109	Office-08	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	8	NA	8	NA	2,054	2.19	7.1
Lights	104	Office-35	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	388	NA	388	NA	75,498	1.97	8.0
Lights	85	Office-13	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	6	NA	6	NA	1,986	3.24	4.8

Table 3.5a
All Building EROs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Lights	108	Office-07	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	12	NA	12	NA	4,645	3.46	4.5
Lights	102	Office-31	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	7	NA	7	NA	1,278	2.19	7.1
Lights	87	Office-15	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	15	NA	15	NA	5,293	3.21	4.9
Lights	104	Office-35	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	2	NA	2	NA	12	1.01	15.4
Lights	101	Office-30	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	29	NA	29	NA	4,838	2.16	7.2
Lights	91	Office-18	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	13	NA	13	NA	84	1.02	15.3
Lights	86	Office-14	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	11	NA	11	NA	1,822	1.77	8.8
Lights	103	Office-34	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	12	NA	12	NA	5,089	3.75	4.2
Lights	109	Office-08	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	42	NA	42	NA	16,685	3.58	4.4
Lights	89	Office-16	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	8	NA	8	NA	2,146	2.81	5.6
Lights	105	Office-37	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	213	NA	213	NA	44,565	2.01	7.8
Lights	97	Office-26	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	91	NA	91	NA	13,038	1.80	8.7
Lights	83	Office-01g	Office	FL116: FL 1X8 2F96T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights	100	Office-03	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	64	NA	64	NA	2,287	1.11	14.0
Lights	109	Office-08	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	351	NA	351	NA	86,624	2.47	6.3
Lights	102	Office-31	Office	FL82: FL 1X4 2F40T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights	91	Office-18	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	7	NA	7	NA	2,242	3.13	5.0
Lights	82	Office-01	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	52	NA	52	NA	1,110	1.07	14.6
Lights	107	Office-04	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	17	NA	17	NA	6,042	3.27	4.8
Lights	102	Office-31	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	36	NA	36	NA	6,145	1.83	8.5
Lights	94	Office-20	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	75	NA	75	NA	16,398	2.06	7.6
Lights	103	Office-34	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	12	NA	12	NA	2,217	1.99	7.8
Lights	98	Office-28	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	19	NA	19	NA	6,033	3.01	5.2
Lights	86	Office-14	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	471	NA	471	NA	83,079	2.03	7.7
Lights	108	Office-07	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	22	NA	22	NA	1,165	1.17	13.4
Lights	99	Office-29	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	21	NA	21	NA	4,570	2.05	7.6
Lights	93	Office-02g	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	8	NA	8	NA	2,192	2.80	5.6
Lights	93	Office-02g	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	1	NA	1	NA	18	1.06	14.8
Lights	94	Office-20	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	0	NA	0	NA	16	1.09	14.3
Lights	97	Office-26	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	12	NA	12	NA	622	1.21	12.9
Lights	82	Office-01	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	5	NA	5	NA	571	1.48	10.6
Lights	105	Office-37	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	56	NA	56	NA	8,759	1.81	8.6
Lights	96	Office-22	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	10	NA	10	NA	310	1.09	14.3
Lights	83	Office-01g	Office	FL3: FL 2X4 2F40T12 STD2	none	0	NA	0	NA	0	NA	NA
Lights	88	Office-15ng	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	63	NA	63	NA	19,192	2.98	5.2
Lights	92	Office-02	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	4	NA	4	NA	384	1.36	11.5
Lights	96	Office-22	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	416	NA	416	NA	142,780	3.21	4.9
Lights	90	Office-17	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	1	NA	1	NA	144	1.54	10.1
Lights	102	Office-31	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	1	NA	1	NA	59	1.18	13.2
Lights	103	Office-34	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	1	NA	1	NA	142	1.36	11.5
Lights	108	Office-07	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	2	NA	2	NA	235	1.47	10.7
Lights	85	Office-13	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	11	NA	11	NA	235	1.07	14.6
Lights	106	Office-38	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	1	NA	1	NA	134	1.45	10.8
Lights	86	Office-14	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	57	NA	57	NA	19,548	3.22	4.9
Lights	95	Office-21	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	3	NA	3	NA	211	1.26	12.4
Lights	101	Office-30	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	138	NA	138	NA	23,282	1.81	8.6
Lights	97	Office-26	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	2	NA	2	NA	117	1.16	13.5
Lights	82	Office-01	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	29	NA	29	NA	10,593	3.37	4.6
Lights	106	Office-38	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	39	NA	39	NA	9,168	2.37	6.6
Lights	103	Office-34	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	44	NA	44	NA	10,560	2.16	7.2
Lights	107	Office-04	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	100	NA	100	NA	17,710	2.22	7.0
Lights	86	Office-14	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	115	NA	115	NA	10,565	1.32	11.8
Lights	95	Office-21	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	92	NA	92	NA	20,272	2.10	7.4
Lights	98	Office-28	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	2	NA	2	NA	61	1.09	14.3
Lights	110	Office-09	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	16	NA	16	NA	371	1.07	14.6
Lights	107	Office-04	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	3	NA	3	NA	202	1.28	12.2
Lights	95	Office-21	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	24	NA	24	NA	8,795	3.36	4.7
Lights	84	Office-10	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	1	NA	1	NA	179	1.60	9.7
Lights	110	Office-09	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	53	NA	53	NA	10,196	2.34	6.7
Lights	91	Office-18	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	1	NA	1	NA	125	1.44	10.8
Lights	84	Office-10	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	52	NA	52	NA	8,501	1.84	8.5
Lights	101	Office-30	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	5	NA	5	NA	98	1.08	14.5
Lights	89	Office-16	Office	FL116: FL 1X8 2F96T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights	85	Office-13	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	1	NA	1	NA	104	1.44	10.9
Lights	104	Office-35	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	13	NA	13	NA	502	1.13	13.6
Lights	98	Office-28	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	72	NA	72	NA	12,179	1.82	8.6
Lights	88	Office-15ng	Office	FL3: FL 2X4 2F40T12 STD2	none	0	NA	0	NA	0	NA	NA
Lights	99	Office-29	Office	FL62: FL 1X8 2F96T12 STD2	none	0	NA	0	NA	0	NA	NA
Lights	107	Office-04	Office	FL116: FL 1X8 2F96T12ES STD2	none	0	NA	0	NA	0	NA	NA

Table 3.5a
All Building EROs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Lights		89 Office-16	Office	FL3 FL 2X4 2F40T12 STD2	none	0	NA	0	NA	0	NA	NA
Lights		101 Office-30	Office	FL82 FL 1X4 2F40T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights		88 Office-15ng	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	200	NA	200	NA	22,005	1.42	11.0
Lights		91 Office-18	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	43	NA	43	NA	7,582	2.32	6.7
Lights		87 Office-15	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	3	NA	3	NA	262	1.41	11.1
Lights		84 Office-10	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	13	NA	13	NA	295	1.07	14.6
Lights		105 Office-37	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	7	NA	7	NA	552	1.29	12.1
Lights		105 Office-37	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	58	NA	58	NA	21,739	3.43	4.5
Lights		92 Office-02	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	149	NA	149	NA	23,947	2.20	7.1
Lights		88 Office-15ng	Office	FL116 FL 1X8 2F96T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights		87 Office-15	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	119	NA	119	NA	18,351	1.84	8.5
Lights		90 Office-17	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	12	NA	12	NA	432	1.12	14.0
Lights		101 Office-30	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	37	NA	37	NA	11,960	3.06	5.1
Lights		96 Office-22	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	1,582	NA	1,582	NA	302,532	1.95	8.0
Lights		110 Office-09	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	2	NA	2	NA	243	1.65	9.5
Lights		90 Office-17	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	48	NA	48	NA	8,128	1.89	8.2
Lights		105 Office-37	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	1	NA	1	NA	85	1.18	13.3
Lights		92 Office-02	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	26	NA	26	NA	8,052	3.04	5.1
Lights		111 Other-01	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	2	NA	2	NA	201	1.21	12.9
Lights		139 Other-09	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	33	NA	33	NA	10,315	2.99	5.2
Lights		140 Other-09g	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	6	NA	6	NA	1,831	3.92	4.0
Lights		133 Other-38	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	861	NA	861	NA	209,036	2.48	6.3
Lights		139 Other-09	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	3	NA	3	NA	232	1.22	12.8
Lights		116 Other-17	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	0	NA	0	NA	66	2.16	7.2
Lights		136 Other-03	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	6	NA	6	NA	2,077	3.24	4.8
Lights		116 Other-17	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	16	NA	16	NA	4,890	2.92	5.4
Lights		127 Other-03	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	7	NA	7	NA	1,875	4.13	3.8
Lights		126 Other-29	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	9	NA	9	NA	1,826	2.21	7.1
Lights		117 Other-17ng	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	7	NA	7	NA	231	1.07	14.6
Lights		118 Other-18	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1	NA	1	NA	223	2.81	5.6
Lights		130 Other-32	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	132	NA	132	NA	41,254	3.02	5.2
Lights		120 Other-02	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	12	NA	12	NA	2,076	2.06	7.6
Lights		140 Other-09g	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	0	NA	0	NA	11	1.07	14.6
Lights		121 Other-20	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	38	NA	38	NA	12,641	4.70	3.3
Lights		122 Other-23	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	10	NA	10	NA	2,118	2.22	7.0
Lights		117 Other-17ng	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	12	NA	12	NA	3,641	3.94	4.0
Lights		131 Other-36	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	180	NA	180	NA	57,783	2.82	5.5
Lights		138 Other-08	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	172	NA	172	NA	48,272	4.14	3.8
Lights		111 Other-01	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	42	NA	42	NA	11,357	2.55	6.1
Lights		117 Other-17ng	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	55	NA	55	NA	16,000	2.88	5.4
Lights		130 Other-32	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1	NA	1	NA	96	1.21	12.9
Lights		124 Other-26	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	43	NA	43	NA	15,461	5.00	3.1
Lights		126 Other-29	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	2	NA	2	NA	141	1.21	12.9
Lights		133 Other-38	Other	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	3,831	NA	3,831	NA	1,831,235	9.27	1.7
Lights		136 Other-03	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1	NA	1	NA	94	1.22	12.8
Lights		126 Other-29	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	57	NA	57	NA	15,191	2.51	6.2
Lights		123 Other-24	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1	NA	1	NA	85	1.30	12.0
Lights		117 Other-17ng	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	79	NA	79	NA	14,632	1.94	8.1
Lights		139 Other-09	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	20	NA	20	NA	4,003	2.19	7.1
Lights		128 Other-30	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	151	NA	151	NA	46,875	2.76	5.7
Lights		128 Other-30	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1	NA	1	NA	197	1.42	11.0
Lights		128 Other-30	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	57	NA	57	NA	19,781	3.25	4.8
Lights		131 Other-36	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	69	NA	69	NA	21,188	3.28	4.8
Lights		116 Other-17	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	2	NA	2	NA	186	1.19	13.1
Lights		112 Other-01g	Other	HS17 HPS 250 PEND	none	0	NA	0	NA	0	NA	NA
Lights		113 Other-10	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	34	NA	34	NA	10,655	3.01	5.2
Lights		123 Other-24	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	70	NA	70	NA	19,897	4.19	3.7
Lights		132 Other-37	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	6	NA	6	NA	1,603	2.81	5.6
Lights		112 Other-01g	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	3	NA	3	NA	141	1.12	14.0
Lights		122 Other-23	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1	NA	1	NA	71	1.21	12.9
Lights		137 Other-07	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	32	NA	32	NA	11,072	3.24	4.8
Lights		117 Other-17ng	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	1	NA	1	NA	154	1.81	8.6
Lights		138 Other-08	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	63	NA	63	NA	18,973	2.88	5.4
Lights		113 Other-10	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	0	NA	0	NA	8	1.27	12.3
Lights		118 Other-18	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	0	NA	0	NA	55	1.98	7.9
Lights		123 Other-27	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	11	NA	11	NA	3,486	3.02	5.2
Lights		115 Other-16	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	45	NA	45	NA	13,849	2.00	7.8
Lights		130 Other-32	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	64	NA	64	NA	19,480	2.58	6.1
Lights		122 Other-23	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	35	NA	35	NA	9,243	2.32	6.2

Table 3.5a
All Building EROs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW-mo)	Net Present Value 1993 $	Savings to Invest Ratio	Discounted Payback
Lights		120 Other-02	Other	HS15 HPS 150 PEND	none	0	NA		NA	0	NA	NA
Lights		111 Other-01	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	2	NA	2	NA	331	2.18	7.2
Lights		112 Other-01g	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	28	NA	28	NA	5,611	2.96	7.6
Lights		112 Other-01g	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	2	NA	2	NA	319	1.90	8.2
Lights		111 Other-01	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	29	NA	29	NA	9,158	3.04	5.1
Lights		111 Other-01	Other	HS17 HPS 250 PEND	none	0	NA	0	NA	0	NA	NA
Lights		119 Other-19	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	26	NA	26	NA	8,562	3.15	5.0
Lights		137 Other-07	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	2	NA	2	NA	312	1.35	11.6
Lights		137 Other-07	Other	HS15 HPS 150 PEND	none	0	NA	0	NA	0	NA	NA
Lights		124 Other-26	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	16	NA	16	NA	5,990	3.35	4.7
Lights		120 Other-02	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	43	NA	43	NA	13,091	2.95	5.3
Lights		123 Other-24	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	30	NA	30	NA	8,829	2.87	5.4
Lights		114 Other-15	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	28	NA	28	NA	8,776	3.02	5.2
Lights		121 Other-20	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	41	NA	41	NA	13,007	3.04	5.1
Lights		119 Other-19	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	77	NA	77	NA	24,167	2.77	5.6
Lights		122 Other-23	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	20	NA	20	NA	6,304	3.02	5.2
Lights		134 Other-41	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	244	NA	244	NA	79,986	4.68	3.3
Lights		116 Other-17	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	4	NA	4	NA	1,229	4.31	3.6
Lights		112 Other-01g	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	43	NA	43	NA	13,293	4.20	3.7
Lights		126 Other-29	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	29	NA	29	NA	9,104	3.03	5.2
Lights		135 Other-42	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	92	NA	92	NA	25,940	2.82	5.5
Lights		140 Other-09g	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5	NA	5	NA	1,395	2.78	5.6
Lights		120 Other-02	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	24	NA	24	NA	6,539	2.55	6.1
Lights		115 Other-16	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	26	NA	26	NA	8,425	3.09	5.1
Lights		120 Other-02	Other	HS17 HPS 250 PEND	none	0	NA	0	NA	0	NA	NA
Lights		129 Other-31	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	2	NA	2	NA	564	2.95	5.3
Lights		114 Other-15	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	84	NA	84	NA	27,825	2.88	5.4
Lights		113 Other-10	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	101	NA	101	NA	28,101	2.57	6.1
Lights		116 Other-17	Other	HS17 HPS 250 PEND	none	0	NA	0	NA	0	NA	NA
Lights		128 Other-30	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	2	NA	2	NA	640	2.68	5.8
Lights		139 Other-09	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	47	NA	47	NA	13,901	4.35	3.6
Lights		132 Other-37	Other	FL81 FL 2X4 2F40T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights		120 Other-02	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	4	NA	4	NA	302	1.17	13.3
Lights		111 Other-01	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	24	NA	24	NA	5,134	2.24	7.0
Lights		112 Other-01g	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	37	NA	37	NA	9,615	2.68	5.8
Lights		116 Other-17	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	27	NA	27	NA	5,377	2.15	7.3
Lights		127 Other-03	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	3	NA	3	NA	722	2.83	5.5
Lights		125 Other-27	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	5	NA	5	NA	861	2.09	7.5
Lights		135 Other-42	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	16	NA	16	NA	790	1.12	13.9
Lights		140 Other-09g	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	3	NA	3	NA	475	1.93	8.1
Lights		126 Other-29	Other	HS17 HPS 250 PEND	none	0	NA	0	NA	0	NA	NA
Lights		134 Other-41	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	92	NA	92	NA	29,995	3.10	5.0
Lights		129 Other-31	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	5	NA	5	NA	1,431	4.26	3.7
Lights		130 Other-32	Other	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	11	NA	11	NA	1,597	1.64	9.5
Lights		121 Other-20	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	4	NA	4	NA	755	1.40	11.2
Lights		122 Other-23	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1	NA	1	NA	50	1.21	12.9
Lights		117 Other-17ng	Other	HS17 HPS 250 PEND	none	0	NA	0	NA	0	NA	NA
Lights		143 Public Order-03	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	3	NA	3	NA	1,058	3.86	4.0
Lights		143 Public Order-03	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	16	NA	16	NA	6,299	4.45	3.5
Lights		143 Public Order-03	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	3	NA	3	NA	782	2.93	5.5
Lights		141 Public Order-01	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	11	NA	11	NA	4,139	4.49	3.5
Lights		141 Public Order-01	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	8	NA	8	NA	3,146	3.43	4.6
Lights		142 Public Order-02	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5	NA	5	NA	1,602	3.23	4.8
Lights		142 Public Order-02	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	6	NA	6	NA	2,189	4.32	3.6
Lights		144 Public Order-04	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	4	NA	4	NA	1,439	3.49	4.5
Lights		144 Public Order-04	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	5	NA	5	NA	1,887	4.56	3.4
Lights		145 Public Order-05	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	13	NA	13	NA	4,912	3.46	4.5
Lights		49 FH-attached-03	Single Family Attached	IN9 INC 2-75 CEIL	none	0	NA	0	NA	0	NA	NA
Lights		49 FH-attached-03	Single Family Attached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	11	NA	11	NA	3,625	1.98	7.7
Lights		50 FH-attached-04	Single Family Attached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	1	NA	1	NA	865	6.38	2.4
Lights		49 FH-attached-03	Single Family Attached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	31	NA	31	NA	16,669	3.04	5.1
Lights		48 FH-attached-01	Single Family Attached	FL5 FL 1X4 1F40T12 STD1	none	0	NA		NA	0	NA	NA
Lights		51 FH-attached-05	Single Family Attached	FL4 FL 1X4 2F40T12 STD2	FL52 FL 1X4 2F32T8 ELC2	25	NA	25	NA	3,598	1.35	11.5
Lights		49 FH-attached-03	Single Family Attached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	7	NA	7	NA	5,537	4.47	2.4
Lights		51 FH-attached-05	Single Family Attached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	87	NA	87	NA	37,256	2.29	6.8
Lights		50 FH-attached-04	Single Family Attached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	2	NA	2	NA	1,294	3.07	5.1
Lights		49 FH-attached-03	Single Family Attached	IN10 INC 3-75 CEIL	none	0	NA		NA	0	NA	NA
Lights		48 FH-attached-01	Single Family Attached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	121	NA	121	NA	38,269	1.95	8.0
Lights		50 FH-attached-04	Single Family Attached	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	7	NA	7	NA	3,237	2.32	6.7

Table 3.5a
All Building EROs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Lights		50 FH-attached-04	Single Family Attached	IN9 INC 2-75 CEIL	none	0	NA	0	NA	0	NA	NA
Lights		48 FH-attached-01	Single Family Attached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	507	NA	507	NA	237,161	2.79	5.6
Lights		51 FH-attached-05	Single Family Attached	FL5 FL 1X4 1F40T12 STD1	none	0	NA	0	NA	0	NA	NA
Lights		51 FH-attached-05	Single Family Attached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	122	NA	122	NA	70,268	3.19	4.9
Lights		44 FH-Detached-03	Single Family Detached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	0	NA	0	NA	84	1.95	8.0
Lights		45 FH-Detached-04	Single Family Detached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	10	NA	10	NA	5,523	3.04	5.1
Lights		45 FH-Detached-04	Single Family Detached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	4	NA	4	NA	1,515	2.24	7.0
Lights		46 FH-Detached-05	Single Family Detached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	2	NA	2	NA	773	2.34	6.7
Lights		43 FH-Detached-01	Single Family Detached	IN8 INC 75 CEIL	FL173 CFL 27 INTEGRAL UNIT	1	NA	1	NA	465	6.47	2.4
Lights		47 FH-Detached-07	Single Family Detached	IN8 INC 75 CEIL	FL173 CFL 27 INTEGRAL UNIT	0	NA	0	NA	241	6.88	2.3
Lights		44 FH-Detached-03	Single Family Detached	IN9 INC 2-75 CEIL	none	0	NA	0	NA	0	NA	NA
Lights		47 FH-Detached-07	Single Family Detached	IN10 INC 3-75 CEIL	none	0	NA	0	NA	0	NA	NA
Lights		47 FH-Detached-07	Single Family Detached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	1	NA	1	NA	702	3.11	5.0
Lights		46 FH-Detached-05	Single Family Detached	IN10 INC 3-75 CEIL	none	0	NA	0	NA	0	NA	NA
Lights		46 FH-Detached-05	Single Family Detached	IN9 INC 2-75 CEIL	none	0	NA	0	NA	0	NA	NA
Lights		45 FH-Detached-04	Single Family Detached	IN8 INC 75 CEIL	FL173 CFL 27 INTEGRAL UNIT	3	NA	3	NA	2,073	7.19	2.2
Lights		46 FH-Detached-05	Single Family Detached	IN8 INC 75 CEIL	FL173 CFL 27 INTEGRAL UNIT	1	NA	1	NA	1,034	7.54	2.1
Lights		44 FH-Detached-03	Single Family Detached	IN10 INC 3-75 CEIL	none	0	NA	0	NA	0	NA	NA
Lights		47 FH-Detached-07	Single Family Detached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	0	NA	0	NA	187	2.25	7.0
Lights		45 FH-Detached-04	Single Family Detached	IN10 INC 3-75 CEIL	none	0	NA	0	NA	0	NA	NA
Lights		46 FH-Detached-05	Single Family Detached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	5	NA	5	NA	2,409	2.89	5.4
Lights		43 FH-Detached-01	Single Family Detached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	1	NA	1	NA	313	2.09	7.8
Lights		47 FH-Detached-07	Single Family Detached	IN9 INC 2-75 CEIL	none	0	NA	0	NA	0	NA	NA
Lights		43 FH-Detached-01	Single Family Detached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	3	NA	3	NA	1,359	2.97	5.3
Lights		44 FH-Detached-03	Single Family Detached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	1	NA	1	NA	356	2.83	5.5
Lights		44 FH-Detached-03	Single Family Detached	IN8 INC 75 CEIL	FL173 CFL 27 INTEGRAL UNIT	0	NA	0	NA	122	6.08	2.6
Lights		43 FH-Detached-01	Single Family Detached	IN9 INC 2-75 CEIL	none	0	NA	0	NA	0	NA	NA
Lights		43 FH-Detached-01	Single Family Detached	IN10 INC 3-75 CEIL	none	0	NA	0	NA	0	NA	NA
Lights		45 FH-Detached-04	Single Family Detached	IN9 INC 2-75 CEIL	none	0	NA	0	NA	0	NA	NA
Lights		155 Warehouse-11	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	28	NA	28	NA	8,851	3.01	5.2
Lights		168 Warehouse-03	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	35	NA	35	NA	6,678	1.99	7.8
Lights		168 Warehouse-03	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	126	NA	126	NA	3,800	1.13	13.8
Lights		165 Warehouse-23	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	34	NA	34	NA	10,159	2.95	5.3
Lights		154 Warehouse-01	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	18	NA	18	NA	5,572	2.99	5.2
Lights		170 Warehouse-04	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	19	NA	19	NA	5,410	2.83	5.5
Lights		160 Warehouse-19	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	12	NA	12	NA	3,681	3.01	5.2
Lights		169 Warehouse-30	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	35	NA	35	NA	10,847	3.02	5.2
Lights		155 Warehouse-11	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	25	NA	25	NA	1,169	1.17	13.9
Lights		167 Warehouse-29	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	5	NA	5	NA	267	1.16	13.5
Lights		167 Warehouse-29	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5	NA	5	NA	1,421	3.03	5.2
Lights		156 Warehouse-12	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	6	NA	6	NA	306	1.16	13.5
Lights		156 Warehouse-12	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	2	NA	2	NA	334	2.11	7.4
Lights		164 Warehouse-24	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1	NA	1	NA	350	2.92	5.3
Lights		162 Warehouse-21	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	6	NA	6	NA	341	1.14	13.6
Lights		156 Warehouse-12	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5	NA	5	NA	1,477	2.81	5.6
Lights		172 Warehouse-07	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	2	NA	2	NA	353	1.89	8.2
Lights		158 Warehouse-16	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	2	NA	2	NA	337	1.97	7.9
Lights		168 Warehouse-03	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	119	NA	119	NA	36,406	2.98	5.2
Lights		161 Warehouse-02	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	1	NA	1	NA	29	1.07	14.7
Lights		154 Warehouse-01	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	20	NA	20	NA	1,473	1.22	12.8
Lights		166 Warehouse-26	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1	NA	1	NA	360	2.85	5.5
Lights		160 Warehouse-19	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	3	NA	3	NA	698	2.04	7.7
Lights		158 Warehouse-16	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	7	NA	7	NA	254	1.11	14.1
Lights		167 Warehouse-29	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	1	NA	1	NA	259	2.09	7.8
Lights		160 Warehouse-19	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	10	NA	10	NA	273	1.07	14.6
Lights		155 Warehouse-11	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	9	NA	9	NA	1,673	2.04	7.7
Lights		164 Warehouse-24	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	1	NA	1	NA	62	1.14	13.7
Lights		166 Warehouse-26	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	0	NA	0	NA	64	1.90	8.2
Lights		164 Warehouse-24	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	0	NA	0	NA	63	1.94	8.1
Lights		165 Warehouse-25	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	10	NA	10	NA	1,305	1.68	9.3
Lights		174 Warehouse-09	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	2	NA	2	NA	402	2.01	7.8
Lights		172 Warehouse-07	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	7	NA	7	NA	392	1.15	13.6
Lights		165 Warehouse-25	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	36	NA	36	NA	1,816	1.15	13.6
Lights		157 Warehouse-15	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	4	NA	4	NA	532	1.17	13.4
Lights		163 Warehouse-23	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	43	NA	43	NA	13,535	3.02	5.2
Lights		170 Warehouse-04	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	20	NA	20	NA	963	1.07	14.6
Lights		166 Warehouse-26	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	1	NA	1	NA	52	1.11	14.1
Lights		160 Warehouse-19	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	13	NA	13	NA	822	1.19	13.1
Lights		163 Warehouse-23	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	36	NA	36	NA	940	1.05	14.7

Table 3.5a
All Building ERCs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Lights	169	Warehouse-30	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	28	NA	28	NA	764	1.07	14.7
Lights	162	Warehouse-21	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	7	NA	7	NA	700	1.27	12.3
Lights	157	Warehouse-15	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	3	NA	3	NA	493	2.01	7.8
Lights	154	Warehouse-01	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	6	NA	6	NA	989	1.96	8.0
Lights	162	Warehouse-21	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	2	NA	2	NA	478	2.20	7.1
Lights	161	Warehouse-02	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1	NA	1	NA	414	3.02	5.2
Lights	173	Warehouse-08	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	9	NA	9	NA	430	1.14	13.7
Lights	159	Warehouse-18	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	4	NA	4	NA	1,149	2.87	5.4
Lights	171	Warehouse-05	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	3	NA	3	NA	37	1.05	15.1
Lights	170	Warehouse-04	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	6	NA	6	NA	1,064	1.99	7.9
Lights	173	Warehouse-08	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	2	NA	2	NA	448	1.93	8.0
Lights	171	Warehouse-05	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	3	NA	3	NA	986	2.87	5.4
Lights	174	Warehouse-09	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	7	NA	7	NA	453	1.17	13.3
Lights	159	Warehouse-18	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	3	NA	3	NA	37	1.05	15.2
Lights	170	Warehouse-04	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	16	NA	16	NA	204	1.05	15.1
Lights	154	Warehouse-01	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	16	NA	16	NA	700	1.12	14.0
Lights	171	Warehouse-05	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	1	NA	1	NA	195	2.09	7.8
Lights	158	Warehouse-16	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	5	NA	5	NA	69	1.05	15.1
Lights	173	Warehouse-08	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	8	NA	8	NA	2,403	2.87	5.5
Lights	163	Warehouse-23	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	13	NA	13	NA	2,483	2.01	7.8
Lights	155	Warehouse-11	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	32	NA	32	NA	2,309	1.24	12.6
Lights	165	Warehouse-25	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	28	NA	28	NA	8	1.09	15.6
Lights	164	Warehouse-24	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	1	NA	1	NA	8	1.02	15.3
Lights	161	Warehouse-02	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	0	NA	0	NA	76	2.01	7.8
Lights	157	Warehouse-15	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	9	NA	9	NA	2,660	3.09	5.2
Lights	162	Warehouse-21	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	7	NA	7	NA	2,264	3.09	5.1
Lights	163	Warehouse-23	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	46	NA	46	NA	2,802	1.17	13.3
Lights	166	Warehouse-26	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	1	NA	1	NA	1	1.09	15.6
Lights	156	Warehouse-12	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	5	NA	5	NA	309	1.06	14.7
Lights	173	Warehouse-08	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights	167	Warehouse-29	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	4	NA	4	NA	95	1.06	14.7
Lights	161	Warehouse-02	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	1	NA	1	NA	86	2.18	13.3
Lights	174	Warehouse-09	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	6	NA	6	NA	134	1.07	14.7
Lights	172	Warehouse-07	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	none	0	NA	0	NA	0	NA	NA
Lights	169	Warehouse-30	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	37	NA	37	NA	2,231	1.17	13.3
Lights	169	Warehouse-30	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	10	NA	10	NA	1,999	2.02	7.7
Lights	159	Warehouse-18	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	4	NA	4	NA	185	1.13	13.9
Lights	158	Warehouse-16	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	7	NA	7	NA	1,863	2.89	5.5
Lights	172	Warehouse-07	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	7	NA	7	NA	2,128	2.97	5.3
Lights	174	Warehouse-09	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	7	NA	7	NA	2,192	3.02	5.2
Lights	171	Warehouse-05	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	4	NA	4	NA	173	1.14	13.8
Lights	157	Warehouse-15	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	7	NA	7	NA	170	1.06	14.8
Lights	168	Warehouse-03	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	98	NA	98	NA	2,227	1.06	14.8
Lights	159	Warehouse-18	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	1	NA	1	NA	186	1.83	8.6
Roof	37	FH-2 to 4-12	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling Increase Insulation by R-6	NA	NA	NA	NA	30,732	1.43	11.0
Roof	40	FH-2 to 4-17	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling Increase insulation by R-11	NA	NA	NA	NA	139,259	1.48	10.6
Roof	35	FH-2 to 4-01	2 to 4 Unit Buildings	roof insulation R-value 5.00	Attic Ceiling Increase insulation by R-19	NA	NA	NA	NA	310,413	3.57	4.4
Roof	36	FH-2 to 4-10	2 to 4 Unit Buildings	roof insulation R-value 19.00	none	NA	NA	NA	NA	0	NA	NA
Roof	38	FH-2 to 4-03	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling Increase insulation by R-11	NA	NA	NA	NA	44,650	1.47	10.6
Roof	39	FH-2 to 4-05	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling Increase Insulation by R-8	NA	NA	NA	NA	36,724	1.48	10.5
Roof	41	FH-2 to 4-19	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling Increase Insulation by R-8	NA	NA	NA	NA	6,730	1.38	11.3
Roof	42	FH-5 or More-01	5 or More Unit Buildings	roof insulation R-value 11.00	Attic Ceiling Increase Insulation by R-8	NA	NA	NA	NA	14,334	1.40	11.2
Roof	3	Assembly-13	Assembly	roof insulation R-value 8.00	none	NA	NA	NA	NA	0	NA	NA
Roof	13	Assembly-04	Assembly	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof	9	Assembly-22	Assembly	roof insulation R-value 30.00	none	NA	NA	NA	NA	0	NA	NA
Roof	1	Assembly-10	Assembly	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof	10	Assembly-23	Assembly	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof	11	Assembly-24	Assembly	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof	8	Assembly-20	Assembly	roof insulation R-value 8.00	Suspended Ceiling Increase Insulation by R-8	NA	NA	NA	NA	16,436	1.74	9.0
Roof	2	Assembly-13	Assembly	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof	16	Assembly-08	Assembly	roof insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Roof	7	Assembly-02	Assembly	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-30	NA	NA	NA	NA	13,786	2.49	2.4
Roof	0	Assembly-01	Assembly	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	NA	NA	NA	NA	73,607	3.96	4.0
Roof	5	Assembly-18	Assembly	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof	17	Assembly-09	Assembly	roof insulation R-value 13.00	none	NA	NA	NA	NA	0	NA	NA
Roof	4	Assembly-16	Assembly	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof	15	Assembly-07	Assembly	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-11	NA	NA	NA	NA	423	1.01	9.7
Roof	12	Assembly-03	Assembly	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-19	NA	NA	NA	NA	33,467	2.32	6.7
Roof	14	Assembly-05	Assembly	roof insulation R-value 13.00	none	NA	NA	NA	NA	0	NA	NA

Table 3.5a
All Building EROs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Roof	6	Assembly-19	Assembly	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	33	Education-08	Education	roof insulation R-value 13.00	Suspended Ceiling Increase insulation by R-11	NA	NA	NA	NA	11,359	1.41	11.1
Roof	23	Education-16	Education	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	21	Education-14	Education	roof insulation R-value 21.00	none	NA	NA	NA	NA	0	NA	NA
Roof	26	Education-19	Education	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	24	Education-17	Education	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	19	Education-11	Education	roof insulation R-value 13.00	Suspended Ceiling Increase insulation by R-11	NA	NA	NA	NA	950	1.33	11.7
Roof	34	Education-09	Education	roof insulation R-value 13.00	Suspended Ceiling Increase insulation by R-8	NA	NA	NA	NA	1,185	1.31	11.9
Roof	28	Education-22	Education	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	31	Education-04	Education	roof insulation R-value 11.00	Attic Ceiling Increase insulation by R-8	NA	NA	NA	NA	4,462	1.35	11.6
Roof	22	Education-15	Education	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	25	Education-18	Education	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	20	Education-12	Education	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	18	Education-01	Education	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	NA	NA	NA	NA	16,641	2.63	5.9
Roof	32	Education-07	Education	roof insulation R-value 11.00	Attic Ceiling Increase insulation by R-11	NA	NA	NA	NA	4,939	1.58	9.9
Roof	30	Education-24	Education	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	29	Education-23	Education	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	27	Education-02	Education	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	NA	NA	NA	NA	29,645	6.10	2.6
Roof	32	Food Sales-01	Food Sales	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	54	Food Service-11	Food Service	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	56	Food Service-13	Food Service	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	60	Food Service-04	Food Service	roof insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Roof	62	Food Service-08	Food Service	roof insulation R-value 13.00	none	NA	NA	NA	NA	0	NA	NA
Roof	61	Food Service-07	Food Service	roof insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Roof	58	Food Service-17	Food Service	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	53	Food Service-01	Food Service	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-8	NA	NA	NA	NA	3,619	2.32	6.7
Roof	55	Food Service-12	Food Service	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	63	Food Service-09	Food Service	roof insulation R-value 13.00	none	NA	NA	NA	NA	0	NA	NA
Roof	59	Food Service-02	Food Service	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-8	NA	NA	NA	NA	7,437	2.25	6.9
Roof	57	Food Service-15	Food Service	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	64	Health Care-01	Health Care	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-30	NA	NA	NA	NA	911	2.87	5.4
Roof	68	Health Care-06	Health Care	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	66	Health Care-03	Health Care	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	67	Health Care-04	Health Care	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	69	Health Care-07	Health Care	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	65	Health Care-02	Health Care	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-19	NA	NA	NA	NA	1,857	1.64	9.5
Roof	71	Lodging-10	Lodging	roof insulation R-value 19.00	none	NA	NA	NA	NA	0	NA	NA
Roof	74	Lodging-13	Lodging	roof insulation R-value 8.00	Suspended Ceiling Increase insulation by R-8	NA	NA	NA	NA	10,972	1.72	9.1
Roof	70	Lodging-01	Lodging	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	NA	NA	NA	NA	10,930	3.81	4.1
Roof	78	Lodging-02	Lodging	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	NA	NA	NA	NA	69,083	6.62	2.4
Roof	81	Lodging-08	Lodging	roof insulation R-value 8.00	Attic Ceiling Increase insulation by R-8	NA	NA	NA	NA	1,303	1.31	11.9
Roof	76	Lodging-16	Lodging	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	72	Lodging-11	Lodging	roof insulation R-value 8.00	Suspended Ceiling Increase insulation by R-8	NA	NA	NA	NA	114,571	2.18	7.2
Roof	79	Lodging-05	Lodging	roof insulation R-value 8.00	Suspended Ceiling Increase insulation by R-19	NA	NA	NA	NA	31,946	2.05	7.7
Roof	80	Lodging-07	Lodging	roof insulation R-value 8.00	Attic Ceiling Increase insulation by R-8	NA	NA	NA	NA	4,885	1.94	15.0
Roof	75	Lodging-15	Lodging	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	73	Lodging-12	Lodging	roof insulation R-value 9.00	none	NA	NA	NA	NA	0	NA	NA
Roof	77	Lodging-19	Lodging	roof insulation R-value 8.00	Suspended Ceiling Increase insulation by R-8	NA	NA	NA	NA	16,982	1.79	8.7
Roof	152	Service-08	Mercantile & Service	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	146	Service-01	Mercantile & Service	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	NA	NA	NA	NA	16,111	2.62	6.0
Roof	148	Service-04	Mercantile & Service	roof insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Roof	150	Service-06	Mercantile & Service	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	149	Service-05	Mercantile & Service	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	147	Service-03	Mercantile & Service	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	NA	NA	NA	NA	53,497	4.17	3.7
Roof	153	Service-09	Mercantile & Service	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	151	Service-07	Mercantile & Service	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	88	Office-15mg	Office	roof insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Roof	83	Office-01g	Office	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-11	NA	NA	NA	NA	2,940	1.32	11.8
Roof	89	Office-16	Office	roof insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Roof	100	Office-03	Office	roof insulation R-value 6.00	Attic Ceiling Increase insulation by R-11	NA	NA	NA	NA	8,271	2.2[illegible]	7.1
Roof	92	Office-02	Office	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	NA	NA	NA	NA	58,726	3.21	4.9
Roof	87	Office-13	Office	roof insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Roof	95	Office-21	Office	roof insulation R-value 13.00	Suspended Ceiling Increase insulation by R-8	NA	NA	NA	NA	∞	[illegible]	19.4
Roof	102	Office-31	Office	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	96	Office-29	Office	roof insulation R-value 8.00	Suspended Ceiling Increase insulation by R-8	NA	NA	NA	NA	1,118	[illegible]	7.7
Roof	93	Office-02g	Office	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-11	NA	NA	NA	NA	3,578	[illegible]	9.5
Roof	90	Office-17	Office	roof insulation R-value 11.00	Attic Ceiling Increase insulation by R-11	NA	NA	NA	NA	968	[illegible]	11.3
Roof	104	Office-33	Office	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof	94	Office-20	Office	roof insulation R-value 13.00	none	NA	NA	NA	NA	0	NA	NA

Table 3.5a
All Building EROs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW/mo)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW/mo)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Roof		96 Office-22	Office	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof		84 Office-10	Office	roof insulation R-value 5.00	Suspended Ceiling Increase insulation by R-19	NA	NA	NA	NA	24,350	3.74	4.2
Roof		110 Office-09	Office	roof insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Roof		103 Office-37	Office	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof		91 Office-18	Office	roof insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Roof		97 Office-26	Office	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof		101 Office-30	Office	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof		82 Office-01	Office	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	NA	NA	NA	NA	72,984	3.43	4.6
Roof		103 Office-34	Office	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof		85 Office-13	Office	roof insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Roof		86 Office-14	Office	roof insulation R-value 8.90	none	NA	NA	NA	NA	0	NA	NA
Roof		107 Office-04	Office	roof insulation R-value 8.00	none	NA	NA	NA	NA	0	NA	NA
Roof		106 Office-38	Office	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof		98 Office-28	Office	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof		109 Office-08	Office	roof insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Roof		108 Office-07	Office	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof		120 Other-02	Other	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-11	NA	NA	NA	NA	21,047	2.05	7.6
Roof		139 Other-09	Other	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		138 Other-08	Other	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		118 Other-18	Other	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-11	NA	NA	NA	NA	28	1.46	14.7
Roof		128 Other-30	Other	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof		140 Other-09g	Other	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		122 Other-23	Other	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		125 Other-27	Other	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof		126 Other-29	Other	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		113 Other-10	Other	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		129 Other-31	Other	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof		133 Other-38	Other	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof		137 Other-07	Other	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		131 Other-36	Other	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof		123 Other-24	Other	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		135 Other-42	Other	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		116 Other-17	Other	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		121 Other-20	Other	roof insulation R-value 5.00	Attic Ceiling Increase insulation by R-8	NA	NA	NA	NA	11,309	1.73	9.0
Roof		111 Other-01	Other	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		127 Other-03	Other	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-11	NA	NA	NA	NA	1,666	2.38	6.6
Roof		119 Other-19	Other	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-11	NA	NA	NA	NA	1,751	1.09	14.3
Roof		130 Other-32	Other	roof insulation R-value 8.69	none	NA	NA	NA	NA	0	NA	NA
Roof		112 Other-01g	Other	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-8	NA	NA	NA	NA	2,039	1.15	13.3
Roof		117 Other-17ng	Other	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		132 Other-37	Other	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof		114 Other-15	Other	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		136 Other-05	Other	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-11	NA	NA	NA	NA	3,172	2.12	7.4
Roof		134 Other-41	Other	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		115 Other-16	Other	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		124 Other-26	Other	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof		144 Publa. Order-04	Publa. Order Safety	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof		141 Publa. Order-01	Publa. Order Safety	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	NA	NA	NA	NA	12,212	4.39	3.6
Roof		142 Publa. Order-02	Publa. Order Safety	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-19	NA	NA	NA	NA	3,190	3.18	4.9
Roof		143 Publa. Order-03	Publa. Order Safety	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	NA	NA	NA	NA	2,110	2.88	5.4
Roof		145 Publa. Order-05	Publa. Order Safety	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof		51 FH-attached-05	Single Family Attached	roof insulation R-value 19.00	none	NA	NA	NA	NA	0	NA	NA
Roof		49 FH-attached-03	Single Family Attached	roof insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Roof		50 FH-attached-04	Single Family Attached	roof insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Roof		48 FH-attached-01	Single Family Attached	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	NA	NA	NA	NA	2,466,709	11.93	1.3
Roof		46 FH-Detached-05	Single Family Detached	roof insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Roof		44 FH-Detached-03	Single Family Detached	roof insulation R-value 11.00	Attic Ceiling Increase insulation by R-8	NA	NA	NA	NA	238	1.45	10.9
Roof		43 FH-Detached-01	Single Family Detached	roof insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Roof		47 FH-Detached-07	Single Family Detached	roof insulation R-value 19.00	none	NA	NA	NA	NA	0	NA	NA
Roof		45 FH-Detached-04	Single Family Detached	roof insulation R-value 5.00	Attic Ceiling Increase insulation by R-8	NA	NA	NA	NA	9,277	2.21	7.1
Roof		163 Warehouse-23	Warehouse & Storage	roof insulation R-value 8.90	none	NA	NA	NA	NA	0	NA	NA
Roof		161 Warehouse-02	Warehouse & Storage	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		169 Warehouse-30	Warehouse & Storage	roof insulation R-value 20.00	none	NA	NA	NA	NA	0	NA	NA
Roof		174 Warehouse-09	Warehouse & Storage	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		167 Warehouse-29	Warehouse & Storage	roof insulation R-value 8.69	none	NA	NA	NA	NA	0	NA	NA
Roof		173 Warehouse-08	Warehouse & Storage	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		158 Warehouse-16	Warehouse & Storage	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		159 Warehouse-18	Warehouse & Storage	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		170 Warehouse-04	Warehouse & Storage	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA

Table 3.5a
All Building ERUs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW mo)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW mo)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Roof		163 Warehouse-25	Warehouse & Storage	roof insulation R-value 8.69	none	NA	NA	NA	NA	0	NA	NA
Roof		160 Warehouse-19	Warehouse & Storage	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof		162 Warehouse-21	Warehouse & Storage	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof		172 Warehouse-07	Warehouse & Storage	roof insulation R-value 0.00	Attic Cooling Increase Insulation by R-8	NA	NA	NA	NA	268	1.05	14.8
Roof		157 Warehouse-15	Warehouse & Storage	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		171 Warehouse-05	Warehouse & Storage	roof insulation R-value 0.00	Attic Cooling Increase Insulation by R-8	NA	NA	NA	NA	643	1.27	12.3
Roof		168 Warehouse-03	Warehouse & Storage	roof insulation R-value 0.00	Attic Cooling Increase Insulation by R-8	NA	NA	NA	NA	7,437	1.09	14.3
Roof		154 Warehouse-01	Warehouse & Storage	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		155 Warehouse-11	Warehouse & Storage	roof insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Roof		164 Warehouse-24	Warehouse & Storage	roof insulation R-value 20.05	none	NA	NA	NA	NA	0	NA	NA
Roof		166 Warehouse-26	Warehouse & Storage	roof insulation R-value 8.69	none	NA	NA	NA	NA	0	NA	NA
Roof		156 Warehouse-12	Warehouse & Storage	roof insulation R-value 0.00	Attic Cooling Increase Insulation by R-8	NA	NA	NA	NA	284	1.08	14.5
Wall		35 FH-2 to 4-01	2 to 4 Unit Buildings	wall insulation R-value 7.00	none	NA	NA	NA	NA	0	NA	NA
Wall		40 FH-2 to 4-07	2 to 4 Unit Buildings	wall insulation R-value 5.00	none	NA	NA	NA	NA	0	NA	NA
Wall		37 FH-2 to 4-12	2 to 4 Unit Buildings	wall insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Wall		38 FH-2 to 4-03	2 to 4 Unit Buildings	wall insulation R-value 5.00	none	NA	NA	NA	NA	0	NA	NA
Wall		41 FH-2 to 4-09	2 to 4 Unit Buildings	wall insulation R-value 5.00	none	NA	NA	NA	NA	0	NA	NA
Wall		36 FH-2 to 4-10	2 to 4 Unit Buildings	wall insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Wall		39 FH-2 to 4-06	2 to 4 Unit Buildings	wall insulation R-value 5.00	none	NA	NA	NA	NA	0	NA	NA
Wall		42 FH-5 or More-01	5 or More Unit Buildings	wall insulation R-value 5.00	none	NA	NA	NA	NA	0	NA	NA
Wall		17 Assembly-09	Assembly	wall insulation R-value 7.00	none	NA	NA	NA	NA	0	NA	NA
Wall		14 Assembly-05	Assembly	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		1 Assembly-10	Assembly	wall insulation R-value 5.32	none	NA	NA	NA	NA	0	NA	NA
Wall		16 Assembly-08	Assembly	wall insulation R-value 7.00	none	NA	NA	NA	NA	0	NA	NA
Wall		8 Assembly-20	Assembly	wall insulation R-value 5.32	none	NA	NA	NA	NA	0	NA	NA
Wall		9 Assembly-22	Assembly	wall insulation R-value 13.00	none	NA	NA	NA	NA	0	NA	NA
Wall		11 Assembly-24	Assembly	wall insulation R-value 19.00	none	NA	NA	NA	NA	0	NA	NA
Wall		13 Assembly-04	Assembly	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		10 Assembly-23	Assembly	wall insulation R-value 5.32	none	NA	NA	NA	NA	0	NA	NA
Wall		12 Assembly-03	Assembly	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		5 Assembly-18	Assembly	wall insulation R-value 5.32	none	NA	NA	NA	NA	0	NA	NA
Wall		3 Assembly-15	Assembly	wall insulation R-value 5.32	none	NA	NA	NA	NA	0	NA	NA
Wall		6 Assembly-19	Assembly	wall insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Wall		0 Assembly-01	Assembly	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		15 Assembly-07	Assembly	wall insulation R-value 0.00	Blown insulation Increase Insulation by R-13	NA	NA	NA	NA	270	1.07	14.6
Wall		4 Assembly-16	Assembly	wall insulation R-value 5.32	none	NA	NA	NA	NA	0	NA	NA
Wall		2 Assembly-13	Assembly	wall insulation R-value 7.00	none	NA	NA	NA	NA	0	NA	NA
Wall		7 Assembly-02	Assembly	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		30 Education-24	Education	wall insulation R-value 19.00	none	NA	NA	NA	NA	0	NA	NA
Wall		23 Education-16	Education	wall insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Wall		24 Education-17	Education	wall insulation R-value 5.32	none	NA	NA	NA	NA	0	NA	NA
Wall		29 Education-23	Education	wall insulation R-value 19.00	none	NA	NA	NA	NA	0	NA	NA
Wall		22 Education-15	Education	wall insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Wall		25 Education-18	Education	wall insulation R-value 5.32	none	NA	NA	NA	NA	0	NA	NA
Wall		21 Education-14	Education	wall insulation R-value 8.79	none	NA	NA	NA	NA	0	NA	NA
Wall		27 Education-02	Education	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		18 Education-01	Education	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		28 Education-22	Education	wall insulation R-value 8.79	none	NA	NA	NA	NA	0	NA	NA
Wall		34 Education-09	Education	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		33 Education-08	Education	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		19 Education-11	Education	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		32 Education-07	Education	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		31 Education-04	Education	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		20 Education-12	Education	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		26 Education-19	Education	wall insulation R-value 5.32	none	NA	NA	NA	NA	0	NA	NA
Wall		52 Food Sales-01	Food Sales	wall insulation R-value 5.32	none	NA	NA	NA	NA	0	NA	NA
Wall		59 Food Service-02	Food Service	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		60 Food Service-04	Food Service	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		53 Food Service-01	Food Service	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		54 Food Service-11	Food Service	wall insulation R-value 5.32	none	NA	NA	NA	NA	0	NA	NA
Wall		55 Food Service-12	Food Service	wall insulation R-value 19.00	none	NA	NA	NA	NA	0	NA	NA
Wall		56 Food Service-13	Food Service	wall insulation R-value 19.00	none	NA	NA	NA	NA	0	NA	NA
Wall		63 Food Service-06	Food Service	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		58 Food Service-17	Food Service	wall insulation R-value 19.00	none	NA	NA	NA	NA	0	NA	NA
Wall		57 Food Service-15	Food Service	wall insulation R-value 19.00	none	NA	NA	NA	NA	0	NA	NA
Wall		61 Food Service-07	Food Service	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		62 Food Service-08	Food Service	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		66 Health Care-07	Health Care	wall insulation R-value 19.00	none	NA	NA	NA	NA	0	NA	NA
Wall		64 Health Care-01	Health Care	wall insulation R-value 0.00	Blown insulation Increase Insulation by R-13	NA	NA	NA	NA	2,[illegible]	2.[illegible]	[illegible]

Table 3.5a
All Building ERUs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (Mbtu)	First Year Demand Savings (kW-mo)	Full Implementation Energy Savings (Mbtu)	Full Implementation Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Wall	67	Health Care-04	Health Care	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	66	Health Care-03	Health Care	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	65	Health Care-02	Health Care	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	68	Health Care-06	Health Care	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	75	Lodging-15	Lodging	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	74	Lodging-13	Lodging	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	76	Lodging-16	Lodging	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	72	Lodging-11	Lodging	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	81	Lodging-08	Lodging	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	79	Lodging-05	Lodging	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	73	Lodging-12	Lodging	wall insulation R-value 5 00	none	NA	NA	NA	NA	0	NA	NA
Wall	78	Lodging-02	Lodging	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	71	Lodging-10	Lodging	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	80	Lodging-07	Lodging	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	77	Lodging-19	Lodging	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	70	Lodging-01	Lodging	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	150	Service-06	Mercantile & Service	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	146	Service-01	Mercantile & Service	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	152	Service-08	Mercantile & Service	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	148	Service-04	Mercantile & Service	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	149	Service-05	Mercantile & Service	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	153	Service-09	Mercantile & Service	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	147	Service-03	Mercantile & Service	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	151	Service-07	Mercantile & Service	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	105	Office-37	Office	wall insulation R-value 19 00	none	NA	NA	NA	NA	0	NA	NA
Wall	91	Office-18	Office	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	90	Office-17	Office	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	99	Office-29	Office	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	98	Office-28	Office	wall insulation R-value 19 00	none	NA	NA	NA	NA	0	NA	NA
Wall	101	Office-30	Office	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	92	Office-02	Office	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	87	Office-15	Office	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	88	Office-15ng	Office	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	94	Office-20	Office	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	109	Office-08	Office	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	85	Office-13	Office	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	108	Office-07	Office	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	95	Office-21	Office	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	100	Office-03	Office	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	96	Office-22	Office	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	97	Office-26	Office	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	93	Office-02g	Office	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	107	Office-04	Office	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	102	Office-31	Office	wall insulation R-value 8 79	none	NA	NA	NA	NA	0	NA	NA
Wall	106	Office-38	Office	wall insulation R-value 19 00	none	NA	NA	NA	NA	0	NA	NA
Wall	104	Office-35	Office	wall insulation R-value 5 32	none	NA	NA	NA	NA	0	NA	NA
Wall	82	Office-01	Office	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	84	Office-10	Office	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	83	Office-01g	Office	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	110	Office-09	Office	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	103	Office-34	Office	wall insulation R-value 19 00	none	NA	NA	NA	NA	0	NA	NA
Wall	86	Office-14	Office	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	89	Office-16	Office	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	124	Other-26	Other	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	127	Other-03	Other	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	113	Other-10	Other	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	112	Other-01g	Other	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	115	Other-16	Other	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	123	Other-24	Other	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	120	Other-02	Other	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	111	Other-01	Other	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	126	Other-29	Other	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	119	Other-19	Other	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	132	Other-37	Other	wall insulation R-value 19 00	none	NA	NA	NA	NA	0	NA	NA
Wall	116	Other-17	Other	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	117	Other-17ng	Other	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	118	Other-18	Other	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	122	Other-23	Other	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA
Wall	121	Other-20	Other	wall insulation R-value 0 00	none	NA	NA	NA	NA	0	NA	NA

Table 3.5a
All Building EIRAs: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW, max)	Full Implementation Energy Savings (MBtu)	Full Implementation Demand Savings (kW, max)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Wall		133 Other-42	Other	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		140 Other-99g	Other	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		136 Other-45	Other	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		114 Other-15	Other	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		134 Other-41	Other	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		133 Other-38	Other	wall insulation R-value 19.00	none	NA	NA	NA	NA	0	NA	NA
Wall		128 Other-30	Other	wall insulation R-value 19.00	none	NA	NA	NA	NA	0	NA	NA
Wall		139 Other-99	Other	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		129 Other-31	Other	wall insulation R-value 19.00	none	NA	NA	NA	NA	0	NA	NA
Wall		125 Other-27	Other	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		138 Other-98	Other	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		131 Other-36	Other	wall insulation R-value 19.00	none	NA	NA	NA	NA	0	NA	NA
Wall		130 Other-32	Other	wall insulation R-value 8.79	none	NA	NA	NA	NA	0	NA	NA
Wall		137 Other-97	Other	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		143 Public Order-05	Public Order Safety	wall insulation R-value 0.00	Blow-in Insulation: Increase Insulation by R-13	NA	NA	NA	NA	20	1.02	15.4
Wall		141 Public Order-01	Public Order Safety	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		142 Public Order-02	Public Order Safety	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		144 Public Order-06	Public Order Safety	wall insulation R-value 5.32	none	NA	NA	NA	NA	0	NA	NA
Wall		145 Public Order-03	Public Order Safety	wall insulation R-value 5.32	none	NA	NA	NA	NA	0	NA	NA
Wall		49 FH-attached-03	Single Family Attached	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		48 FH-attached-01	Single Family Attached	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		51 FH-attached-05	Single Family Attached	wall insulation R-value 5.00	none	NA	NA	NA	NA	0	NA	NA
Wall		50 FH-attached-04	Single Family Attached	wall insulation R-value 5.00	none	NA	NA	NA	NA	0	NA	NA
Wall		46 FH-Detached-05	Single Family Detached	wall insulation R-value 5.00	none	NA	NA	NA	NA	0	NA	NA
Wall		43 FH-Detached-01	Single Family Detached	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		45 FH-Detached-04	Single Family Detached	wall insulation R-value 0.00	Blow-in Insulation: Increase Insulation by R-6.5	NA	NA	NA	NA	18,205	1.0	8.7
Wall		47 FH-Detached-07	Single Family Detached	wall insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Wall		44 FH-Detached-03	Single Family Detached	wall insulation R-value 5.00	none	NA	NA	NA	NA	0	NA	NA
Wall		171 Warehouse-05	Warehouse & Storage	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		162 Warehouse-21	Warehouse & Storage	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		160 Warehouse-19	Warehouse & Storage	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		161 Warehouse-92	Warehouse & Storage	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		169 Warehouse-30	Warehouse & Storage	wall insulation R-value 11.00	none	NA	NA	NA	NA	0	NA	NA
Wall		155 Warehouse-11	Warehouse & Storage	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		170 Warehouse-04	Warehouse & Storage	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		163 Warehouse-23	Warehouse & Storage	wall insulation R-value 8.79	none	NA	NA	NA	NA	0	NA	NA
Wall		154 Warehouse-01	Warehouse & Storage	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		166 Warehouse-26	Warehouse & Storage	wall insulation R-value 8.79	none	NA	NA	NA	NA	0	NA	NA
Wall		168 Warehouse-93	Warehouse & Storage	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		157 Warehouse-13	Warehouse & Storage	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		167 Warehouse-29	Warehouse & Storage	wall insulation R-value 5.32	none	NA	NA	NA	NA	0	NA	NA
Wall		164 Warehouse-24	Warehouse & Storage	wall insulation R-value 5.32	none	NA	NA	NA	NA	0	NA	NA
Wall		156 Warehouse-12	Warehouse & Storage	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		159 Warehouse-18	Warehouse & Storage	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		172 Warehouse-07	Warehouse & Storage	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		173 Warehouse-98	Warehouse & Storage	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		158 Warehouse-16	Warehouse & Storage	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA
Wall		163 Warehouse-23	Warehouse & Storage	wall insulation R-value 5.32	none	NA	NA	NA	NA	0	NA	NA
Wall		174 Warehouse-99	Warehouse & Storage	wall insulation R-value 0.00	none	NA	NA	NA	NA	0	NA	NA

Table 3.5b
All Non-Building EROs: Annual Energy and Demand Reductions

End Use	Bldg. Set No	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement. Energy Savings (MBtu)	Full Implement. Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Cooling		Hsg-fam - 1	Hsg-fam - 1	AC and Heat Source	Reflect Win Film - RI	124	108	124	108	19,510	5.26	3.0
Cooling		Hsg-fam - 1	Hsg-fam - 1	AC and Heat Source	Shade Screen - RI	124	108	124	108	32,009	6.53	2.4
Cooling		Hsg-fam - 2	Hsg-fam - 2	AC and Heat Source	Reflect Win Film - RI	199	169	199	169	30,941	5.22	3.0
Cooling		Hsg-fam - 2	Hsg-fam - 2	AC and Heat Source	Shade Screen - RI	199	169	199	169	50,139	6.40	2.4
Cool, Heat		Hsg-fam	Hsg-fam	AC and Elec Heat	Radiant Barriers	1,075	925	1,075	925	-406,122	0.13	122.1
Cool, Heat		Hsg-fam	Hsg-fam	AC and Gas Heat	Radiant Barriers	1,828	1,572	1,828	1,572	-1,145,697	0.04	370.9
Dryer		On-Post Housing	On-Post Housing	Clothes Drying	DRE-1	913	526	913	526	-924,,26	-0.58	-26.8
Dryer		On-Post Housing	On-Post Housing	Clothes Drying	Switch to Nat Gas	5,599	3,227	5,599	3,227	-708,789	0.07	214.5
Dshwshr		On-Post Housing	On-Post Housing	Dishwasher	DWE-1	2,155	104	2,155	104	-92,504	0.86	18.2
Lights		8 Ball Fields	8 Ball Fields	Lighting Controls	Lighting Controls - RI	7,953	52	7,953	52	877,537	22.94	0.7
Lights		BRK/ADM - 2	BRK/ADM - 2	60W INC	CFL 2-13 CEIL	614	0	614	0	-69,769	0.56	27.8
Motors		1	Assembly	AHU	EEM - RI	1	3	1	3	328	1.27	6.9
Motors		1	Assembly	AHU	EEM - ROF	0	0	1	3	401	1.34	6.7
Motors		10A	Assembly	AHU	EEM - RI	5	18	0	18	2,084	2.48	4.5
Motors		10A	Assembly	AHU	EEM - ROF	0	0	4	13	2,024	2.49	4.5
Motors		10B	Assembly	AHU	EEM - RI	5	18	0	18	2,084	2.48	4.5
Motors		10B	Assembly	AHU	EEM - ROF	0	0	4	13	2,024	2.49	4.5
Motors		10B	Assembly	AHU	VSD to Existing - RI	38	139	38	140	-49,468	0.07	14.6
Motors		10B	Assembly	AHU	VSD & EEM - RI	40	145	40	145	50,291	0.06	14.8
Motors		11	Assembly	AHU	EEM - RI	6	23	0	23	2,530	2.33	4.7
Motors		11	Assembly	AHU	EEM - ROF	0	0	4	16	2,463	2.34	4.7
Motors		11	Assembly	AHU	VSD to Existing - RI	56	203	56	204	-74,145	0.06	14.8
Motors		11	Assembly	AHU	VSD & EEM - RI	58	211	58	211	-75,408	0.05	14.9
Motors		12	Assembly	AHU	EEM - RI	14	49	0	49	5,596	2.67	4.3
Motors		12	Assembly	AHU	EEM - ROF	0	0	10	35	5,392	2.68	4.3
Motors		12	Assembly	AHU	VSD to Existing - RI	111	405	112	408	-145,656	0.06	14.7
Motors		12	Assembly	AHU	VSD & EEM - RI	116	422	116	422	-147,785	0.05	14.8
Motors		13	Assembly	AHU	EEM - RI	6	22	0	22	2,330	2.51	4.5
Motors		13	Assembly	AHU	EEM - ROF	0	0	4	15	2,248	2.51	4.4
Motors		13	Assembly	AHU	VSD to Existing - RI	55	199	55	200	-73,259	0.05	14.8
Motors		13	Assembly	AHU	VSD & EEM - RI	57	207	57	207	-74,342	0.04	15.0
Motors		14	Assembly	AHU	EEM - RI	8	29	0	29	3,128	2.63	4.3
Motors		14	Assembly	AHU	EEM - ROF	0	0	5	20	3,007	2.63	4.3
Motors		14	Assembly	AHU	VSD to Existing - RI	72	263	73	265	-98,030	0.05	14.9
Motors		14	Assembly	AHU	VSD & EEM - RI	75	273	75	273	-99,418	0.04	15.0
Motors		15	Assembly	Air Comp.	EEM - RI	2	9	0	9	1,042	2.48	4.5
Motors		15	Assembly	Air Comp.	EEM - ROF	0	0	2	7	1,012	2.49	4.5
Motors		16	Assembly	CTwr Fan	EEM - RI	4	8	0	8	1,807	2.49	4.5
Motors		16	Assembly	CTwr Fan	EEM - ROF	0	0	3	6	1,706	2.52	4.4
Motors		16	Assembly	CTwr Fan	VSD to Existing - RI	22	40	23	42	9,179	3.07	3.8
Motors		16	Assembly	CTwr Fan	VSD & EEM - RI	24	44	24	44	8,532	2.79	4.1
Motors		17	Assembly	CTwr Fan	EEM - RI	5	9	0	9	2,084	2.48	4.5
Motors		17	Assembly	CTwr Fan	EEM - ROF	0	0	4	7	2,024	2.49	4.5
Motors		17	Assembly	CTwr Fan	VSD to Existing - RI	29	53	30	55	12,732	3.41	3.5
Motors		17	Assembly	CTwr Fan	VSD & EEM - RI	32	58	32	58	12,044	3.17	3.7
Motors		18	Assembly	CWtr Pump	EEM - RI	2	4	0	4	936	2.54	4.4
Motors		18	Assembly	CWtr Pump	EEM - ROF	0	0	2	3	910	2.56	4.4
Motors		18	Assembly	CWtr Pump	VSD to Existing - RI	14	26	15	27	401	1.06	7.6
Motors		18	Assembly	CWtr Pump	VSD & EEM - RI	15	28	15	28	26	1.00	7.8
Motors		19	Assembly	CWtr Pump	EEM - RI	5	9	0	9	2,016	2.43	4.6

Table 3.5b
All Non-Building EROs: Annual Energy and Demand Reductions

End Use	Bldg. Set No.	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement. Energy Savings (MBtu)	Full Implement. Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		19	Assembly	CWtr Pump	EEM - ROF	0	0	4	7	1,898	2.46	4.5
Motors		19	Assembly	CWtr Pump	VSD to Existing - RI	38	69	38	70	1,083	1.06	7.6
Motors		19	Assembly	CWtr Pump	VSD & EEM - RI	40	73	40	73	222	1.01	7.8
Motors		2	Assembly	AHU	EEM - RI	0	1	0	1	129	1.31	6.8
Motors		2	Assembly	AHU	EEM - ROF	0	0	0	1	152	1.38	6.6
Motors		20	Assembly	CWtr Pump	EEM - RI	3	6	0	6	1,265	2.33	4.7
Motors		20	Assembly	CWtr Pump	EEM - ROF	0	0	2	4	1,232	2.34	4.7
Motors		20	Assembly	CWtr Pump	VSD to Existing - RI	28	51	28	51	1,057	1.09	7.5
Motors		20	Assembly	CWtr Pump	VSD & EEM - RI	29	53	29	53	425	1.03	7.7
Motors		21	Assembly	Cond. Fan	EEM - RI	1	1	0	1	195	1.19	7.1
Motors		21	Assembly	Cond. Fan	EEM - ROF	0	0	1	1	313	1.34	6.7
Motors		22	Assembly	Cond. Fan	EEM - RI	0	0	0	0	64	1.31	6.8
Motors		22	Assembly	Cond. Fan	EEM - ROF	0	0	0	0	76	1.38	6.6
Motors		23	Assembly	Cond. Fan	EEM	1	3	0	3	414	1.18	7.2
Motors		23	Assembly	Cond. Fan	EEM	0	0	1	2	558	1.26	6.9
Motors		24	Assembly	Cond. Fan	EEM	2	3	0	3	642	1.45	6.4
Motors		24	Assembly	Cond. Fan	EEM - ROF	0	0	1	2	705	1.51	6.2
Motors		25	Assembly	Cond. Fan	EEM - RI	0	1	0	1	169	1.61	6.0
Motors		25	Assembly	Cond. Fan	EEM - ROF	0	0	0	1	178	1.67	5.8
Motors		26	Assembly	Cond. Fan	EEM - RI	2	3	0	3	765	1.80	5.6
Motors		26	Assembly	Cond. Fan	EEM - ROF	0	0	1	3	779	1.85	5.5
Motors		27	Assembly	Cond. Fan	EEM - RI	5	10	0	10	2,311	2.33	4.7
Motors		27	Assembly	Cond. Fan	EEM - ROF	0	0	4	7	2,261	2.35	4.7
Motors		28	Assembly	Cond. Fan	EEM - RI	4	8	0	8	1,871	2.54	4.4
Motors		28	Assembly	Cond. Fan	EEM - ROF	0	0	3	6	1,819	2.56	4.4
Motors		29	Assembly	Cond. Fan	EEM - RI	2	5	0	5	1,042	2.48	4.5
Motors		29	Assembly	Cond. Fan	EEM - ROF	0	0	2	3	1,012	2.49	4.5
Motors		3	Assembly	AHU	EEM - RI	2	7	0	7	313	1.11	7.4
Motors		3	Assembly	AHU	EEM - ROF	0	0	1	5	680	1.25	6.9
Motors		30	Assembly	Cond. Pump	EEM - RI	4	8	0	8	1,807	2.49	4.5
Motors		30	Assembly	Cond. Pump	EEM - ROF	0	0	3	6	1,706	2.52	4.4
Motors		30	Assembly	Cond. Pump	VSD to Existing - RI	22	40	23	42	9,179	3.07	3.8
Motors		30	Assembly	Cond. Pump	VSD & EEM - RI	24	44	24	44	8,532	2.79	4.1
Motors		31	Assembly	Cond. Pump	EEM - RI	5	9	0	9	2,084	2.48	4.5
Motors		31	Assembly	Cond. Pump	EEM - ROF	0	0	4	7	2,024	2.49	4.5
Motors		31	Assembly	Cond. Pump	VSD to Existing - RI	29	53	30	55	12,732	3.41	3.5
Motors		31	Assembly	Cond. Pump	VSD & EEM - RI	32	58	32	58	12,044	3.17	3.7
Motors		4	Assembly	AHU	EEM - RI	1	3	0	3	321	1.45	6.4
Motors		4	Assembly	AHU	EEM - ROF	0	0	1	2	352	1.51	6.2
Motors		5A	Assembly	AHU	EEM - RI	2	6	0	6	596	1.54	6.1
Motors		5A	Assembly	AHU	EEM - ROF	0	0	1	5	668	1.66	5.9
Motors		5B	Assembly	AHU	EEM - RI	2	7	0	7	745	1.54	6.1
Motors		5B	Assembly	AHU	EEM - ROF	0	0	2	6	835	1.66	5.9
Motors		5B	Assembly	AHU	VSD to Existing - RI	11	39	11	40	-18,313	0.01	15.5
Motors		5B	Assembly	AHU	VSD & EEM - RI	11	41	11	41	-18,775	-0.01	15.7
Motors		6A	Assembly	AHU	EEM - RI	3	11	0	11	1,070	1.67	5.8
Motors		6A	Assembly	AHU	EEM - ROF	0	0	2	8	1,139	1.81	5.6
Motors		6B	Assembly	AHU	EEM - RI	4	16	0	16	1,499	1.67	5.8
Motors		6B	Assembly	AHU	EEM - ROF	0	0	3	12	1,595	1.81	5.6
Motors		6B	Assembly	AHU	VSD to Existing - RI	29	105	29	106	-41,957	0.04	15.0

Table 3.5b
All Non-Building EROs: Annual Energy and Demand Reductions

End Use	Bldg. Set No.	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement. Energy Savings (MBtu)	Full Implement. Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		6B	Assembly	AHU	VSD & EEM - RI	30	110	30	110	-42,932	0.03	15.2
Motors		7A	Assembly	AHU	EEM - RI	2	7	0	7	685	1.90	5.4
Motors		7A	Assembly	AHU	EEM - ROF	0	0	1	5	672	2.03	5.1
Motors		7B	Assembly	AHU	EEM - RI	2	7	0	7	685	1.90	5.4
Motors		7B	Assembly	AHU	EEM - ROF	0	0	1	5	672	2.03	5.1
Motors		7B	Assembly	AHU	VSD to Existing - RI	12	43	12	44	-16,971	0.04	15.0
Motors		7B	Assembly	AHU	VSD & EEM - RI	13	46	13	46	-17,326	0.03	15.1
Motors		8A	Assembly	AHU	EEM - RI	3	10	0	10	1,021	2.18	4.9
Motors		8A	Assembly	AHU	EEM - ROF	0	0	2	7	928	2.25	4.8
Motors		8B	Assembly	AHU	EEM - RI	3	10	0	10	1,021	2.18	4.9
Motors		8B	Assembly	AHU	EEM - ROF	0	0	2	7	928	2.25	4.8
Motors		8B	Assembly	AHU	VSD to Existing - RI	20	71	20	72	-25,870	0.06	14.7
Motors		8B	Assembly	AHU	VSD & EEM - RI	20	75	20	75	-26,392	0.05	14.9
Motors		9	Assembly	AHU	EEM - RI	2	8	0	8	936	2.54	4.4
Motors		9	Assembly	AHU	EEM - ROF	0	0	2	6	910	2.56	4.4
Motors		9	Assembly	AHU	VSD to Existing - RI	14	52	15	53	-18,568	0.07	14.5
Motors		9	Assembly	AHU	VSD & EEM - RI	15	55	15	55	-18,942	0.06	14.7
Motors		1	Education	AHU	EEM - RI	1	1	0	1	141	1.35	6.7
Motors		1	Education	AHU	EEM - ROF	0	0	1	1	163	1.42	6.5
Motors		10	Education	AHU	EEM - RI	19	33	0	33	4,585	3.05	3.9
Motors		10	Education	AHU	EEM - ROF	0	0	14	23	4,379	3.04	3.9
Motors		10	Education	AHU	VSD to Existing - RI	157	270	158	272	-87,853	0.15	13.5
Motors		10	Education	AHU	VSD & EEM - RI	163	281	163	281	-89,247	0 14	13.7
Motors		11	Education	AHU	EEM - RI	25	43	0	43	5,735	2.85	4.1
Motors		11	Education	AHU	EEM - ROF	0	0	17	29	5,478	2.84	4.1
Motors		11	Education	AHU	VSD to Existing - RI	231	399	232	400	-132,863	0.14	13.6
Motors		11	Education	AHU	VSD & EEM - RI	240	414	240	414	-134,996	0.13	13.8
Motors		12	Education	Air Comp.	EEM - RI	6	10	0	10	1,423	2.64	4.3
Motors		12	Education	Air Comp.	EEM - ROF	0	0	4	7	1,377	2.65	4.3
Motors		13	Education	Air Comp.	EEM - RI	10	16	0	16	2,293	3.05	3.9
Motors		13	Education	Air Comp.	EEM - ROF	0	0	7	12	2,189	3.04	3.9
Motors		14	Education	Air Comp.	EEM - RI	12	22	0	22	2,867	2.85	4.1
Motors		14	Education	Air Comp.	EEM - ROF	0	0	9	15	2,739	2.84	4.1
Motors		15	Education	CTwr Fan	EEM - RI	9	8	0	8	2,301	2.90	4.0
Motors		15	Education	CTwr Fan	EEM - ROF	0	0	7	6	2,216	2.90	4.0
Motors		15	Education	CTwr Fan	VSD to Existing - RI	47	40	49	42	12,251	3.74	3.3
Motors		15	Education	CTwr Fan	VSD & EEM - RI	51	44	51	44	11,625	3 44	3.5
Motors		16	Education	CTwr Fan	EEM - RI	11	9	0	9	2,565	2.82	4.1
Motors		16	Education	CTwr Fan	EEM - ROF	0	0	8	7	2,466	2.82	4.1
Motors		16	Education	CTwr Fan	VSD to Existing - RI	62	53	64	55	16,670	4 16	3.0
Motors		16	Education	CTwr Fan	VSD & EEM - RI	67	58	67	58	16,002	3.88	3.2
Motors		17A	Education	CWtr Pump	EEM - RI	11	9	0	9	2,565	2.82	4.1
Motors		17A	Education	CWtr Pump	EEM - ROF	0	0	8	7	2,466	2.82	4.1
Motors		17B	Education	CWtr Pump	EEM - RI	11	9	0	9	2,565	2.82	4 1
Motors		17B	Education	CWtr Pump	EEM - ROF	0	0	8	7	2,466	2.82	4.1
Motors		17B	Education	CWtr Pump	VSD to Existing - RI	80	69	81	70	6,101	1.36	6.6
Motors		17B	Education	CWtr Pump	VSD & EEM - RI	84	73	84	73	5,292	1.31	6.8
Motors		18	Education	Cond. Fan	EEM - RI	1	1	0	1	110	1.18	7.2
Motors		18	Education	Cond. Fan	EEM - ROF	0	0	1	1	228	1.43	6.4
Motors		19	Education	Cond. Fan	EEM - RI	6	5	0	5	716	1.17	7.2

Table 3.5b
All Non-Building EROs: Annual Energy and Demand Reductions

End Use	Bldg. Set No.	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement. Energy Savings (MBtu)	Full Implement. Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		19	Education	Cond. Fan	EEM - ROF	0	0	4	3	1,210	1.30	6.8
Motors		2	Education	AHU	EEM - RI	1	2	0	2	246	1.40	6.5
Motors		2	Education	AHU	EEM - ROF	0	0	1	1	278	1.46	6.3
Motors		20	Education	Cond. Fan	EEM - RI	3	3	0	3	674	1.57	6.1
Motors		20	Education	Cond. Fan	EEM - ROF	0	0	2	2	715	1.63	6.0
Motors		21	Education	Cond. Fan	EEM - RI	8	7	0	7	1,897	1.77	5.6
Motors		21	Education	Cond. Fan	EEM - ROF	0	0	6	5	1,951	1.82	5.5
Motors		22	Education	Cond. Fan	EEM - RI	4	3	0	3	949	1.99	5.2
Motors		22	Education	Cond. Fan	EEM - ROF	0	0	3	3	949	2.03	5.1
Motors		23	Education	Cond. Fan	EEM - RI	6	5	0	5	1,423	2.64	4.3
Motors		23	Education	Cond. Fan	EEM - ROF	0	0	4	4	1,377	2.65	4.3
Motors		24	Education	Cond. Fan	EEM - RI	5	4	0	4	1,150	2.90	4.0
Motors		24	Education	Cond. Fan	EEM - ROF	0	0	3	3	1,108	2.90	4.0
Motors		25	Education	Cond. Pump	EEM - RI	9	8	0	8	2,301	2.90	4.0
Motors		25	Education	Cond. Pump	EEM - ROF	0	0	7	6	2,216	2.90	4.0
Motors		25	Education	Cond. Pump	VSD to Existing - RI	47	40	49	42	12,251	3.74	3.3
Motors		25	Education	Cond. Pump	VSD & EEM - RI	51	44	51	44	11,625	3.44	3.5
Motors		26	Education	Cond. Pump	EEM - RI	11	9	0	9	2,565	2.82	4.1
Motors		26	Education	Cond. Pump	EEM - ROF	0	0	8	7	2,466	2.82	4.1
Motors		26	Education	Cond. Pump	VSD to Existing - RI	62	53	64	55	16,670	4.16	3.0
Motors		26	Education	Cond. Pump	VSD & EEM - RI	67	58	67	58	16,002	3.88	3.2
Motors		27	Education	Refrig.	EEM - RI	15	9	0	9	2,167	4.07	3.1
Motors		27	Education	Refrig.	EEM - ROF	0	0	11	7	2,045	4.02	3.1
Motors		3	Education	AHU	EEM - RI	4	6	0	6	256	1.09	7.5
Motors		3	Education	AHU	EEM - ROF	0	0	3	4	715	1.30	6.8
Motors		4	Education	AHU	EEM - RI	2	4	0	4	284	1.30	6.8
Motors		4	Education	AHU	EEM - ROF	0	0	2	3	438	1.56	6.1
Motors		5A	Education	AHU	EEM - RI	7	12	0	12	1,384	1.63	5.9
Motors		5A	Education	AHU	EEM - ROF	0	0	5	9	1,522	1.78	5.6
Motors		5B	Education	AHU	EEM - RI	11	19	0	19	2,249	1.63	5.9
Motors		5B	Education	AHU	EEM - ROF	0	0	9	15	2,473	1.78	5.6
Motors		5B	Education	AHU	VSD to Existing - RI	58	100	60	103	-44,429	0.08	14.5
Motors		5B	Education	AHU	VSD & EEM - RI	62	107	62	107	-45,788	0.06	14.7
Motors		6A	Education	AHU	EEM - RI	8	14	0	14	1,898	1.99	5.2
Motors		6A	Education	AHU	EEM - ROF	0	0	6	10	1,897	2.03	5.1
Motors		6B	Education	AHU	EEM - RI	18	32	0	32	4,429	1.99	5.2
Motors		6B	Education	AHU	EEM - ROF	0	0	14	24	4,427	2.03	5.1
Motors		6B	Education	AHU	VSD to Existing - RI	121	209	123	212	-76,472	0.13	13.8
Motors		6B	Education	AHU	VSD & EEM - RI	128	220	128	220	-77,948	0.12	14.0
Motors		7A	Education	AHU	EEM - RI	12	21	0	21	2,913	2.28	4.8
Motors		7A	Education	AHU	EEM - ROF	0	0	9	16	2,804	2.33	4.7
Motors		7B	Education	AHU	EEM - RI	20	35	0	35	4,855	2.28	4.8
Motors		7B	Education	AHU	EEM - ROF	0	0	15	27	4,673	2.33	4.7
Motors		7B	Education	AHU	VSD to Existing - RI	125	216	128	220	-76,907	0.14	13.8
Motors		7B	Education	AHU	VSD & EEM - RI	132	228	132	228	-78,290	0.12	13.9
Motors		8	Education	AHU	EEM - RI	5	9	0	9	1,282	2.82	4.1
Motors		8	Education	AHU	EEM - ROF	0	0	4	7	1,233	2.82	4.1
Motors		8	Education	AHU	VSD to Existing - RI	40	69	41	70	-22,519	0.16	13.5
Motors		8	Education	AHU	VSD & EEM - RI	42	73	42	73	-22,924	0.15	13.6
Motors		9	Education	AHU	EEM - RI	20	35	0	35	4,564	2.59	4.3

Table 3.5b
All Non-Building EROs: Annual Energy and Demand Reductions

End Use	Bldg. Set No.	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement. Energy Savings (MBtu)	Full Implement. Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		9	Education	AHU	EEM - ROF	0	0	14	24	4,220	2.59	4.3
Motors		9	Education	AHU	VSD to Existing - RI	176	304	177	306	-100,205	0.15	13.6
Motors		9	Education	AHU	VSD & EEM - RI	183	316	183	316	-102,123	0.14	13.7
Motors		1	FH-2 to 4	AHU	EEM - RI	0	0	0	0	79	1.38	6.6
Motors		1	FH-2 to 4	AHU	EEM - ROF	0	0	0	0	90	1.45	6.4
Motors		2	FH-2 to 4	AHU	EEM - RI	30	43	0	43	2,091	1.08	7.5
Motors		2	FH-2 to 4	AHU	EEM - ROF	0	0	21	30	6,319	1.29	6.8
Motors		3	FH-2 to 4	AHU	EEM - RI	476	669	2	669	100,374	1.48	6.3
Motors		3	FH-2 to 4	AHU	EEM - ROF	0	0	360	506	115,335	1.59	6.0
Motors		4	FH-2 to 4	AHU	EEM - RI	520	731	2	731	123,215	1.67	5.8
Motors		4	FH-2 to 4	AHU	EEM - ROF	0	0	411	577	131,644	1.78	5.6
Motors		5	FH-2 to 4	AHU	EEM - RI	34	48	0	48	8,593	1.97	5.3
Motors		5	FH-2 to 4	AHU	EEM - ROF	0	0	25	35	8,612	2.01	5.2
Motors		6	FH-2 to 4	Cond. Fan	EEM - RI	31	30	0	30	4,110	1.18	7.1
Motors		6	FH-2 to 4	Cond. Fan	EEM - ROF	0	0	25	24	7,638	1.39	6.5
Motors		7	FH-2 to 4	Cond. Fan	EEM - RI	125	117	0	117	29,942	1.38	6.6
Motors		7	FH-2 to 4	Cond. Fan	EEM - ROF	0	0	99	93	33,947	1.45	6.4
Motors		8	FH-2 to 4	Cond. Fan	EEM - RI	321	301	-1	301	40,941	1.16	7.2
Motors		8	FH-2 to 4	Cond. Fan	EEM - ROF	0	0	223	209	71,287	1.30	6.8
Motors		9	FH-2 to 4	Cond. Fan	EEM - RI	9	8	0	8	2,088	1.55	6.1
Motors		9	FH-2 to 4	Cond. Fan	EEM - ROF	0	0	7	6	2,226	1.61	6.0
Motors		10	FH-5 or More	AHU	EEM - RI	8	11	0	11	-764	0.88	8.3
Motors		10	FH-5 or More	AHU	EEM - ROF	0	0	6	8	1,366	1.26	6.9
Motors		11	FH-5 or More	AHU	EEM - RI	23	32	0	32	2,789	1.28	6.9
Motors		11	FH-5 or More	AHU	EEM - ROF	0	0	17	24	4,477	1.54	6.1
Motors		12	FH-5 or More	AHU	EEM - RI	27	37	0	37	3,901	1.42	6.5
Motors		12	FH-5 or More	AHU	EEM - ROF	0	0	21	29	5,113	1.69	5.8
Motors		13	FH-5 or More	Cond. Fan	EEM - RI	8	8	0	8	-126	0.98	7.9
Motors		13	FH-5 or More	Cond. Fan	EEM - ROF	0	0	7	6	1,637	1.35	6.6
Motors		14	FH-5 or More	Cond. Fan	EEM - RI	14	13	0	13	825	1.09	7.5
Motors		14	FH-5 or More	Cond. Fan	EEM - ROF	0	0	11	10	2,898	1.40	6.5
Motors		15	FH-5 or More	Cond. Fan	EEM - RI	9	9	0	9	-896	0.88	8.3
Motors		15	FH-5 or More	Cond. Fan	EEM - ROF	0	0	7	6	1,602	1.26	6.9
Motors		16	FH-Attached	AHU	EEM - RI	3	4	0	4	-485	0.76	8.9
Motors		16	FH-Attached	AHU	EEM - ROF	0	0	2	2	364	1.24	7.0
Motors		17	FH-Attached	AHU	EEM - RI	202	285	1	285	36,558	1.41	6.5
Motors		17	FH-Attached	AHU	EEM - ROF	0	0	153	215	45,921	1.58	6.1
Motors		18	FH-Attached	AHU	EEM - RI	75	105	0	105	15,976	1.61	6.0
Motors		18	FH-Attached	AHU	EEM - ROF	0	0	59	83	17,764	1.76	5.7
Motors		19	FH-Attached	AHU	EEM - RI	27	37	0	37	6,316	1.90	5.4
Motors		19	FH-Attached	AHU	EEM - ROF	0	0	20	28	6,345	1.98	5.2
Motors		20	FH-Attached	Cond. Fan	EEM - RI	3	2	0	2	-266	0.85	8.4
Motors		20	FH-Attached	Cond. Fan	EEM - ROF	0	0	2	2	437	1.33	6.7
Motors		21	FH-Attached	Cond. Fan	EEM - RI	19	17	0	17	3,561	1.31	6.8
Motors		21	FH-Attached	Cond. Fan	EEM - ROF	0	0	15	14	4,728	1.44	6.4
Motors		22	FH-Attached	Cond. Fan	EEM - RI	116	109	0	109	7,979	1.08	7.5
Motors		22	FH-Attached	Cond. Fan	EEM - ROF	0	0	81	76	24,117	1.29	6.8
Motors		23	FH-Attached	Cond. Fan	EEM - RI	11	10	0	10	2,610	1.55	6.1
Motors		23	FH-Attached	Cond. Fan	EEM - ROF	0	0	8	8	2,783	1.61	6.0
Motors		24	FH-Detached	AHU	EEM - RI	1	1	0	1	7	1.02	7.8

Table 3.5b
All Non-Building EROs: Annual Energy and Demand Reductions

End Use	Bldg. Set No.	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW mo)	Full Implement. Energy Savings (MBtu)	Full Implement. Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		24	FH-Detached	AHU	EEM - ROF	0	0	0	1	108	1.28	6.9
Motors		25	FH-Detached	AHU	EEM - RI	8	11	0	11	778	1.22	7.0
Motors		25	FH-Detached	AHU	EEM - ROF	0	0	6	9	1,489	1.53	6.2
Motors		26	FH-Detached	AHU	EEM - RI	12	18	0	18	3,269	1.74	5.7
Motors		26	FH-Detached	AHU	EEM - ROF	0	0	10	14	3,373	1.80	5.6
Motors		27	FH-Detached	AHU	EEM - RI	7	10	0	10	1,841	1.97	5.3
Motors		27	FH-Detached	AHU	EEM - ROF	0	0	5	8	1,845	2.01	5.2
Motors		28	FH-Detached	AHU	EEM - RI	2	3	0	3	493	2.30	4.7
Motors		28	FH-Detached	AHU	EEM - ROF	0	0	1	2	485	2.33	4.7
Motors		29	FH-Detached	Cond. Fan	EEM - RI	2	2	0	2	138	1.09	7.5
Motors		29	FH-Detached	Cond. Fan	EEM - ROF	0	0	2	2	483	1.40	6.5
Motors		30	FH-Detached	Cond. Fan	EEM - RI	7	6	0	6	460	1.08	7.5
Motors		30	FH-Detached	Cond. Fan	EEM - ROF	0	0	5	4	1,391	1.29	6.8
Motors		31	FH-Detached	Cond. Fan	EEM - RI	3	3	0	3	783	1.55	6.1
Motors		31	FH-Detached	Cond. Fan	EEM - ROF	0	0	2	2	835	1.61	6.0
Motors		32	FH-Detached	Cond. Fan	EEM - RI	1	1	0	1	307	1.97	5.3
Motors		32	FH-Detached	Cond. Fan	EEM - ROF	0	0	1	1	308	2.01	5.2
Motors		1	Food Sales	AHU	EEM - RI	6	8	0	8	1,273	3.10	3.8
Motors		1	Food Sales	AHU	EEM - ROF	0	0	4	6	1,221	3.09	3.8
Motors		1	Food Sales	AHU	VSD to Existing - RI	40	52	40	53	-15,583	0.22	12.8
Motors		1	Food Sales	AHU	VSD & EEM - RI	42	55	42	55	-15,948	0.21	12.9
Motors		2	Food Sales	AHU	EEM - RI	25	33	0	33	5,074	3.27	3.7
Motors		2	Food Sales	AHU	EEM - ROF	0	0	18	23	4,827	3.25	3.7
Motors		2	Food Sales	AHU	VSD to Existing - RI	204	270	205	272	-82,311	0.21	12.9
Motors		2	Food Sales	AHU	VSD & EEM - RI	212	281	212	281	-83,691	0.20	13.0
Motors		3	Food Sales	Cond. Fan	EEM - RI	4	2	0	2	788	2.82	4.1
Motors		3	Food Sales	Cond. Fan	EEM - ROF	0	0	3	2	759	2.82	4.1
Motors		4	Food Sales	Cond. Fan	EEM - RI	26	17	0	17	4,971	3.21	3.7
Motors		4	Food Sales	Cond. Fan	EEM - ROF	0	0	17	11	4,709	3.18	3.7
Motors		5	Food Sales	Refrig.	EEM - RI	30	16	0	16	4,065	4.64	2.8
Motors		5	Food Sales	Refrig.	EEM - ROF	0	0	22	12	3,816	4.56	2.8
Motors		6	Food Sales	Refrig.	EEM - RI	40	22	0	22	5,096	4.30	2.9
Motors		6	Food Sales	Refrig.	EEM - ROF	0	0	27	15	4,776	4.21	3.0
Motors		1	Food Service	AHU	EEM - RI	1	1	0	1	167	1.41	6.5
Motors		1	Food Service	AHU	EEM - ROF	0	0	1	1	187	1.48	6.3
Motors		10	Food Service	AHU	EEM - RI	10	12	0	12	1,809	2.90	4.0
Motors		10	Food Service	AHU	EEM - ROF	0	0	7	8	1,729	2.88	4.0
Motors		10	Food Service	AHU	VSD to Existing - RI	85	101	86	102	-30,164	0.23	12.7
Motors		10	Food Service	AHU	VSD & EEM - RI	89	105	89	105	-30,780	0.22	12.8
Motors		11	Food Service	AHU	EEM - RI	29	34	0	34	5,170	3.30	3.6
Motors		11	Food Service	AHU	EEM - ROF	0	0	19	23	4,617	3.22	3.7
Motors		11	Food Service	AHU	VSD to Existing - RI	276	328	277	329	-101,109	0.21	12.9
Motors		11	Food Service	AHU	VSD & EEM - RI	286	340	286	340	-102,742	0.20	13.0
Motors		12	Food Service	Air Comp.	EEM - RI	4	5	0	5	826	2.90	4.0
Motors		12	Food Service	Air Comp.	EEM - ROF	0	0	3	4	793	2.90	4.0
Motors		13	Food Service	Air Comp.	EEM - RI	7	8	0	8	1,333	3.20	3.7
Motors		13	Food Service	Air Comp.	EEM - ROF	0	0	5	6	1,276	3.19	3.7
Motors		14	Food Service	Air Comp.	EEM - RI	18	22	0	22	3,325	3.15	3.8
Motors		14	Food Service	Air Comp.	EEM - ROF	0	0	12	15	3,157	3.12	3.8
Motors		15	Food Service	CTwr Fan	EEM - RI	10	6	0	6	1,777	2.86	4.0

Table 3.5b
All Non-Building EROs: Annual Energy and Demand Reductions

End Use	Bldg. Set No.	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement. Energy Savings (MBtu)	Full Implement. Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		15	Food Service	CTwr Fan	EEM - ROF	0	0	7	4	1,621	2.84	4.1
Motors		15	Food Service	CTwr Fan	VSD to Existing - RI	66	39	67	40	15,131	5.58	2.4
Motors		15	Food Service	CTwr Fan	VSD & EEM - RI	70	42	70	42	14,633	5.12	2.6
Motors		16	Food Service	CWtr Pump	EEM - RI	14	8	0	8	2,628	3.35	3.6
Motors		16	Food Service	CWtr Pump	EEM - ROF	0	0	10	6	2,366	3.29	3.6
Motors		16	Food Service	CWtr Pump	VSD to Existing - RI	113	67	114	68	11,406	1.74	5.7
Motors		16	Food Service	CWtr Pump	VSD & EEM - RI	118	70	118	70	10,717	1.68	5.8
Motors		17	Food Service	Cond. Fan	EEM - RI	8	5	0	5	1,475	2.16	4.9
Motors		17	Food Service	Cond. Fan	EEM - ROF	0	0	6	3	1,458	2.19	4.9
Motors		18	Food Service	Cond. Fan	EEM - RI	6	3	0	3	1,180	2.55	4.4
Motors		18	Food Service	Cond. Fan	EEM - ROF	0	0	4	3	1,148	2.57	4.4
Motors		19	Food Service	Cond. Fan	EEM - RI	4	2	0	2	826	2.90	4.0
Motors		19	Food Service	Cond. Fan	EEM - ROF	0	0	3	2	793	2.90	4.0
Motors		2	Food Service	AHU	EEM - RI	1	1	0	1	51	1.12	7.4
Motors		2	Food Service	AHU	EEM - ROF	0	0	1	1	152	1.45	6.3
Motors		20	Food Service	Cond. Fan	EEM - RI	7	4	0	4	1,333	3.20	3.7
Motors		20	Food Service	Cond. Fan	EEM - ROF	0	0	5	3	1,276	3.19	3.7
Motors		21	Food Service	Cond. Pump	EEM - RI	10	6	0	6	1,777	2.86	4.0
Motors		21	Food Service	Cond. Pump	EEM - ROF	0	0	7	4	1,621	2.84	4.1
Motors		21	Food Service	Cond. Pump	VSD to Existing - RI	66	39	67	40	15,131	5.58	2.4
Motors		21	Food Service	Cond. Pump	VSD & EEM - RI	70	42	70	42	14,633	5.12	2.6
Motors		22	Food Service	HW Circ.	EEM - RI	4	5	0	5	826	2.90	4.0
Motors		22	Food Service	HW Circ.	EEM - ROF	0	0	3	4	793	2.90	4.0
Motors		23	Food Service	Refrig.	EEM - RI	1	1	0	1	104	1.46	6.4
Motors		23	Food Service	Refrig.	EEM - ROF	0	0	1	0	113	1.52	6.2
Motors		24	Food Service	Refrig.	EEM - RI	15	9	0	9	2,171	2.71	4.2
Motors		24	Food Service	Refrig.	EEM - ROF	0	0	12	7	2,098	2.72	4.2
Motors		25	Food Service	Refrig.	EEM - RI	12	7	0	7	1,726	3.27	3.7
Motors		25	Food Service	Refrig.	EEM - ROF	0	0	9	5	1,653	3.26	3.7
Motors		3	Food Service	AHU	EEM - RI	7	8	0	8	1,055	1.29	6.8
Motors		3	Food Service	AHU	EEM - ROF	0	0	5	6	1,252	1.36	6.6
Motors		4	Food Service	AHU	EEM - RI	47	57	0	57	8,870	1.67	5.9
Motors		4	Food Service	AHU	EEM - ROF	0	0	36	43	9,231	1.72	5.7
Motors		5	Food Service	AHU	EEM - RI	2	3	0	3	455	1.83	5.5
Motors		5	Food Service	AHU	EEM - ROF	0	0	2	2	468	1.92	5.3
Motors		6	Food Service	AHU	EEM - RI	4	5	0	5	596	1.94	5.3
Motors		6	Food Service	AHU	EEM - ROF	0	0	3	3	558	2.07	5.1
Motors		7A	Food Service	AHU	EEM - RI	9	10	0	10	1,769	2.55	4.4
Motors		7A	Food Service	AHU	EEM - ROF	0	0	7	8	1,722	2.57	4.4
Motors		7B	Food Service	AHU	EEM - RI	15	17	0	17	2,949	2.55	4.4
Motors		7B	Food Service	AHU	EEM - ROF	0	0	11	13	2,871	2.57	4.4
Motors		7B	Food Service	AHU	VSD to Existing - RI	91	108	92	110	-35,094	0.21	12.9
Motors		7B	Food Service	AHU	VSD & EEM - RI	96	114	96	114	-35,697	0.20	13.0
Motors		8A	Food Service	AHU	EEM - RI	4	5	0	5	826	2.90	4.0
Motors		8A	Food Service	AHU	EEM - ROF	0	0	3	4	793	2.90	4.0
Motors		8B	Food Service	AHU	EEM - RI	8	10	0	10	1,651	2.90	4.0
Motors		8B	Food Service	AHU	EEM - ROF	0	0	6	7	1,587	2.90	4.0
Motors		8B	Food Service	AHU	VSD to Existing - RI	60	71	60	72	-21,073	0.24	12.6
Motors		8B	Food Service	AHU	VSD & EEM - RI	63	75	63	75	-21,498	0.22	12.8
Motors		9	Food Service	AHU	EEM - RI	8	9	0	9	1,487	3.11	3.8

Table 3.5b
All Non-Building EROs: Annual Energy and Demand Reductions

End Use	Bldg. Set No.	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement. Energy Savings (MBtu)	Full Implement. Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		9	Food Service	AHU	EEM - ROF	0	0	6	7	1,421	3.10	3.8
Motors		9	Food Service	AHU	VSD to Existing - RI	58	69	59	70	-20,396	0.24	12.6
Motors		9	Food Service	AHU	VSD & EEM - RI	61	73	61	73	-20,795	0.23	12.7
Motors		1	Health Care	AHU	EEM - RI	2	1	0	1	237	2.00	5.2
Motors		1	Health Care	AHU	EEM - ROF	0	0	1	1	237	2.04	5.1
Motors		10	Health Care	Cond. Fan	EEM - RI	2	1	0	1	365	2.33	4.7
Motors		10	Health Care	Cond. Fan	EEM - ROF	0	0	2	1	359	2.36	4.7
Motors		11	Health Care	Cond. Fan	EEM - RI	6	3	0	3	863	3.27	3.7
Motors		11	Health Care	Cond. Fan	EEM - ROF	0	0	5	3	826	3.26	3.7
Motors		12	Health Care	Cond. Pump	EEM - RI	13	8	0	8	1,928	4.18	3.0
Motors		12	Health Care	Cond. Pump	EEM - ROF	0	0	10	6	1,723	4.07	3.1
Motors		12	Health Care	Cond. Pump	VSD to Existing - RI	69	40	72	42	11,731	6.48	2.1
Motors		12	Health Care	Cond. Pump	VSD & EEM - RI	76	44	76	44	11,485	5.98	2.2
Motors		13	Health Care	Vac. Sys	EEM - RI	13	8	0	8	1,802	3.97	3.1
Motors		13	Health Care	Vac. Sys	EEM - ROF	0	0	10	6	648	2.85	4.1
Motors		2	Health Care	AHU	EEM - RI	8	5	0	5	1,085	2.71	4.2
Motors		2	Health Care	AHU	EEM - ROF	0	0	6	3	1,049	2.72	4.2
Motors		2	Health Care	AHU	VSD to Existing - RI	51	30	52	30	-6,912	0.45	10.8
Motors		2	Health Care	AHU	VSD & EEM - RI	54	31	54	31	-7,110	0.44	10.9
Motors		3	Health Care	AHU	EEM - RI	12	7	0	7	1,726	3.27	3.7
Motors		3	Health Care	AHU	EEM - ROF	0	0	9	5	1,653	3.26	3.7
Motors		3	Health Care	AHU	VSD to Existing - RI	74	43	75	44	-9,600	0.46	10.7
Motors		3	Health Care	AHU	VSD & EEM - RI	78	46	78	46	-9,827	0.45	10.8
Motors		4	Health Care	AHU	EEM - RI	13	8	0	8	1,942	4.20	3.0
Motors		4	Health Care	AHU	EEM - ROF	0	0	10	6	1,837	4.15	3.0
Motors		4	Health Care	AHU	VSD to Existing - RI	90	52	91	53	-9,675	0.52	10.3
Motors		4	Health Care	AHU	VSD & EEM - RI	94	55	94	55	-10,022	0.50	10.4
Motors		5	Health Care	AHU	EEM - RI	31	18	0	18	4,254	4.02	3.1
Motors		5	Health Care	AHU	EEM - ROF	0	0	22	13	3,137	3.71	3.3
Motors		5	Health Care	AHU	VSD to Existing - RI	237	139	239	140	-26,279	0.50	10.4
Motors		5	Health Care	AHU	VSD & EEM - RI	247	145	247	145	-26,949	0.49	10.5
Motors		6	Health Care	AHU	EEM - RI	28	16	0	16	3,865	4.46	2.9
Motors		6	Health Care	AHU	EEM - ROF	0	0	20	12	3,408	4.30	2.9
Motors		6	Health Care	AHU	VSD to Existing - RI	230	135	232	136	-25,463	0.50	10.4
Motors		6	Health Care	AHU	VSD & EEM - RI	240	141	240	141	-26,083	0.50	10.4
Motors		7	Health Care	CTwr Fan	EEM - RI	13	8	0	8	1,928	4.18	3.0
Motors		7	Health Care	CTwr Fan	EEM - ROF	0	0	10	6	1,723	4.07	3.1
Motors		7	Health Care	CTwr Fan	VSD to Existing - RI	69	40	72	42	11,731	6.48	2.1
Motors		7	Health Care	CTwr Fan	VSD & EEM - RI	76	44	76	44	11,485	5.98	2.2
Motors		8	Health Care	CWtr Pump	EEM - RI	15	9	0	9	2,157	4.06	3.1
Motors		8	Health Care	CWtr Pump	EEM - ROF	0	0	11	7	1,918	3.94	3.2
Motors		8	Health Care	CWtr Pump	VSD to Existing - RI	118	69	119	70	11,935	2.37	4.6
Motors		8	Health Care	CWtr Pump	VSD & EEM - RI	124	73	124	73	11,568	2.30	4.7
Motors		9	Health Care	Cond. Fan	EEM - RI	3	2	0	2	474	2.00	5.2
Motors		9	Health Care	Cond. Fan	EEM - ROF	0	0	3	2	475	2.04	5.1
Motors		1	Lodging	AHU	EEM - RI	0	0	0	0	90	1.43	6.4
Motors		1	Lodging	AHU	EEM - ROF	0	0	0	0	100	1.50	6.3
Motors		10	Lodging	CWtr Pump	EEM - RI	6	4	0	4	1,242	3.05	3.9
Motors		10	Lodging	CWtr Pump	EEM - ROF	0	0	4	3	1,193	3.04	3.9
Motors		10	Lodging	CWtr Pump	VSD to Existing - RI	37	26	38	27	3,112	1.47	6.3

Table 3.5b
All Non-Building EROs: Annual Energy and Demand Reductions

End Use	Bldg. Set No.	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement. Energy Savings (MBtu)	Full Implement. Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		10	Lodging	CWtr Pump	VSD & EEM - RI	39	28	39	28	2,746	1.41	6.5
Motors		11	Lodging	Cond. Fan	EEM - RI	1	1	0	1	154	1.38	6.6
Motors		11	Lodging	Cond. Fan	EEM - ROF	0	0	1	0	175	1.45	6.4
Motors		12	Lodging	Cond. Fan	EEM - RI	1	1	0	1	180	1.43	6.4
Motors		12	Lodging	Cond. Fan	EEM - ROF	0	0	1	0	199	1.50	6.3
Motors		13	Lodging	Cond. Fan	EEM - RI	3	2	0	2	422	1.27	6.9
Motors		13	Lodging	Cond. Fan	EEM - ROF	0	0	2	1	512	1.34	6.7
Motors		14	Lodging	Cond. Fan	EEM - RI	1	1	0	1	229	1.83	5.5
Motors		14	Lodging	Cond. Fan	EEM - ROF	0	0	1	1	233	1.88	5.4
Motors		15	Lodging	Cond. Fan	EEM - RI	19	14	0	14	4,112	2.08	5.1
Motors		15	Lodging	Cond. Fan	EEM - ROF	0	0	14	10	4,085	2.11	5.0
Motors		16	Lodging	Cond. Fan	EEM - RI	5	3	0	3	1,098	2.44	4.5
Motors		16	Lodging	Cond. Fan	EEM - ROF	0	0	4	3	1,073	2.47	4.5
Motors		2	Lodging	AHU	EEM - RI	79	83	0	83	12,792	1.27	6.9
Motors		2	Lodging	AHU	EEM - ROF	0	0	55	58	15,503	1.34	6.7
Motors		3	Lodging	AHU	EEM - RI	6	6	0	6	1,173	1.62	6.0
Motors		3	Lodging	AHU	EEM - ROF	0	0	4	5	1,232	1.67	5.8
Motors		4A	Lodging	AHU	EEM - RI	4	4	0	4	915	1.83	5.5
Motors		4A	Lodging	AHU	EEM - ROF	0	0	3	3	933	1.88	5.4
Motors		4B	Lodging	AHU	EEM - RI	5	5	0	5	1,143	1.83	5.5
Motors		4B	Lodging	AHU	EEM - ROF	0	0	4	4	1,167	1.88	5.4
Motors		4B	Lodging	AHU	VSD to Existing - RI	27	29	28	30	-16,282	0.12	13.9
Motors		4B	Lodging	AHU	VSD & EEM - RI	29	31	29	31	-16,656	0.11	14.1
Motors		5	Lodging	AHU	EEM - RI	2	2	0	2	343	2.08	5.1
Motors		5	Lodging	AHU	EEM - ROF	0	0	1	1	340	2.11	5.0
Motors		5	Lodging	AHU	VSD to Existing - RI	11	11	11	11	-5,214	0.17	13.4
Motors		5	Lodging	AHU	VSD & EEM - RI	11	12	11	12	-5,319	0.16	13.5
Motors		6A	Lodging	AHU	EEM - RI	12	13	0	13	2,638	2.39	4.6
Motors		6A	Lodging	AHU	EEM - ROF	0	0	9	10	2,515	2.43	4.6
Motors		6B	Lodging	AHU	EEM - RI	20	21	0	21	4,220	2.39	4.6
Motors		6B	Lodging	AHU	EEM - ROF	0	0	15	16	4,024	2.43	4.6
Motors		6B	Lodging	AHU	VSD to Existing - RI	123	130	125	132	-58,859	0.17	13.3
Motors		6B	Lodging	AHU	VSD & EEM - RI	130	137	130	137	-59,947	0.16	13.4
Motors		7	Lodging	AHU	EEM - RI	7	7	0	7	1,538	2.77	4.1
Motors		7	Lodging	AHU	EEM - ROF	0	0	5	6	1,482	2.78	4.1
Motors		7	Lodging	AHU	VSD to Existing - RI	51	53	51	54	-22,158	0.20	13.1
Motors		7	Lodging	AHU	VSD & EEM - RI	53	56	53	56	-22,586	0.19	13.2
Motors		8	Lodging	AHU	EEM - RI	6	6	0	6	1,242	3.05	3.9
Motors		8	Lodging	AHU	EEM - ROF	0	0	4	4	1,193	3.04	3.9
Motors		8	Lodging	AHU	VSD to Existing - RI	37	39	38	40	-15,857	0.21	12.9
Motors		8	Lodging	AHU	VSD & EEM - RI	39	41	39	41	-16,223	0.20	13.0
Motors		9	Lodging	Air Comp.	EEM - RI	25	35	0	35	5,382	2.77	4.1
Motors		9	Lodging	Air Comp.	EEM - ROF	0	0	18	26	5,188	2.78	4.1
Motors		1	Office	AHU	EEM - RI	39	42	0	42	6,932	1.43	6.4
Motors		1	Office	AHU	EEM - ROF	0	0	31	34	7,695	1.50	6.2
Motors		10A	Office	AHU	EEM - RI	25	27	0	27	4,644	3.20	3.7
Motors		10A	Office	AHU	EEM - ROF	0	0	18	20	4,431	3.18	3.7
Motors		10B	Office	AHU	EEM - RI	33	36	0	36	6,193	3.20	3.7
Motors		10B	Office	AHU	EEM - ROF	0	0	24	26	5,908	3.18	3.7
Motors		10B	Office	AHU	VSD to Existing - RI	255	277	257	280	-78,478	0.26	12.4

Table 3.5b
All Non-Building EROs: Annual Energy and Demand Reductions

End Use	Bldg. Set No.	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement. Energy Savings (MBtu)	Full Implement. Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		10B	Office	AHU	VSD & EEM - RI	266	290	266	290	-80,066	0.25	12.5
Motors		11	Office	AHU	EEM - RI	21	23	0	23	3,767	2.97	3.9
Motors		11	Office	AHU	EEM - ROF	0	0	15	16	3,596	2.96	3.9
Motors		11	Office	AHU	VSD to Existing - RI	186	203	187	204	-58,857	0.25	12.5
Motors		11	Office	AHU	VSD & EEM - RI	194	211	194	211	-60,084	0.24	12.6
Motors		12	Office	AHU	EEM - RI	20	22	0	22	3,462	3.24	3.7
Motors		12	Office	AHU	EEM - ROF	0	0	13	15	3,283	3.21	3.7
Motors		12	Office	AHU	VSD to Existing - RI	183	199	184	200	-58,239	0.25	12.5
Motors		12	Office	AHU	VSD & EEM - RI	190	207	190	207	-59,288	0.24	12.6
Motors		13	Office	Air Comp.	EEM - RI	33	36	0	36	6,193	3.20	3.7
Motors		13	Office	Air Comp.	EEM - ROF	0	0	24	26	5,908	3.18	3.7
Motors		14	Office	CTwr Fan	EEM - RI	8	6	0	6	1,548	3.20	3.7
Motors		14	Office	CTwr Fan	EEM - ROF	0	0	6	4	1,477	3.18	3.7
Motors		14	Office	CTwr Fan	VSD to Existing - RI	49	36	51	37	10,236	4.61	2.8
Motors		14	Office	CTwr Fan	VSD & EEM - RI	53	39	53	39	9,913	4.33	2.9
Motors		15	Office	CWtr Pump	EEM - RI	8	6	0	6	1,548	3.20	3.7
Motors		15	Office	CWtr Pump	EEM - ROF	0	0	6	4	1,477	3.18	3.7
Motors		15	Office	CWtr Pump	VSD to Existing - RI	64	46	64	47	5,533	1.63	5.9
Motors		15	Office	CWtr Pump	VSD & EEM - RI	67	48	67	48	5,135	1.58	6.1
Motors		16	Office	Cond. Fan	EEM - RI	8	6	0	6	1,492	1.43	6.4
Motors		16	Office	Cond. Fan	EEM - ROF	0	0	7	5	1,656	1.50	6.2
Motors		17	Office	Cond. Fan	EEM - RI	2	2	0	2	408	1.49	6.3
Motors		17	Office	Cond. Fan	EEM - ROF	0	0	2	1	444	1.55	6.1
Motors		18	Office	Cond. Fan	EEM - RI	4	3	0	3	422	1.23	7.0
Motors		18	Office	Cond. Fan	EEM - ROF	0	0	3	2	611	1.36	6.6
Motors		19	Office	Cond. Fan	EEM - RI	16	11	0	11	2,269	1.56	6.1
Motors		19	Office	Cond. Fan	EEM - ROF	0	0	12	9	2,558	1.71	5.8
Motors		2	Office	AHU	EEM - RI	1	1	0	1	102	1.49	6.3
Motors		2	Office	AHU	EEM - ROF	0	0	0	0	111	1.55	6.1
Motors		20	Office	Cond. Fan	EEM - RI	16	12	0	12	3,085	1.93	5.3
Motors		20	Office	Cond. Fan	EEM - ROF	0	0	13	9	3,115	1.98	5.2
Motors		21	Office	Cond. Fan	EEM - RI	27	20	3	20	4,759	2.15	5.0
Motors		21	Office	Cond. Fan	EEM - ROF	0	0	20	15	4,619	2.21	4.9
Motors		22	Office	Cond. Fan	EEM - RI	32	23	0	23	5,942	2.56	4.4
Motors		22	Office	Cond. Fan	EEM - ROF	0	0	24	18	5,598	2.59	4.3
Motors		23	Office	Cond. Fan	EEM - RI	64	47	0	47	11,790	2.94	4.0
Motors		23	Office	Cond. Fan	EEM - ROF	0	0	47	34	10,828	2.93	4.0
Motors		24	Office	Cond. Fan	EEM - RI	14	10	0	10	2,776	3.29	3.6
Motors		24	Office	Cond. Fan	EEM - ROF	0	0	11	8	2,654	3.27	3.7
Motors		25	Office	Cond. Pump	EEM - RI	8	6	0	6	1,548	3.20	3.7
Motors		25	Office	Cond. Pump	EEM - ROF	0	0	6	4	1,477	3.18	3.7
Motors		25	Office	Cond. Pump	VSD to Existing - RI	49	36	51	37	10,236	4.61	2.8
Motors		25	Office	Cond. Pump	VSD & EEM - RI	53	39	53	39	9,913	4.33	2.9
Motors		3	Office	AHU	EEM - RI	23	25	0	25	2,531	1.23	7.0
Motors		3	Office	AHU	EEM - ROF	0	0	16	17	3,664	1.36	6.6
Motors		4	Office	AHU	EEM - RI	4	4	0	4	534	1.56	6.1
Motors		4	Office	AHU	EEM - ROF	0	0	3	3	602	1.71	5.8
Motors		5A	Office	AHU	EEM - RI	5	6	0	6	954	1.87	5.4
Motors		5A	Office	AHU	EEM - ROF	0	0	4	5	974	1.96	5.3
Motors		5B	Office	AHU	EEM - RI	7	7	0	7	1,193	1.87	5.4

Table 3.5b
All Non-Building EROs: Annual Energy and Demand Reductions

End Use	Bldg. Set No.	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement. Energy Savings (MBtu)	Full Implement Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		5B	Office	AHU	EEM - ROF	0	0	5	6	1,217	1.96	5.3
Motors		5B	Office	AHU	VSD to Existing - RI	35	39	36	40	-15,349	0.17	13.4
Motors		5B	Office	AHU	VSD & EEM - RI	38	41	38	41	-15,788	0.15	13.5
Motors		6A	Office	AHU	EEM - RI	29	32	0	32	5,125	2.15	5.0
Motors		6A	Office	AHU	EEM - ROF	0	0	22	24	4,974	2.21	4.9
Motors		6B	Office	AHU	EEM - RI	46	50	0	50	8,053	2.15	5.0
Motors		6B	Office	AHU	EEM - ROF	0	0	34	37	7,816	2.21	4.9
Motors		6B	Office	AHU	VSD to Existing - RI	302	329	307	334	-106,998	0.22	12.8
Motors		6B	Office	AHU	VSD & EEM - RI	318	346	318	346	-109,562	0.21	12.9
Motors		7A	Office	AHU	EEM - RI	32	35	0	35	5,942	2.56	4.4
Motors		7A	Office	AHU	EEM - ROF	0	0	24	27	5,598	2.59	4.3
Motors		7B	Office	AHU	EEM - RI	51	55	0	55	9,507	2.56	4.4
Motors		7B	Office	AHU	EEM - ROF	0	0	39	43	8,956	2.59	4.3
Motors		7B	Office	AHU	VSD to Existing - RI	317	346	323	352	-109,202	0.23	12.7
Motors		7B	Office	AHU	VSD & EEM - RI	335	365	335	365	-111,325	0.22	12.8
Motors		8A	Office	AHU	EEM - RI	50	55	0	55	9,264	2.94	4.0
Motors		8A	Office	AHU	EEM - ROF	0	0	37	40	8,508	2.93	4.0
Motors		8B	Office	AHU	EEM - RI	73	80	0	80	13,474	2.94	4.0
Motors		8B	Office	AHU	EEM - ROF	0	0	54	59	12,375	2.93	4.0
Motors		8B	Office	AHU	VSD to Existing - RI	523	569	529	576	-162,756	0.26	12.4
Motors		8B	Office	AHU	VSD & EEM - RI	548	597	548	597	-166,250	0.25	12.5
Motors		9A	Office	AHU	EEM - RI	29	31	0	31	5,367	3.21	3.7
Motors		9A	Office	AHU	EEM - ROF	0	0	22	24	4,660	3.16	3.8
Motors		9B	Office	AHU	EEM - RI	36	39	0	39	6,709	3.21	3.7
Motors		9B	Office	AHU	EEM - ROF	0	0	27	30	5,825	3.16	3.8
Motors		9B	Office	AHU	VSD to Existing - RI	241	262	245	267	-73,270	0.27	12.3
Motors		9B	Office	AHU	VSD & EEM - RI	254	276	254	276	-75,093	0.26	12.4
Motors		1	Other	AHU	EEM - RI	1	2	0	2	68	1.11	7.4
Motors		1	Other	AHU	EEM - ROF	0	0	1	1	213	1.42	6.5
Motors		10	Other	AHU	EEM - RI	13	22	0	22	2,780	2.80	4.1
Motors		10	Other	AHU	EEM - ROF	0	0	9	15	2,408	2.75	4.2
Motors		10	Other	AHU	VSD to Existing - RI	116	199	117	200	-66,121	0.15	13.6
Motors		10	Other	AHU	VSD & EEM - RI	121	207	121	207	-67,224	0.14	13.8
Motors		11	Other	Air Comp.	EEM - RI	1	1	0	1	211	1.77	5.6
Motors		11	Other	Air Comp.	EEM - ROF	0	0	1	1	217	1.82	5.5
Motors		12	Other	Air Comp.	EEM - RI	4	3	0	3	611	2.61	4.3
Motors		12	Other	Air Comp.	EEM - ROF	0	0	3	3	506	2.62	4.3
Motors		13	Other	Air Comp.	EEM - RI	11	18	0	18	2,569	2.82	4.1
Motors		13	Other	Air Comp.	EEM - ROF	0	0	8	13	2,470	2.82	4.1
Motors		14	Other	Air Comp.	EEM - RI	25	43	0	43	5,745	2.86	4.0
Motors		14	Other	Air Comp.	EEM - ROF	0	0	17	29	5,487	2.85	4.1
Motors		15	Other	Air Comp.	EEM - RI	20	34	0	34	4,499	3.00	3.9
Motors		15	Other	Air Comp.	EEM - ROF	0	0	13	23	4,278	2.98	3.9
Motors		16	Other	Air Comp.	EEM - RI	39	34	0	34	6,021	3.68	3.3
Motors		16	Other	Air Comp.	EEM - ROF	0	0	26	23	5,668	3.62	3.4
Motors		17	Other	Air Comp.	EEM - RI	49	85	0	85	9,576	2.31	4.7
Motors		17	Other	Air Comp.	EEM - ROF	0	0	31	53	8,070	2.30	4.7
Motors		18	Other	CTwr Fan	EEM - RI	5	5	0	5	1,227	2.74	4.2
Motors		18	Other	CTwr Fan	EEM - ROF	0	0	4	3	1,084	2.73	4.2
Motors		18	Other	CTwr Fan	VSD to Existing - RI	31	27	32	28	8,010	3.87	3.2

Table 3.5b
All Non-Building EROs: Annual Energy and Demand Reductions

End Use	Bldg. Set No.	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement. Energy Savings (MBtu)	Full Implement. Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		18	Other	CTwr Fan	VSD & EEM - RI	34	29	34	29	7,684	3.58	3.4
Motors		19	Other	CTwr Fan	EEM - RI	21	9	0	9	3,440	3.44	3.5
Motors		19	Other	CTwr Fan	EEM - ROF	0	0	15	7	3,270	3.41	3.5
Motors		19	Other	CTwr Fan	VSD to Existing - RI	121	53	126	55	23,850	5.52	2.4
Motors		19	Other	CTwr Fan	VSD & EEM - RI	132	58	132	58	23,217	5.18	2.5
Motors		2	Other	AHU	EEM - RI	7	11	0	11	1,205	1.24	7.0
Motors		2	Other	AHU	EEM - ROF	0	0	5	8	1,497	1.31	6.8
Motors		20CEP	Other	CTwr Fan	EEM - RI	174	68	1	68	22,746	4.38	2.9
Motors		20CEP	Other	CTwr Fan	EEM - ROF	0	0	117	46	21,277	4.28	3.0
Motors		20CEP	Other	CTwr Fan	VSD to Existing - RI	1,293	505	1,323	517	230,413	9.65	1.5
Motors		20CEP	Other	CTwr Fan	VSD & EEM - RI	1,380	539	1,380	539	226,795	9.10	1.5
Motors		21CEP	Other	CTwr Fan	EEM - RI	70	27	0	27	9,137	5.07	2.6
Motors		21CEP	Other	CTwr Fan	EEM - ROF	0	0	47	18	8,511	4.94	2.6
Motors		21CEP	Other	CTwr Fan	VSD to Existing - RI	517	202	529	207	94,088	11.59	1.2
Motors		21CEP	Other	CTwr Fan	VSD & EEM - RI	552	216	552	216	92,779	10.94	1.3
Motors		22	Other	CWtr Pump	EEM - RI	5	5	0	5	1,227	2.74	4.2
Motors		22	Other	CWtr Pump	EEM - ROF	0	0	4	3	1,084	2.73	4.2
Motors		22	Other	CWtr Pump	VSD to Existing - RI	40	35	41	35	2,762	1.32	6.7
Motors		22	Other	CWtr Pump	VSD & EEM - RI	42	36	42	36	2,334	1.26	6.9
Motors		23	Other	CWtr Pump	EEM - RI	41	14	0	14	5,813	4.03	3.1
Motors		23	Other	CWtr Pump	EEM - ROF	0	0	28	10	4,195	3.66	3.4
Motors		23	Other	CWtr Pump	VSD to Existing - RI	375	132	376	132	38,340	2.24	4.8
Motors		23	Other	CWtr Pump	VSD & EEM - RI	389	137	389	137	37,187	2.18	4.9
Motors		24CEP	Other	CWtr Pump	EEM - RI	75	31	0	31	9,927	5.42	2.4
Motors		24CEP	Other	CWtr Pump	EEM - ROF	0	0	51	21	6,854	4.71	2.7
Motors		24CEP	Other	CWtr Pump	VSD to Existing - RI	728	328	730	329	78,564	2.76	4.1
Motors		24CEP	Other	CWtr Pump	VSD & EEM - RI	755	340	755	340	77,341	2.71	4.2
Motors		25CEP	Other	CWtr Pump	EEM - RI	342	137	1	137	35,726	4.49	2.8
Motors		25CEP	Other	CWtr Pump	EEM - ROF	0	0	208	84	33,093	4.36	2.9
Motors		25CEP	Other	CWtr Pump	VSD to Existing - RI	4,012	1,610	3,998	1,605	437,587	3.36	3.6
Motors		25CEP	Other	CWtr Pump	VSD & EEM - RI	4,132	1,658	4,132	1,658	430,739	3.30	3.6
Motors		26CEP	Other	CWtr Pump	EEM - RI	349	140	1	140	32,990	3.34	3.6
Motors		26CEP	Other	CWtr Pump	EEM - ROF	0	0	193	78	30,619	3.26	3.7
Motors		26CEP	Other	CWtr Pump	VSD to Existing - RI	4,746	1,905	4,712	1,891	516,880	3.35	3.6
Motors		26CEP	Other	CWtr Pump	VSD & EEM - RI	4,868	1,954	4,868	1,954	505,022	3.25	3.7
Motors		27CEP	Other	CWtr Pump	EEM - RI	435	175	1	175	43,058	3.63	3.4
Motors		27CEP	Other	CWtr Pump	EEM - ROF	0	0	252	101	39,999	3.54	3.4
Motors		27CEP	Other	CWtr Pump	VSD to Existing - RI	5,555	2,230	5,525	2,217	602,690	3.32	3.6
Motors		27CEP	Other	CWtr Pump	VSD & EEM - RI	5,708	2,291	5,708	2,291	594,335	3.27	3.7
Motors		28	Other	Circ. Pump	EEM - RI	2	3	0	3	465	2.22	4.8
Motors		28	Other	Circ. Pump	EEM - ROF	0	0	2	3	438	2.30	4.7
Motors		29	Other	Circ. Pump	EEM - RI	29	12	0	12	3,424	4.59	2.8
Motors		29	Other	Circ. Pump	EEM - ROF	0	0	20	8	2,439	4.11	3.1
Motors		3	Other	AHU	EEM - RI	9	16	0	16	1,890	1.50	6.3
Motors		3	Other	AHU	EEM - ROF	0	0	7	12	2,150	1.61	6.0
Motors		30	Other	Cond. Fan	EEM - RI	3	3	0	3	705	1.35	6.6
Motors		30	Other	Cond. Fan	EEM - ROF	0	0	3	2	815	1.42	6.5
Motors		31	Other	Cond. Fan	EEM - RI	3	3	0	3	599	1.32	6.7
Motors		31	Other	Cond. Fan	EEM - ROF	0	0	3	2	783	1.45	6.4
Motors		32	Other	Cond. Fan	EEM - RI	2	2	0	2	227	1.17	7.2

Table 3.5b
All Non-Building EROs: Annual Energy and Demand Reductions

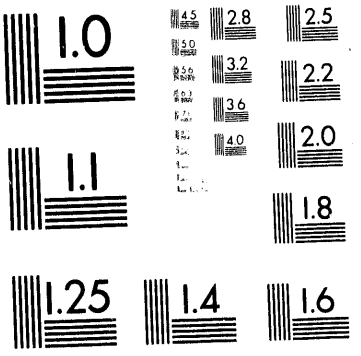
End Use	Bldg. Set No.	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement Energy Savings (MBtu)	Full Implement Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		32	Other	Cond. Fan	EEM - ROF	0	0	1	1	383	1.30	6.8
Motors		33	Other	Cond. Fan	EEM - RI	6	5	0	5	1,019	1.43	6.4
Motors		33	Other	Cond. Fan	EEM - ROF	0	0	4	4	1,258	1.59	6.0
Motors		34	Other	Cond. Fan	EEM - RI	3	2	0	2	633	1.77	5.6
Motors		34	Other	Cond. Fan	EEM - ROF	0	0	2	2	651	1.82	5.5
Motors		35	Other	Cond. Fan	EEM - RI	15	12	0	12	3,063	1.88	5.4
Motors		35	Other	Cond. Fan	EEM - ROF	0	0	11	9	3,059	1.98	5.2
Motors		36	Other	Cond. Fan	EEM - RI	20	17	0	17	4,447	2.17	4.9
Motors		36	Other	Cond. Fan	EEM - ROF	0	0	16	13	4,098	2.26	4.8
Motors		37	Other	Cond. Fan	EEM - RI	3	2	0	2	635	2.46	4.5
Motors		37	Other	Cond. Fan	EEM - ROF	0	0	2	2	528	2.48	4.5
Motors		38	Other	Cond. Pump	EEM - RI	5	5	0	5	1,227	2.74	4.2
Motors		38	Other	Cond. Pump	EEM - ROF	0	0	4	3	1,084	2.73	4.2
Motors		38	Other	Cond. Pump	VSD to Existing - RI	31	27	32	28	8,010	3.87	3.2
Motors		38	Other	Cond. Pump	VSD & EEM - RI	34	29	34	29	7,684	3.58	3.4
Motors		39	Other	Cond. Pump	EEM - RI	7	6	0	6	1,561	2.64	4.3
Motors		39	Other	Cond. Pump	EEM - ROF	0	0	5	4	1,503	2.64	4.3
Motors		39	Other	Cond. Pump	VSD to Existing - RI	45	39	47	40	12,775	4.83	2.7
Motors		39	Other	Cond. Pump	VSD & EEM - RI	49	42	49	42	12,253	4.45	2.9
Motors		40	Other	Cond. Pump	EEM - RI	24	11	0	11	3,847	3.49	3.5
Motors		40	Other	Cond. Pump	EEM - ROF	0	0	17	7	3,634	3.44	3.5
Motors		40	Other	Cond. Pump	VSD to Existing - RI	175	77	179	79	36,323	7.55	1.8
Motors		40	Other	Cond. Pump	VSD & EEM - RI	187	82	187	82	35,493	7.05	1.9
Motors		41CEP	Other	Cond. Pump	EEM - RI	254	103	1	103	29,216	3.85	3.2
Motors		41CEP	Other	Cond. Pump	EEM - ROF	0	0	155	63	27,204	3.76	3.3
Motors		41CEP	Other	Cond. Pump	VSD to Existing - RI	2,290	929	2,318	940	403,860	12.34	1.2
Motors		41CEP	Other	Cond. Pump	VSD & EEM - RI	2,417	981	2,417	981	398,488	11.69	1.2
Motors		42CEP	Other	Cond. Pump	EEM - RI	181	73	1	73	21,922	3.39	3.6
Motors		42CEP	Other	Cond. Pump	EEM - ROF	0	0	112	45	20,550	3.33	3.6
Motors		42CEP	Other	Cond. Pump	VSD to Existing - RI	1,620	655	1,641	663	299,239	11.67	1.2
Motors		42CEP	Other	Cond. Pump	VSD & EEM - RI	1,711	691	1,711	691	293,610	10.70	1.3
Motors		43	Other	HTW Pump	EEM - RI	29	12	0	12	3,424	4.59	2.8
Motors		43	Other	HTW Pump	EEM - ROF	0	0	20	8	2,439	4.11	3.1
Motors		44CEP	Other	HTW Pump	EEM - RI	140	56	0	56	14,788	4.48	2.9
Motors		44CEP	Other	HTW Pump	EEM - ROF	0	0	86	35	13,714	4.35	2.9
Motors		45CEP	Other	HTW Pump	EEM - RI	171	69	1	69	17,863	4.49	2.8
Motors		45CEP	Other	HTW Pump	EEM - ROF	0	0	104	42	16,547	4.36	2.9
Motors		46	Other	Makeup Pmp	EEM - RI	2	3	0	3	425	2.12	5.0
Motors		46	Other	Makeup Pmp	EEM - ROF	0	0	2	3	382	2.22	4.8
Motors		47	Other	Oil Pump	EEM - RI	29	23	0	23	5,241	3.33	3.6
Motors		47	Other	Oil Pump	EEM - ROF	0	0	20	15	4,955	3.29	3.6
Motors		48	Other	Pumps	EEM - RI	54	22	0	22	6,226	5.03	2.6
Motors		48	Other	Pumps	EEM - ROF	0	0	37	15	5,808	4.91	2.6
Motors		48	Other	Pumps	VSD to Existing - RI	382	153	392	157	61,105	12.01	1.2
Motors		48	Other	Pumps	VSD & EEM - RI	409	164	409	164	60,379	11.30	1.3
Motors		49	Other	Pumps	EEM - RI	71	29	0	29	8,335	5.35	2.5
Motors		49	Other	Pumps	EEM - ROF	0	0	49	20	7,769	5.21	2.5
Motors		49	Other	Pumps	VSD to Existing - RI	505	203	518	208	80,809	12.16	1.2
Motors		49	Other	Pumps	VSD & EEM - RI	541	217	541	217	79,893	11.47	1.3
Motors		4A	Other	AHU	EEM - RI	2	3	0	3	347	1.63	5.9

Table 3.5b
All Non-Building EROs: Annual Energy and Demand Reductions

End Use	Bldg. Set No.	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement Energy Savings (MBtu)	Full Implement Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		4A	Other	AHU	EEM - ROF	0	0	1	2	381	1.78	5.6
Motors		4B	Other	AHU	EEM - RI	3	4	0	4	520	1.63	5.9
Motors		4B	Other	AHU	EEM - ROF	0	0	2	3	572	1.78	5.6
Motors		4B	Other	AHU	VSD to Existing - RI	13	23	14	24	-10,149	0.08	14.4
Motors		4B	Other	AHU	VSD & EEM - RI	14	25	14	25	-10,462	0.07	14.6
Motors		50	Other	Pumps	EEM - RI	85	34	0	34	9,736	5.33	2.5
Motors		50	Other	Pumps	EEM - ROF	0	0	57	23	9,059	5.19	2.5
Motors		50	Other	Pumps	VSD to Existing - RI	629	252	644	258	100,408	12.31	1.2
Motors		50	Other	Pumps	VSD & EEM - RI	671	270	671	270	99,296	11.64	1.2
Motors		51CEP	Other	HTW Pump	EEM - RI	85	34	0	34	10,213	5.55	2.4
Motors		51CEP	Other	HTW Pump	EEM - ROF	0	0	57	23	6,015	4.52	2.8
Motors		52CEP	Other	Makeup Pmp	EEM - RI	20	16	0	16	3,133	3.81	3.2
Motors		52CEP	Other	Makeup Pmp	EEM - ROF	0	0	15	12	2,018	3.38	3.6
Motors		53CEP	Other	CWtr Pump	EEM - RI	259	105	1	105	26,900	2.91	4.0
Motors		53CEP	Other	CWtr Pump	EEM - ROF	0	0	143	58	25,163	2.86	4.1
Motors		53CEP	Other	CWtr Pump	VSD to Existing - RI	3,522	1,429	3,497	1,419	392,199	2.75	4.2
Motors		53CEP	Other	CWtr Pump	VSD & EEM - RI	3,612	1,466	3,612	1,466	788,483	4.51	2.8
Motors		54CEP	Other	Cond. Pump	EEM - RI	81	33	0	33	9,613	3.89	3.2
Motors		54CEP	Other	Cond. Pump	EEM - ROF	0	0	51	21	8,975	3.81	3.3
Motors		54CEP	Other	Cond. Pump	VSD to Existing - RI	691	280	701	284	106,427	8.87	1.6
Motors		54CEP	Other	Cond. Pump	VSD & EEM - RI	731	297	731	297	244,186	18.88	0.8
Motors		55CEP	Other	CWtr Pump	EEM - RI	35	14	0	14	4,752	4.07	3.1
Motors		55CEP	Other	CWtr Pump	EEM - ROF	0	0	24	10	3,417	3.69	3.3
Motors		56CEP	Other	CWtr Pump	EEM - RI	70	28	0	28	8,771	4.91	2.6
Motors		56CEP	Other	CWtr Pump	EEM - ROF	0	0	47	19	5,275	4.09	3.1
Motors		57CEP	Other	FD Fan #4	EEM - RI	102	41	0	41	12,514	6.57	2.1
Motors		57CEP	Other	FD Fan #4	EEM - ROF	0	0	68	27	7,237	5.24	2.5
Motors		58CEP	Other	Under Air #4	EEM - RI	140	56	0	56	15,838	4.72	2.7
Motors		58CEP	Other	Under Air #4	EEM - ROF	0	0	86	35	9,161	3.84	3.2
Motors		5A	Other	AHU	EEM - RI	7	11	0	11	1,487	1.93	5.3
Motors		5A	Other	AHU	EEM - ROF	0	0	5	8	1,485	2.01	5.2
Motors		5B	Other	AHU	EEM - RI	11	18	0	18	2,378	1.93	5.3
Motors		5B	Other	AHU	EEM - ROF	0	0	8	14	2,376	2.01	5.2
Motors		5B	Other	AHU	VSD to Existing - RI	70	120	71	121	-43,560	0.13	13.8
Motors		5B	Other	AHU	VSD & EEM - RI	73	126	73	126	-44,522	0.12	14.0
Motors		6A	Other	AHU	EEM - RI	8	14	0	14	1,861	2.22	4.8
Motors		6A	Other	AHU	EEM - ROF	0	0	6	11	1,753	2.30	4.7
Motors		6B	Other	AHU	EEM - RI	12	21	0	21	2,791	2.22	4.8
Motors		6B	Other	AHU	EEM - ROF	0	0	9	16	2,629	2.30	4.7
Motors		6B	Other	AHU	VSD to Existing - RI	76	130	77	132	-46,148	0.13	13.8
Motors		6B	Other	AHU	VSD & EEM - RI	80	137	80	137	-47,066	0.12	13.9
Motors		7A	Other	AHU	EEM - RI	20	35	0	35	4,707	2.55	4.4
Motors		7A	Other	AHU	EEM - ROF	0	0	15	26	4,237	2.57	4.4
Motors		7B	Other	AHU	EEM - RI	32	55	0	55	7,396	2.55	4.4
Motors		7B	Other	AHU	EEM - ROF	0	0	24	40	6,658	2.57	4.4
Motors		7B	Other	AHU	VSD to Existing - RI	228	391	231	396	127,511	0.16	13.5
Motors		7B	Other	AHU	VSD & EEM - RI	239	410	239	410	-130,114	0.15	13.6
Motors		8A	Other	AHU	EEM - RI	5	8	0	8	1,046	2.72	4.2
Motors		8A	Other	AHU	EEM - ROF	0	0	3	6	850	2.70	4.2
Motors		8B	Other	AHU	EEM - RI	9	16	0	16	2,093	2.72	4.2

Table 3.5b
All Non-Building FROs: Annual Energy and Demand Reductions

End Use	Bldg. Set No.	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement. Energy Savings (MBtu)	Full Implement Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		8B	Other	AHU	EEM - ROF	0	0	7	12	1,700	2.70	4.2
Motors		8B	Other	AHU	VSD to Existing - RI	61	105	62	107	-33,670	0.16	13.5
Motors		8B	Other	AHU	VSD & EEM - RI	64	110	64	110	-34,465	0.15	13.6
Motors		9	Other	AHU	EEM - RI	13	23	0	23	2,839	2.49	4.5
Motors		9	Other	AHU	EEM - ROF	0	0	9	16	2,302	2.47	4.5
Motors		9	Other	AHU	VSD to Existing - RI	118	203	119	204	-66,980	0.15	13.6
Motors		9	Other	AHU	VSD & EEM - RI	123	211	123	211	-68,351	0.14	13.7
Motors		1	Public Order	AHU	EEM - RI	4	5	0	5	796	2.25	4.8
Motors		1	Public Order	AHU	EEM - ROF	0	0	3	3	783	2.28	4.8
Motors		1	Public Order	AHU	VSD to Existing - RI	30	30	30	30	-9,454	0.25	12.5
Motors		1	Public Order	AHU	VSD & EEM - RI	31	31	31	31	-9,660	0.23	12.7
Motors		2	Public Order	AHU	EEM - RI	3	3	0	3	561	2.48	4.5
Motors		2	Public Order	AHU	EEM - ROF	0	0	3	3	473	2.51	4.4
Motors		2	Public Order	AHU	VSD to Existing - RI	21	22	22	22	-6,673	0.25	12.5
Motors		2	Public Order	AHU	VSD & EEM - RI	23	23	23	23	-6,838	0.24	12.6
Motors		3	Public Order	AHU	EEM - RI	5	5	0	5	757	2.75	4.2
Motors		3	Public Order	AHU	EEM - ROF	0	0	4	4	443	2.51	4.4
Motors		3	Public Order	AHU	VSD to Existing - RI	35	36	36	36	-9,914	0.27	12.3
Motors		3	Public Order	AHU	VSD & EEM - RI	37	37	37	37	-10,171	0.26	12.4
Motors		4	Public Order	AHU	EEM - RI	8	8	0	8	1,259	3.07	3.8
Motors		4	Public Order	AHU	EEM - ROF	0	0	6	6	713	2.74	4.2
Motors		4	Public Order	AHU	VSD to Existing - RI	52	52	53	53	-14,319	0.28	12.2
Motors		4	Public Order	AHU	VSD & EEM - RI	55	55	55	55	-14,681	0.27	12.3
Motors		5	Public Order	Cond. Fan	EEM - RI	2	1	0	1	343	1.72	5.7
Motors		5	Public Order	Cond. Fan	EEM - ROF	0	0	2	1	354	1.77	5.6
Motors		6	Public Order	Cond. Fan	EEM - RI	2	1	0	1	330	2.04	5.1
Motors		6	Public Order	Cond. Fan	EEM - ROF	0	0	2	1	300	2.15	5.0
Motors		7	Public Order	Cond. Fan	EEM - RI	3	2	0	2	482	2.27	4.8
Motors		7	Public Order	Cond. Fan	EEM - ROF	0	0	3	1	321	2.25	4.8
Motors		8	Public Order	Cond. Fan	EEM - RI	5	2	0	2	757	2.75	4.2
Motors		8	Public Order	Cond. Fan	EEM - ROF	0	0	4	2	443	2.51	4.4
Motors		1	Service	AHU	EEM - RI	0	1	0	1	51	1.22	7.0
Motors		1	Service	AHU	EEM - ROF	0	0	0	0	64	1.29	6.8
Motors		10	Service	CWtr Pump	EEM - RI	8	8	0	8	2,173	2.79	4.1
Motors		10	Service	CWtr Pump	EEM - ROF	0	0	6	6	2,098	2.80	4.1
Motors		10	Service	CWtr Pump	VSD to Existing - RI	51	52	52	53	3,254	1.25	7.0
Motors		10	Service	CWtr Pump	VSD & EEM - RI	54	55	54	55	2,514	1.19	7.1
Motors		11	Service	Cond. Fan	EEM - RI	0	0	0	0	51	1.22	7.0
Motors		11	Service	Cond. Fan	EEM - ROF	0	0	0	0	64	1.29	6.8
Motors		12	Service	Cond. Fan	EEM - RI	1	2	0	2	380	1.53	6.2
Motors		12	Service	Cond. Fan	EEM - ROF	0	0	1	1	406	1.59	6.0
Motors		13	Service	Cond. Fan	EEM - RI	3	3	0	3	894	1.94	5.3
Motors		13	Service	Cond. Fan	EEM - ROF	0	0	2	3	898	1.98	5.2
Motors		14	Service	Cond. Fan	EEM - RI	2	2	0	2	479	2.26	4.8
Motors		14	Service	Cond. Fan	EEM - ROF	0	0	1	1	472	2.29	4.7
Motors		15	Service	Cond. Pump	EEM - RI	8	8	0	8	2,166	2.94	4.0
Motors		15	Service	Cond. Pump	EEM - ROF	0	0	6	6	2,073	2.93	4.0
Motors		15	Service	Cond. Pump	VSD to Existing - RI	51	52	52	54	17,008	5.77	2.3
Motors		15	Service	Cond. Pump	VSD & EEM - RI	55	56	55	56	16,441	5.37	2.5
Motors		16	Service	HTW Pump	EEM - RI	3	7	0	7	958	2.26	4.8


1.0
4.5
2.8
2.5
5.0
3.2
2.2
5.6
3.6
2.0
4.0
1.1
1.8
1.25
1.4
1.6

3 of 4

Table 3.5b
All Non-Building EROs: Annual Energy and Demand Reductions

End Use	Bldg. Set No.	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement. Energy Savings (MBtu)	Full Implement. Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		16	Service	HTW Pump	EEM - ROF	0	0	3	5	944	2.29	4.7
Motors		2	Service	AHU	EEM - RI	1	2	0	2	219	1.46	6.4
Motors		2	Service	AHU	EEM - ROF	0	0	1	2	254	1.58	6.1
Motors		3A	Service	AHU	EEM - RI	1	1	0	1	179	1.65	5.9
Motors		3A	Service	AHU	EEM - ROF	0	0	1	1	192	1.76	5.7
Motors		3B	Service	AHU	EEM - RI	1	3	0	3	358	1.65	5.9
Motors		3B	Service	AHU	EEM - ROF	0	0	1	2	385	1.76	5.7
Motors		3B	Service	AHU	VSD to Existing - RI	8	15	8	16	-6,930	0.06	14.7
Motors		3B	Service	AHU	VSD & EEM - RI	8	16	8	16	-7,112	0.05	14.9
Motors		4A	Service	AHU	EEM - RI	2	5	0	5	596	1.94	5.3
Motors		4A	Service	AHU	EEM - ROF	0	0	2	3	599	1.98	5.2
Motors		4B	Service	AHU	EEM - RI	2	5	0	5	596	1.94	5.3
Motors		4B	Service	AHU	EEM - ROF	0	0	2	3	599	1.98	5.2
Motors		4B	Service	AHU	VSD to Existing - RI	15	30	15	30	-11,212	0.11	14.1
Motors		4B	Service	AHU	VSD & EEM - RI	15	31	15	31	-11,424	0.09	14.3
Motors		5A	Service	AHU	EEM - RI	2	3	0	3	479	2.26	4.8
Motors		5A	Service	AHU	EEM - ROF	0	0	1	3	472	2.29	4.7
Motors		5B	Service	AHU	EEM - RI	3	7	0	7	958	2.26	4.8
Motors		5B	Service	AHU	EEM - ROF	0	0	3	5	944	2.29	4.7
Motors		5B	Service	AHU	VSD to Existing - RI	21	43	22	44	-15,837	0.11	14.1
Motors		5B	Service	AHU	VSD & EEM - RI	22	46	22	46	-16,084	0.10	14.2
Motors		6	Service	AHU	EEM - RI	2	5	0	5	672	2.55	4.4
Motors		6	Service	AHU	EEM - ROF	0	0	2	4	652	2.56	4.4
Motors		6	Service	AHU	VSD to Existing - RI	17	36	18	36	-11,914	0.13	13.8
Motors		6	Service	AHU	VSD & EEM - RI	18	37	18	37	-12,131	0.12	13.9
Motors		7	Service	AHU	EEM - RI	17	34	0	34	4,242	2.89	4.0
Motors		7	Service	AHU	EEM - ROF	0	0	11	23	4,043	2.87	4.0
Motors		7	Service	AHU	VSD to Existing - RI	161	328	161	329	-114,535	0.11	14.1
Motors		7	Service	AHU	VSD & EEM - RI	166	340	166	340	-116,202	0.10	14.2
Motors		8	Service	Air Comp.	EEM - RI	54	110	0	110	12,418	2.35	4.7
Motors		8	Service	Air Comp.	EEM - ROF	0	0	33	68	11,943	2.35	4.7
Motors		9	Service	CTwr Fan	EEM - RI	8	8	0	8	2,166	2.94	4.0
Motors		9	Service	CTwr Fan	EEM - ROF	0	0	6	6	2,073	2.93	4.0
Motors		9	Service	CTwr Fan	VSD to Existing - RI	51	52	52	54	17,008	5.77	2.3
Motors		9	Service	CTwr Fan	VSD & EEM - RI	55	56	55	56	16,441	5.37	2.5
Motors		1	Warehouse	AHU	EEM - RI	1	2	0	2	298	1.37	6.6
Motors		1	Warehouse	AHU	EEM - ROF	0	0	1	1	341	1.44	6.4
Motors		10	Warehouse	Cond. Fan	EEM - RI	4	3	0	3	708	1.29	6.8
Motors		10	Warehouse	Cond. Fan	EEM - ROF	0	0	3	3	959	1.43	6.4
Motors		11	Warehouse	Cond. Fan	EEM - RI	1	1	0	1	174	1.42	6.5
Motors		11	Warehouse	Cond. Fan	EEM - ROF	0	0	1	0	194	1.48	6.3
Motors		12	Warehouse	Cond. Fan	EEM - RI	3	2	0	2	524	1.26	6.9
Motors		12	Warehouse	Cond. Fan	EEM - ROF	0	0	2	2	640	1.33	6.7
Motors		13	Warehouse	Cond. Fan	EEM - RI	5	4	0	4	995	1.60	6.0
Motors		13	Warehouse	Cond. Fan	EEM - ROF	0	0	4	3	1,049	1.65	5.9
Motors		14	Warehouse	Cond. Fan	EEM - RI	3	2	0	2	666	1.81	5.6
Motors		14	Warehouse	Cond. Fan	EEM - ROF	0	0	2	2	681	1.86	5.5
Motors		15	Warehouse	Cond. Fan	EEM - RI	4	3	0	3	998	2.05	5.1
Motors		15	Warehouse	Cond. Fan	EEM - ROF	0	0	3	3	994	2.08	5.1
Motors		16	Warehouse	Cond. Fan	EEM - RI	3	2	0	2	747	2.72	4.2

Table 3.5b
All Non-Building EROs: Annual Energy and Demand Reductions

End Use	Bldg. Set No.	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement Energy Savings (MBtu)	Full Implement. Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		16	Warehouse	Cond. Fan	EEM - ROF	0	0	2	2	721	2.73	4.2
Motors		17	Warehouse	Refrig.	EEM - RI	11	5	0	5	1,454	4.35	2.9
Motors		17	Warehouse	Refrig.	EEM - ROF	0	0	8	4	1,371	4.29	3.0
Motors		18	Warehouse	Refrig.	EEM - RI	77	34	0	34	9,143	5.07	2.6
Motors		18	Warehouse	Refrig.	EEM - ROF	0	0	52	23	8,517	4.94	2.6
Motors		2	Warehouse	AHU	EEM - RI	5	6	0	6	925	1.34	6.7
Motors		2	Warehouse	AHU	EEM - ROF	0	0	4	5	1,182	1.47	6.3
Motors		3	Warehouse	AHU	EEM - RI	11	13	0	13	300	1.04	7.7
Motors		3	Warehouse	AHU	EEM - ROF	0	0	8	9	1,869	1.30	6.8
Motors		4	Warehouse	AHU	EEM - RI	5	6	0	6	750	1.39	6.5
Motors		4	Warehouse	AHU	EEM - ROF	0	0	4	5	984	1.60	6.0
Motors		5A	Warehouse	AHU	EEM - RI	5	5	0	5	1,014	1.74	5.7
Motors		5A	Warehouse	AHU	EEM - ROF	0	0	4	4	1,064	1.84	5.5
Motors		5B	Warehouse	AHU	EEM - RI	7	8	0	8	1,420	1.74	5.7
Motors		5B	Warehouse	AHU	EEM - ROF	0	0	5	6	1,490	1.84	5.5
Motors		5B	Warehouse	AHU	VSD to Existing - RI	36	40	37	42	-23,147	0.10	14.1
Motors		5B	Warehouse	AHU	VSD & EEM - RI	38	43	38	43	-23,775	0.09	14.3
Motors		6A	Warehouse	AHU	EEM - RI	21	24	0	24	4,386	1.99	5.2
Motors		6A	Warehouse	AHU	EEM - ROF	0	0	16	18	4,349	2.06	5.1
Motors		6B	Warehouse	AHU	EEM - RI	30	34	0	34	6,266	1.99	5.2
Motors		6B	Warehouse	AHU	EEM - ROF	0	0	22	25	6,212	2.06	5.1
Motors		6B	Warehouse	AHU	VSD to Existing - RI	198	224	201	228	-106,378	0.15	13.6
Motors		6B	Warehouse	AHU	VSD & EEM - RI	208	236	208	236	-108,765	0.14	13.7
Motors		7A	Warehouse	AHU	EEM - RI	5	5	0	5	1,066	2.40	4.6
Motors		7A	Warehouse	AHU	EEM - ROF	0	0	4	4	1,044	2.43	4.6
Motors		7B	Warehouse	AHU	EEM - RI	7	8	0	8	1,600	2.40	4.6
Motors		7B	Warehouse	AHU	EEM - ROF	0	0	5	6	1,566	2.43	4.6
Motors		7B	Warehouse	AHU	VSD to Existing - RI	43	49	44	50	-22,433	0.16	13.5
Motors		7B	Warehouse	AHU	VSD & EEM - RI	45	51	45	51	-22,800	0.15	13.6
Motors		8	Warehouse	AHU	EEM - RI	6	7	0	7	1,346	2.91	4.0
Motors		8	Warehouse	AHU	EEM - ROF	0	0	4	5	1,291	2.90	4.0
Motors		8	Warehouse	AHU	VSD to Existing - RI	46	52	46	53	-21,858	0.18	13.2
Motors		8	Warehouse	AHU	VSD & EEM - RI	48	54	48	54	-22,261	0.17	13.3
Motors		9	Warehouse	AHU	EEM - RI	8	9	0	9	1,502	2.57	4.4
Motors		9	Warehouse	AHU	EEM - ROF	0	0	5	6	1,204	2.54	4.4
Motors		9	Warehouse	AHU	VSD to Existing - RI	67	76	67	76	-32,371	0.17	13.3
Motors		9	Warehouse	AHU	VSD & EEM - RI	70	79	70	79	-33,046	0.16	13.4
Motors		1WELL	Water Well	P-933	EEM - RI	171	110	1	110	21,235	3.31	3.6
Motors		1WELL	Water Well	P-933	EEM - ROF	0	0	105	68	12,197	2.82	4.1
Motors		2WELL	Water Well	P-456	EEM - RI	111	69	0	69	13,865	3.71	3.3
Motors		2WELL	Water Well	P-456	EEM - ROF	0	0	67	42	7,678	3.05	3.9
Motors		3WELL	Water Well	P-1345	EEM - RI	100	69	0	69	12,901	3.52	3.5
Motors		3WELL	Water Well	P-1345	EEM - ROF	0	0	61	42	7,238	2.93	4.0
Motors		4WELL	Water Well	[illegible]9961	EEM - RI	107	69	0	69	13,544	3.64	3.4
Motors		4WELL	Water Well	[illegible]9961	EEM - ROF	0	0	65	42	7,531	3.01	3.9
Motors		5WELL	Water Well	[illegible]	EEM - RI	123	56	0	56	14,315	4.37	2.9
Motors		5WELL	Water Well	[illegible]	EEM - ROF	0	0	76	35	7,700	3.48	3.5
Motors		6WELL	Water Well	[illegible]	EEM - RI	4	10	0	10	2,353	2.23	4.8
Motors		6WELL	Water Well	[illegible]	EEM - RI	4	7	0	7	1,807	2.17	4.9
Motors		6WELL	Water Well	[illegible]7732	EEM - ROF	0	0	3	7	1,684	2.20	4.9

Table 3.5b
All Non-Building EROs: Annual Energy and Demand Reductions

End Use	Bldg. Set No.	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement. Energy Savings (MBtu)	Full Implement. Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		6WELL	Water Well	T-15003	EEM - ROF	0	0	3	5	1,310	2.16	4.9
Motors		7WELL	Water Well	S-19222	EEM - RI	5	6	0	6	1,100	2.56	4.4
Motors		7WELL	Water Well	S-19222	EEM - ROF	0	0	4	4	756	2.47	4.5
Refrig.		Barracks	Barracks	Refrigerator	RFE-3	38	14	38	14	-166,486	0.43	36.8
Refrig.		Breakrooms	Breakrooms	Refrigerator	RFE-2	213	77	213	77	-8,890	0.88	17.8
Refrig.		On-Post Housing	On-Post Housing	Refrigerator	RFE-1	2,890	1,044	2,890	1,044	-120,363	0.88	17.8
Transportation		Ambulance	Vehicles	Modular, 4x2	CNG Vehicle - ROF	0	0	119	0	93,827	3.04	3.9
Transportation		Bus	Vehicles	Bus, School, 28-29 psgr	CNG Vehicle - ROF	0	0	17	0	705	0.06	14.8
Transportation		Bus	Vehicles	Bus, School, 42-45 psgr	CNG Vehicle - ROF	0	0	44	0	52,812	2.48	4.5
Transportation		Bus	Vehicles	Bus, Intercity, 41-51 psgr, 4x2	CNG Vehicle - ROF	0	0	334	0	202,692	2.79	4.1
Transportation		Pickup	Vehicles	Compact, 4x2, 4,599 GVW & under	CNG Vehicle - ROF	0	0	210	0	-10,534	-0.14	18.2
Transportation		Sedan	Vehicles	Sedan	CNG Vehicle - ROF	0	0	585	0	141,482	1.28	6.8
Transportation		Truck	Vehicles	Panel Truck, 4x2, 6,999 GVW & under	CNG Vehicle - ROF	0	0	131	0	25,533	0.91	8.2
Transportation		Truck	Vehicles	Tractor, 4x2, 24,000-44,500 GVW	CNG Vehicle - ROF	0	0	32	0	12,382	1.26	6.9
Transportation		Truck	Vehicles	Stake, 4x2, 7,000 GVW	CNG Vehicle - ROF	0	0	1,392	0	304,815	1.34	6.7
Transportation		Truck	Vehicles	Carryall, 4x2, Conv, 15 psgr, 7,700 GVW	CNG Vehicle - ROF	0	0	278	0	71,327	1.99	5.2
Transportation		Truck	Vehicles	Carryall, 4x4, 7,500 GVW	CNG Vehicle - ROF	0	0	170	0	57,953	2.05	5.1
Transportation		Truck	Vehicles	Carryall, 4x2, 6,999 GVW & under	CNG Vehicle - ROF	0	0	404	0	60,901	0.88	8.3
Transportation		Truck	Vehicles	Tractor, 6x4, 24,000-44,500 GVW	CNG Vehicle - ROF	0	0	23	0	70,099	14.78	1.0
Transportation		Truck	Vehicles	Stake, 4x2, 10,000 GVW	CNG Vehicle - ROF	0	0	73	0	24,223	0.61	9.7
Transportation		Truck	Vehicles	Multistop, 4x2, 12,500-16,999 GVW	CNG Vehicle - ROF	0	0	69	0	-142,930	-1.62	-25.0
Transportation		Truck	Vehicles	Multistop, 4x2, 1-ton	CNG Vehicle - ROF	0	0	2	0	-562	-0.22	20.0
Transportation		Truck	Vehicles	Multistop, 4x2, 8,499 GVW & under	CNG Vehicle - ROF	0	0	34	0	-13,039	-0.49	30.6
Transportation		Truck	Vehicles	Cargo, 4x4, 12,499 GVW & under	CNG Vehicle - ROF	0	0	98	0	-87,717	-1.18	-87.0
T&D		Substation	Substation	Sub. Transformers	Conservation Voltage Reduction - RI	4,266	2,447	4,266	2,447	826,805	2068.01	0.0
T&D		Substation	Substation	Capacitor Bank	Power Factor Correction to Unity - RI	89	47	89	47	74,571	2.52	6.2
T&D		Substation	Substation	Capacitor Bank	Power Factor Correction to .95 - RI	18	10	18	10	96,512	7.87	2.0

Table 3.6a
All Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Cooling	41	FH-2 to 4-09	2 to 4 Unit Buildings	electric air cool heat pump	none	0	0	0	0	0	NA	NA
Cooling	37	FH-2 to 4-12	2 to 4 Unit Buildings	electric air cool heat pump	none	0	0	0	0	0	NA	NA
Cooling	40	FH-2 to 4-07	2 to 4 Unit Buildings	package unit	none	0	0	0	0	0	NA	NA
Cooling	39	FH-2 to 4-06	2 to 4 Unit Buildings	electric air cool heat pump	none	0	0	0	0	0	NA	NA
Cooling	36	FH-2 to 4-10	2 to 4 Unit Buildings	package unit	none	0	0	0	0	0	NA	NA
Cooling	35	FH-2 to 4-01	2 to 4 Unit Buildings	package unit	none	0	0	0	0	0	NA	NA
Cooling	38	FH-2 to 4-03	2 to 4 Unit Buildings	package unit	none	0	0	0	0	0	NA	NA
Cooling	42	FH-5 or More-01	5 or More Unit Buildings	electric air cool heat pump	none	0	0	0	0	0	NA	NA
Cooling	8	Assembly-20	Assembly	package unit	none	0	0	0	0	0	NA	NA
Cooling	0	Assembly-01	Assembly	electric air cool heat pump	none	0	0	0	0	0	NA	NA
Cooling	1	Assembly-10	Assembly	electric air cool heat pump	none	0	0	0	0	0	NA	NA
Cooling	12	Assembly-03	Assembly	package unit	none	0	0	0	0	0	NA	NA
Cooling	4	Assembly-16	Assembly	package unit	none	0	0	0	0	0	NA	NA
Cooling	9	Assembly-22	Assembly	electric air cool heat pump	none	0	0	0	0	0	NA	NA
Cooling	5	Assembly-18	Assembly	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	11	Assembly-24	Assembly	package unit	none	0	0	0	0	0	NA	NA
Cooling	7	Assembly-02	Assembly	package unit	none	0	0	0	0	0	NA	NA
Cooling	3	Assembly-15	Assembly	package unit	none	0	0	0	0	0	NA	NA
Cooling	5	Assembly-18	Assembly	single conv chiller	none	0	0	0	0	0	NA	NA
Cooling	6	Assembly-19	Assembly	package unit	none	0	0	0	0	0	NA	NA
Cooling	4	Assembly-16	Assembly	single conv chiller	none	0	0	0	0	0	NA	NA
Cooling	14	Assembly-05	Assembly	single conv chiller	Air-Cooled Reciprocating Chiller (20 to 75 tons cooling)	19,423	25,217	0	25,217	5,794	1.30	12.0
Cooling	2	Assembly-13	Assembly	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	10	Assembly-23	Assembly	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	17	Assembly-09	Assembly	package unit	none	0	0	0	0	0	NA	NA
Cooling	34	Education-09	Education	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	30	Education-24	Education	package unit	none	0	0	0	0	0	NA	NA
Cooling	19	Education-11	Education	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	24	Education-17	Education	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	26	Education-19	Education	package unit	none	0	0	0	0	0	NA	NA
Cooling	22	Education-15	Education	package unit	none	0	0	0	0	0	NA	NA
Cooling	28	Education-22	Education	package unit	none	0	0	0	0	0	NA	NA
Cooling	25	Education-18	Education	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	20	Education-12	Education	package unit	none	0	0	0	0	0	NA	NA
Cooling	27	Education-02	Education	package unit	none	0	0	0	0	0	NA	NA
Cooling	33	Education-08	Education	single conv chiller	Air-Cooled Reciprocating Chiller (20 to 75 tons cooling)	60,470	104,375	0	104,375	43,905	1.73	9.1
Cooling	23	Education-16	Education	package unit	none	0	0	0	0	0	NA	NA
Cooling	25	Education-18	Education	single conv chiller	Air-Cooled Reciprocating Chiller (20 to 75 tons cooling)	10,021	63,629	0	63,629	53,608	6.35	2.4
Cooling	32	Education-07	Education	package unit	none	0	0	0	0	0	NA	NA
Cooling	33	Education-08	Education	package unit	Single Zone Packaged AC Unit (5.4167 to 11.25 tons cooling)	16,434	59,643	0	59,643	43,191	3.62	4.3
Cooling	32	Education-07	Education	package unit	Single Zone Packaged AC Unit (5.4167 to 11.25 tons cooling)	4,095	21,821	0	21,821	17,726	5.33	2.9
Cooling	21	Education-14	Education	package unit	none	0	0	0	0	0	NA	NA
Cooling	31	Education-04	Education	package unit	none	0	0	0	0	0	NA	NA
Cooling	29	Education-23	Education	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	52	Food Sales-01	Food Sales	package unit	none	0	0	0	0	0	NA	NA
Cooling	54	Food Service-11	Food Service	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	62	Food Service-08	Food Service	package unit	none	0	0	0	0	0	NA	NA
Cooling	57	Food Service-15	Food Service	package unit	none	0	0	0	0	0	NA	NA
Cooling	60	Food Service-04	Food Service	package unit	none	0	0	0	0	0	NA	NA
Cooling	55	Food Service-12	Food Service	package unit	none	0	0	0	0	0	NA	NA
Cooling	58	Food Service-17	Food Service	single conv chiller	Centrifugal Liquid (Water) Chiller (200 to 500 tons cooling)	46,962	62,648	0	62,648	15,686	1.33	11.7
Cooling	61	Food Service-07	Food Service	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	67	Health Care-04	Health Care	single conv chiller	none	0	0	0	0	0	NA	NA
Cooling	67	Health Care-04	Health Care	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	66	Health Care-03	Health Care	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	69	Health Care-07	Health Care	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	65	Health Care-02	Health Care	package unit	none	0	0	0	0	0	NA	NA
Cooling	68	Health Care-06	Health Care	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	79	Lodging-05	Lodging	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	75	Lodging-15	Lodging	package unit	none	0	0	0	0	0	NA	NA
Cooling	73	Lodging-12	Lodging	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	76	Lodging-16	Lodging	package unit	none	0	0	0	0	0	NA	NA
Cooling	77	Lodging-19	Lodging	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	72	Lodging-11	Lodging	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	80	Lodging-07	Lodging	package unit	none	0	0	0	0	0	NA	NA
Cooling	78	Lodging-02	Lodging	package unit	none	0	0	0	0	0	NA	NA
Cooling	74	Lodging-13	Lodging	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	148	Service-04	Mercantile & Service	package unit	none	0	0	0	0	0	NA	NA
Cooling	147	Service-03	Mercantile & Service	package unit	none	0	0	0	0	0	NA	NA

Table 3.6a
All Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Cooling	146	Service-01	Mercantile & Service	package unit	none	0	0	0	0	0	NA	NA
Cooling	152	Service-08	Mercantile & Service	single conv chiller	none	0	0	0	0	0	NA	NA
Cooling	151	Service-07	Mercantile & Service	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	150	Service-06	Mercantile & Service	package unit	none	0	0	0	0	0	NA	NA
Cooling	149	Service-05	Mercantile & Service	electric air cool heat pump	none	0	0	0	0	0	NA	NA
Cooling	153	Service-09	Mercantile & Service	package unit	none	0	0	0	0	0	NA	NA
Cooling	102	Office-31	Office	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	92	Office-02	Office	package unit	Single Zone Packaged AC Unit (5 4167 to 11 25 tons cooling)	8,348	12,787	0	12,787	4,439	1 53	10 2
Cooling	97	Office-26	Office	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	89	Office-16	Office	package unit	none	0	0	0	0	0	NA	NA
Cooling	86	Office-14	Office	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	104	Office-35	Office	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	107	Office-04	Office	package unit	none	0	0	0	0	0	NA	NA
Cooling	92	Office-02	Office	package unit	none	0	0	0	0	0	NA	NA
Cooling	106	Office-38	Office	package unit	none	0	0	0	0	0	NA	NA
Cooling	109	Office-08	Office	package unit	none	0	0	0	0	0	NA	NA
Cooling	100	Office-03	Office	package unit	none	0	0	0	0	0	NA	NA
Cooling	100	Office-03	Office	package unit	Single Zone Packaged AC Unit (11.25 to 20 tons cooling)	14,058	22,423	0	22,423	8,365	1 60	9 8
Cooling	82	Office-01	Office	package unit	Single Zone Packaged AC Unit (5 4167 to 11 25 tons cooling)	5,662	17,780	0	17,780	12,118	3 14	5 0
Cooling	99	Office-29	Office	package unit	none	0	0	0	0	0	NA	NA
Cooling	96	Office-22	Office	package unit	Multizone Packaged AC Unit (20 to 150 tons cooling)	38,424	74,898	0	74,898	36,474	1 95	8 0
Cooling	87	Office-15	Office	package unit	none	0	0	0	0	0	NA	NA
Cooling	105	Office-37	Office	package unit	none	0	0	0	0	0	NA	NA
Cooling	82	Office-01	Office	package unit	none	0	0	0	0	0	NA	NA
Cooling	90	Office-17	Office	package unit	none	0	0	0	0	0	NA	NA
Cooling	87	Office-15	Office	package unit	none	0	0	0	0	0	NA	NA
Cooling	110	Office-09	Office	package unit	none	0	0	0	0	0	NA	NA
Cooling	85	Office-13	Office	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	101	Office-30	Office	package unit	none	0	0	0	0	0	NA	NA
Cooling	84	Office-10	Office	package unit	none	0	0	0	0	0	NA	NA
Cooling	103	Office-34	Office	package unit	none	0	0	0	0	0	NA	NA
Cooling	91	Office-18	Office	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	105	Office-37	Office	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	98	Office-28	Office	package unit	none	0	0	0	0	0	NA	NA
Cooling	108	Office-07	Office	package unit	none	0	0	0	0	0	NA	NA
Cooling	94	Office-20	Office	package unit	none	0	0	0	0	0	NA	NA
Cooling	96	Office-22	Office	chilled water coil	none	0	0	0	0	0	NA	NA
Cooling	95	Office-21	Office	package unit	none	0	0	0	0	0	NA	NA
Cooling	124	Other-26	Other	package unit	none	0	0	0	0	0	NA	NA
Cooling	116	Other-17	Other	package unit	none	0	0	0	0	0	NA	NA
Cooling	120	Other-02	Other	package unit	none	0	0	0	0	0	NA	NA
Cooling	130	Other-32	Other	package unit	none	0	0	0	0	0	NA	NA
Cooling	111	Other-01	Other	package unit	none	0	0	0	0	0	NA	NA
Cooling	113	Other-10	Other	package unit	none	0	0	0	0	0	NA	NA
Cooling	122	Other-23	Other	package unit	none	0	0	0	0	0	NA	NA
Cooling	134	Other-41	Other	single conv chiller	none	0	0	0	0	0	NA	NA
Cooling	136	Other-03	Other	package unit	none	0	0	0	0	0	NA	NA
Cooling	119	Other-19	Other	package unit	none	0	0	0	0	0	NA	NA
Cooling	128	Other-30	Other	package unit	none	0	0	0	0	0	NA	NA
Cooling	139	Other-09	Other	package unit	none	0	0	0	0	0	NA	NA
Cooling	114	Other-15	Other	package unit	none	0	0	0	0	0	NA	NA
Cooling	121	Other-20	Other	package unit	none	0	0	0	0	0	NA	NA
Cooling	137	Other-07	Other	package unit	none	0	0	0	0	0	NA	NA
Cooling	122	Other-23	Other	package unit	none	0	0	0	0	0	NA	NA
Cooling	131	Other-36	Other	package unit	none	0	0	0	0	0	NA	NA
Cooling	126	Other-29	Other	package unit	none	0	0	0	0	0	NA	NA
Cooling	115	Other-16	Other	package unit	none	0	0	0	0	0	NA	NA
Cooling	133	Other-38	Other	package unit	none	0	0	0	0	0	NA	NA
Cooling	126	Other-29	Other	package unit	none	0	0	0	0	0	NA	NA
Cooling	144	Public Order-04	Public Order Safety	package unit	none	0	0	0	0	0	NA	NA
Cooling	142	Public Order-02	Public Order Safety	package unit	none	0	0	0	0	0	NA	NA
Cooling	141	Public Order-01	Public Order Safety	package unit	none	0	0	0	0	0	NA	NA
Cooling	145	Public Order-05	Public Order Safety	package unit	none	0	0	0	0	0	NA	NA
Cooling	48	FH-attached-01	Single Family Attached	package unit	none	0	0	0	0	0	NA	NA
Cooling	50	FH-attached-04	Single Family Attached	package unit	none	0	0	0	0	0	NA	NA
Cooling	49	FH-attached-03	Single Family Attached	package unit	none	0	0	0	0	0	NA	NA
Cooling	51	FH-attached-05	Single Family Attached	electric air cool heat pump	none	0	0	0	0	0	NA	NA
Cooling	43	FH-Detached-04	Single Family Detached	package unit	none	0	0	0	0	0	NA	NA
Cooling	46	FH-Detached-03	Single Family Detached	package unit	none	0	0	0	0	0	NA	NA

Table 3.6a
All Building EKOs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Cooling	43	FH-Detached-01	Single Family Detached	package unit	none	0	0	0	0	0	NA	NA
Cooling	47	FH-Detached-07	Single Family Detached	package unit	none	0	0	0	0	0	NA	NA
Cooling	44	FH-Detached-03	Single Family Detached	package unit	none	0	0	0	0	0	NA	NA
Cooling	157	Warehouse-15	Warehouse & Storage	package unit	none	0	0	0	0	0	NA	NA
Cooling	168	Warehouse-03	Warehouse & Storage	package unit	none	0	0	0	0	0	NA	NA
Cooling	159	Warehouse-18	Warehouse & Storage	package unit	none	0	0	0	0	0	NA	NA
Cooling	154	Warehouse-01	Warehouse & Storage	package unit	none	0	0	0	0	0	NA	NA
Cooling	170	Warehouse-04	Warehouse & Storage	package unit	none	0	0	0	0	0	NA	NA
Cooling	168	Warehouse-03	Warehouse & Storage	package unit	none	0	0	0	0	0	NA	NA
Cooling	173	Warehouse-08	Warehouse & Storage	package unit	none	0	0	0	0	0	NA	NA
Cooling	155	Warehouse-11	Warehouse & Storage	package unit	none	0	0	0	0	0	NA	NA
Cooling	160	Warehouse-19	Warehouse & Storage	package unit	none	0	0	0	0	0	NA	NA
Cooling	172	Warehouse-07	Warehouse & Storage	package unit	none	0	0	0	0	0	NA	NA
Cooling	163	Warehouse-23	Warehouse & Storage	package unit	none	0	0	0	0	0	NA	NA
Cooling	171	Warehouse-05	Warehouse & Storage	package unit	none	0	0	0	0	0	NA	NA
Cooling	154	Warehouse-01	Warehouse & Storage	package unit	none	0	0	0	0	0	NA	NA
Cooling	165	Warehouse-25	Warehouse & Storage	package unit	none	0	0	0	0	0	NA	NA
Cooling	158	Warehouse-16	Warehouse & Storage	package unit	none	0	0	0	0	0	NA	NA
Cooling	162	Warehouse-21	Warehouse & Storage	package unit	none	0	0	0	0	0	NA	NA
Heating	38	FH-2 to 4-03	2 to 4 Unit Buildings	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	39	FH-2 to 4-06	2 to 4 Unit Buildings	electric air heat pump	none	0	0	0	0	0	NA	NA
Heating	37	FH-2 to 4-12	2 to 4 Unit Buildings	electric air heat pump	none	0	0	0	0	0	NA	NA
Heating	40	FH-2 to 4-07	2 to 4 Unit Buildings	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	36	FH-2 to 4-10	2 to 4 Unit Buildings	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	35	FH-2 to 4-01	2 to 4 Unit Buildings	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	41	FH-2 to 4-09	2 to 4 Unit Buildings	electric air heat pump	none	0	0	0	0	0	NA	NA
Heating	42	FH-5 or More-01	5 or More Unit Buildings	electric air heat pump	none	0	0	0	0	0	NA	NA
Heating	8	Assembly-20	Assembly	gas conv boiler	Add Automatic Electric Damper	175	1,949	0	1,949	1,774	11.14	1.4
Heating	4	Assembly-16	Assembly	hot water radiator	none	0	0	0	0	0	NA	NA
Heating	4	Assembly-16	Assembly	oil conv boiler	Add Automatic Electric Damper	335	3,526	0	3,526	3,191	10.53	1.5
Heating	12	Assembly-03	Assembly	oil conv boiler	Add Automatic Electric Damper	263	2,880	0	2,880	2,617	10.95	1.4
Heating	14	Assembly-05	Assembly	oil conv boiler	Add Automatic Electric Damper	117	1,149	0	1,149	1,032	9.82	1.6
Heating	2	Assembly-13	Assembly	hot water radiator	none	0	0	0	0	0	NA	NA
Heating	9	Assembly-22	Assembly	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	1	Assembly-10	Assembly	oil conv boiler	Add Automatic Electric Damper	102	713	0	713	611	6.99	2.2
Heating	16	Assembly-08	Assembly	other conv furn	Conventional Gas Furnace	306	853	0	853	547	2.79	5.6
Heating	7	Assembly-02	Assembly	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	13	Assembly-04	Assembly	other conv furn	Conventional Oil Furnace	3,581	4,042	0	4,042	461	1.13	13.8
Heating	16	Assembly-08	Assembly	electric baseboard	none	0	0	0	0	0	NA	NA
Heating	10	Assembly-23	Assembly	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	0	Assembly-01	Assembly	electric air heat pump	none	0	0	0	0	0	NA	NA
Heating	16	Assembly-08	Assembly	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	5	Assembly-18	Assembly	hot water radiator	none	0	0	0	0	0	NA	NA
Heating	3	Assembly-15	Assembly	other conv furn	none	0	0	0	0	0	NA	NA
Heating	15	Assembly-07	Assembly	other conv furn	none	0	0	0	0	0	NA	NA
Heating	5	Assembly-18	Assembly	other conv furn	Conventional Gas Furnace	1,873	14,776	0	14,776	12,903	7.89	2.0
Heating	11	Assembly-24	Assembly	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	3	Assembly-15	Assembly	oil conv furn	none	0	0	0	0	0	NA	NA
Heating	17	Assembly-09	Assembly	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	9	Assembly-22	Assembly	electric air heat pump	none	0	0	0	0	0	NA	NA
Heating	0	Assembly-01	Assembly	other conv furn	none	0	0	0	0	0	NA	NA
Heating	6	Assembly-19	Assembly	oil conv furn	none	0	0	0	0	0	NA	NA
Heating	1	Assembly-10	Assembly	electric air heat pump	none	0	0	0	0	0	NA	NA
Heating	32	Education-07	Education	oil conv furn	none	0	0	0	0	0	NA	NA
Heating	33	Education-08	Education	other conv furn	Conventional Gas Furnace	5,774	59,005	0	59,005	53,231	10.22	1.5
Heating	30	Education-24	Education	gas conv boiler	Add Automatic Electric Damper	172	2,391	0	2,391	2,219	13.90	1.1
Heating	28	Education-22	Education	other conv furn	Conventional Gas Furnace	540	6,009	0	6,009	5,469	11.13	1.4
Heating	32	Education-07	Education	other conv furn	Conventional Oil Furnace	1,565	5,319	0	5,319	3,754	3.40	4.6
Heating	29	Education-23	Education	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	31	Education-04	Education	other conv boiler	Gas Pulse Condensing Boiler	15,098	49,768	0	49,768	34,670	3.30	4.7
Heating	31	Education-04	Education	gas conv boiler	Add Automatic Electric Damper	225	1,648	0	1,648	1,423	7.32	2.1
Heating	33	Education-08	Education	oil conv boiler	Gas Pulse Condensing Boiler	4,249	5,695	0	5,695	1,446	1.34	11.7
Heating	25	Education-18	Education	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	22	Education-15	Education	other conv furn	High Efficiency LPG Furnace	1,129	1,174	0	1,174	45	1.04	15.0
Heating	28	Education-22	Education	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	24	Education-17	Education	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	21	Education-14	Education	oil conv furn	none	0	0	0	0	0	NA	NA
Heating	19	Education-11	Education	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	26	Education-19	Education	gas conv furn	none	0	0	0	0	0	NA	NA

Table 3.6a
All Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Heating	18	Education-01	Education	other conv furn	none	0	0	0	0	0	NA	NA
Heating	20	Education-12	Education	oil conv boiler	Add Automatic Electric Damper	117	1,189	0	1,189	1,072	10.16	1.5
Heating	27	Education-02	Education	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	34	Education-09	Education	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	33	Education-08	Education	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	23	Education-16	Education	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	25	Education-18	Education	oil conv boiler	Add Automatic Electric Damper	114	1,509	0	1,509	1,395	13.24	1.2
Heating	21	Education-14	Education	other conv furn	Conventional Oil Furnace	526	1,944	0	1,944	1,418	3.70	4.2
Heating	24	Education-17	Education	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	32	Food Sales-01	Food Sales	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	63	Food Service-09	Food Service	other conv furn	none	0	0	0	0	0	NA	NA
Heating	62	Food Service-08	Food Service	other conv furn	none	0	0	0	0	0	NA	NA
Heating	58	Food Service-17	Food Service	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	53	Food Service-01	Food Service	other conv furn	none	0	0	0	0	0	NA	NA
Heating	60	Food Service-04	Food Service	other conv furn	none	0	0	0	0	0	NA	NA
Heating	56	Food Service-13	Food Service	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	61	Food Service-07	Food Service	hot water radiator	none	0	0	0	0	0	NA	NA
Heating	57	Food Service-15	Food Service	oil conv boiler	Add Automatic Electric Damper	114	151	0	151	37	1.32	11.8
Heating	59	Food Service-02	Food Service	other conv furn	none	0	0	0	0	0	NA	NA
Heating	54	Food Service-11	Food Service	hot water radiator	none	0	0	0	0	0	NA	NA
Heating	55	Food Service-12	Food Service	oil conv furn	none	0	0	0	0	0	NA	NA
Heating	66	Health Care-03	Health Care	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	67	Health Care-04	Health Care	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	68	Health Care-06	Health Care	hot water radiator	none	0	0	0	0	0	NA	NA
Heating	64	Health Care-01	Health Care	other conv furn	none	0	0	0	0	0	NA	NA
Heating	67	Health Care-04	Health Care	other conv boiler	Gas Pulse Condensing Boiler	6,940	24,694	0	24,694	17,754	3.56	4.4
Heating	65	Health Care-02	Health Care	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	69	Health Care-07	Health Care	hot water fan coil	New Conventional Individual Building Gas Boiler	5,174	9,655	0	9,655	4,481	1.87	8.4
Heating	79	Lodging-05	Lodging	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	73	Lodging-12	Lodging	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	70	Lodging-01	Lodging	other conv furn	none	0	0	0	0	0	NA	NA
Heating	78	Lodging-02	Lodging	oil conv furn	Conventional Gas Furnace	1,528	3,168	0	3,168	1,640	2.07	7.5
Heating	72	Lodging-11	Lodging	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	71	Lodging-10	Lodging	other conv furn	none	0	0	0	0	0	NA	NA
Heating	77	Lodging-19	Lodging	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	80	Lodging-07	Lodging	oil conv boiler	none	0	0	0	0	0	NA	NA
Heating	81	Lodging-08	Lodging	other conv furn	none	0	0	0	0	0	NA	NA
Heating	74	Lodging-13	Lodging	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	78	Lodging-02	Lodging	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	80	Lodging-07	Lodging	other conv furn	Conventional Oil Furnace	84,970	94,238	0	94,238	9,268	1.11	14.1
Heating	78	Lodging-02	Lodging	other conv furn	Conventional Gas Furnace	509	2,867	0	2,867	2,358	5.63	2.8
Heating	76	Lodging-16	Lodging	gas conv boiler	Add Automatic Electric Damper	259	2,650	0	2,650	2,391	10.23	1.5
Heating	75	Lodging-15	Lodging	gas conv boiler	Add Automatic Electric Damper	111	744	0	744	633	6.70	2.3
Heating	146	Service-01	Mercantile & Service	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	147	Service-03	Mercantile & Service	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	149	Service-05	Mercantile & Service	electric air heat pump	none	0	0	0	0	0	NA	NA
Heating	153	Service-09	Mercantile & Service	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	148	Service-04	Mercantile & Service	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	152	Service-08	Mercantile & Service	oil conv boiler	none	0	0	0	0	0	NA	NA
Heating	150	Service-06	Mercantile & Service	other conv furn	Conventional Gas Furnace	247	360	0	360	113	1.46	10.7
Heating	148	Service-04	Mercantile & Service	other conv furn	Conventional Gas Furnace	429	1,556	0	1,556	1,127	3.63	4.3
Heating	150	Service-06	Mercantile & Service	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	146	Service-01	Mercantile & Service	other conv furn	Conventional Gas Furnace	477	1,261	0	1,261	784	2.64	5.9
Heating	151	Service-07	Mercantile & Service	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	100	Office-03	Office	oil conv boiler	Add Automatic Electric Damper	535	3,526	0	3,526	2,991	6.59	2.4
Heating	102	Office-31	Office	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	104	Office-35	Office	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	103	Office-34	Office	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	83	Office-01g	Office	other conv furn	Conventional Oil Furnace	616	681	0	681	65	1.11	14.1
Heating	92	Office-02	Office	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	100	Office-03	Office	other conv furn	Conventional Oil Furnace	1,848	4,607	0	4,607	2,759	2.49	6.3
Heating	99	Office-29	Office	oil conv furn	none	0	0	0	0	0	NA	NA
Heating	107	Office-44	Office	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	109	Office-48	Office	oil conv boiler	Add Automatic Electric Damper	146	2,660	0	2,660	2,514	18.22	0.9
Heating	91	Office-18	Office	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	84	Office-10	Office	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	82	Office-01	Office	other conv furn	Conventional Gas Furnace	1,359	3,576	0	3,576	2,217	2.63	5.9
Heating	95	Office-21	Office	oil conv boiler	Add Automatic Electric Damper	205	1,908	0	1,908	1,703	[illegible]	1.7
Heating	110	Office-49	Office	other conv furn	Conventional Gas Furnace	437	1,473	0	1,473	1,036	3.37	4.6

Table 3.6a
All Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Heating	92	Office-02	Office	oil conv boiler	Add Automatic Electric Damper	466	621	0	621	161	1.35	11.6
Heating	105	Office-37	Office	oil conv boiler	Add Automatic Electric Damper	83	250	0	250	167	3.01	5.2
Heating	87	Office-15	Office	oil conv furn	Conventional Gas Furnace	3,383	3,802	0	3,802	419	1.12	13.9
Heating	110	Office-09	Office	oil conv furn	Conventional Gas Furnace	1,747	2,170	0	2,170	423	1.24	12.6
Heating	90	Office-17	Office	oil conv boiler	Add Automatic Electric Damper	114	1,184	0	1,184	1,070	10.39	1.5
Heating	110	Office-09	Office	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	105	Office-37	Office	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	96	Office-22	Office	oil conv boiler	Add Automatic Electric Damper	105	1,210	0	1,210	1,105	11.52	1.4
Heating	107	Office-04	Office	oil conv boiler	Gas Pulse Condensing Boiler	4,564	5,717	0	5,717	1,153	1.25	12.5
Heating	85	Office-13	Office	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	96	Office-22	Office	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	92	Office-02	Office	other conv furn	Conventional Gas Furnace	1,739	4,905	0	4,905	3,166	2.82	5.5
Heating	86	Office-14	Office	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	101	Office-30	Office	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	89	Office-16	Office	other conv furn	none	0	0	0	0	0	NA	NA
Heating	107	Office-04	Office	other conv furn	Conventional Gas Furnace	2,040	13,187	0	13,187	11,147	6.46	2.4
Heating	84	Office-10	Office	other conv furn	Conventional Gas Furnace	1,001	8,163	0	8,163	7,162	8.15	1.9
Heating	108	Office-07	Office	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	98	Office-28	Office	oil conv furn	none	0	0	0	0	0	NA	NA
Heating	94	Office-20	Office	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	97	Office-26	Office	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	82	Office-01	Office	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	82	Office-01	Office	electric air heat pump	none	0	0	0	0	0	NA	NA
Heating	98	Office-28	Office	other conv furn	none	0	0	0	0	0	NA	NA
Heating	93	Office-02g	Office	other conv furn	none	0	0	0	0	0	NA	NA
Heating	87	Office-15	Office	other conv furn	Conventional Gas Furnace	1,879	5,733	0	5,733	3,854	3.05	5.1
Heating	88	Office-15ng	Office	other conv furn	none	0	0	0	0	0	NA	NA
Heating	106	Office-38	Office	other conv furn	none	0	0	0	0	0	NA	NA
Heating	98	Office-28	Office	electric forced air furN/Ace	Conventional Oil Furnace	466	813	0	813	347	1.74	9.0
Heating	82	Office-01	Office	oil conv furn	none	0	0	0	0	0	NA	NA
Heating	130	Other-32	Other	oil conv boiler	Add Automatic Electric Damper	297	636	0	636	339	2.14	7.3
Heating	140	Other-09g	Other	other conv furn	none	0	0	0	0	0	NA	NA
Heating	137	Other-07	Other	oil conv boiler	Add Automatic Electric Damper	119	536	0	536	417	4.50	3.5
Heating	139	Other-09	Other	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	122	Other-23	Other	other conv furn	Conventional Gas Furnace	164	458	0	458	294	2.79	5.6
Heating	111	Other-01	Other	oil conv furn	Conventional Gas Furnace	845	1,155	0	1,155	310	1.37	11.4
Heating	126	Other-29	Other	oil conv furn	none	0	0	0	0	0	NA	NA
Heating	139	Other-09	Other	oil conv furn	Conventional Gas Furnace	471	682	0	682	211	1.45	10.8
Heating	138	Other-08	Other	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	112	Other-01g	Other	other conv furn	none	0	0	0	0	0	NA	NA
Heating	134	Other-41	Other	oil conv boiler	Add Automatic Electric Damper	192	1,456	0	1,456	1,264	7.58	2.1
Heating	118	Other-18	Other	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	120	Other-02	Other	oil conv furn	Conventional Gas Furnace	478	906	0	906	428	1.90	8.2
Heating	120	Other-02	Other	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	130	Other-32	Other	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	111	Other-01	Other	other conv furn	Conventional Gas Furnace	2,113	7,660	0	7,660	5,547	3.63	4.3
Heating	137	Other-07	Other	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	114	Other-13	Other	oil conv furn	none	0	0	0	0	0	NA	NA
Heating	135	Other-42	Other	gas conv boiler	Add Automatic Electric Damper	164	1,070	0	1,070	906	6.52	2.4
Heating	115	Other-16	Other	oil conv boiler	none	0	0	0	0	0	NA	NA
Heating	121	Other-20	Other	other conv furn	Conventional Gas Furnace	1,667	5,874	0	5,874	4,207	3.52	4.4
Heating	116	Other-17	Other	other conv furn	Conventional Gas Furnace	693	1,693	0	1,693	1,000	2.44	6.4
Heating	139	Other-09	Other	other conv furn	Conventional Gas Furnace	1,885	6,954	0	6,954	5,069	3.69	4.2
Heating	117	Other-17ng	Other	other conv furn	none	0	0	0	0	0	NA	NA
Heating	131	Other-36	Other	oil conv boiler	none	0	0	0	0	0	NA	NA
Heating	113	Other-10	Other	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	132	Other-37	Other	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	128	Other-30	Other	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	136	Other-05	Other	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	121	Other-20	Other	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	122	Other-23	Other	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	116	Other-17	Other	electric baseboard	none	0	0	0	0	0	NA	NA
Heating	123	Other-24	Other	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	127	Other-03	Other	oil conv boiler	Add Automatic Electric Damper	82	141	0	141	59	1.72	9.1
Heating	129	Other-31	Other	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	119	Other-19	Other	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	116	Other-17	Other	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	130	Other-32	Other	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	133	Other-38	Other	hot water fan coil	none	0	0	0	0	0	NA	NA

Table 3.0a
All Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Heating	114	Other-15	Other	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	124	Other-26	Other	oil conv boiler	Add Automatic Electric Damper	105	138	0	138	33	1.31	11.9
Heating	122	Other-23	Other	oil conv furn	Conventional Gas Furnace	492	510	0	510	18	1.04	15.1
Heating	123	Other-24	Other	oil conv furn	Conventional Gas Furnace	221	227	0	227	6	1.03	15.2
Heating	116	Other-17	Other	oil conv furn	none	0	0	0	0	0	NA	NA
Heating	126	Other-29	Other	electric baseboard	none	0	0	0	0	0	NA	NA
Heating	131	Other-36	Other	hot water fan coil	none	0	0	0	0	0	NA	NA
Heating	142	Public Order-02	Public Order Safety	other conv furn	none	0	0	0	0	0	NA	NA
Heating	145	Public Order-05	Public Order Safety	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	144	Public Order-04	Public Order Safety	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	143	Public Order-03	Public Order Safety	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	141	Public Order-01	Public Order Safety	oil conv furn	Conventional Gas Furnace	565	1,682	0	1,682	1,117	2.98	5.2
Heating	48	FH-attached-01	Single Family Attached	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	49	FH-attached-03	Single Family Attached	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	51	FH-attached-05	Single Family Attached	electric air heat pump	none	0	0	0	0	0	NA	NA
Heating	50	FH-attached-04	Single Family Attached	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	46	FH-Detached-05	Single Family Detached	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	42	FH-Detached-01	Single Family Detached	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	44	FH-Detached-03	Single Family Detached	other conv furn	none	0	0	0	0	0	NA	NA
Heating	47	FH-Detached-07	Single Family Detached	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	45	FH-Detached-04	Single Family Detached	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	168	Warehouse-03	Warehouse & Storage	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	163	Warehouse-23	Warehouse & Storage	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	165	Warehouse-25	Warehouse & Storage	other conv furn	none	0	0	0	0	0	NA	NA
Heating	160	Warehouse-19	Warehouse & Storage	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	158	Warehouse-16	Warehouse & Storage	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	155	Warehouse-11	Warehouse & Storage	oil conv furn	none	0	0	0	0	0	NA	NA
Heating	169	Warehouse-30	Warehouse & Storage	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	168	Warehouse-03	Warehouse & Storage	other conv furn	Conventional Gas Furnace	1,061	1,474	0	1,474	413	1.39	11.2
Heating	163	Warehouse-23	Warehouse & Storage	oil conv furn	none	0	0	0	0	0	NA	NA
Heating	164	Warehouse-24	Warehouse & Storage	hot water radiator	none	0	0	0	0	0	NA	NA
Heating	171	Warehouse-03	Warehouse & Storage	oil conv boiler	none	0	0	0	0	0	NA	NA
Heating	168	Warehouse-03	Warehouse & Storage	oil conv boiler	none	0	0	0	0	0	NA	NA
Heating	170	Warehouse-04	Warehouse & Storage	other conv furn	Conventional Gas Furnace	2,389	6,586	0	6,586	4,197	2.76	5.7
Heating	154	Warehouse-01	Warehouse & Storage	oil conv furn	none	0	0	0	0	0	NA	NA
Heating	154	Warehouse-01	Warehouse & Storage	other conv furn	Conventional Gas Furnace	4,363	6,155	0	6,155	1,792	1.41	11.1
Heating	157	Warehouse-15	Warehouse & Storage	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	162	Warehouse-21	Warehouse & Storage	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	159	Warehouse-18	Warehouse & Storage	other conv furn	none	0	0	0	0	0	NA	NA
Heating	167	Warehouse-29	Warehouse & Storage	oil conv furn	none	0	0	0	0	0	NA	NA
Heating	170	Warehouse-04	Warehouse & Storage	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	156	Warehouse-12	Warehouse & Storage	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	163	Warehouse-23	Warehouse & Storage	other conv furn	none	0	0	0	0	0	NA	NA
Heating	173	Warehouse-08	Warehouse & Storage	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	165	Warehouse-25	Warehouse & Storage	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	157	Warehouse-15	Warehouse & Storage	other conv furn	Conventional Gas Furnace	332	393	0	393	61	1.18	13.2
Heating	172	Warehouse-07	Warehouse & Storage	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	166	Warehouse-26	Warehouse & Storage	gas conv furn	none	0	0	0	0	0	NA	NA
Heating	154	Warehouse-01	Warehouse & Storage	gas conv furn	none	0	0	0	0	0	NA	NA
Hot Water	40	FH-2 to 4-07	2 to 4 Unit Buildings	gas shw heater	0.85 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	9,676	13,532	0	13,532	3,856	1.40	11.2
Hot Water	38	FH-2 to 4-03	2 to 4 Unit Buildings	electric shw heater	0.85 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	281	5,604	0	5,604	5,323	19.94	0.8
Hot Water	39	FH-2 to 4-06	2 to 4 Unit Buildings	electric shw heater	Better Elec. WH (RES), Ins. Pipe, LFSHs, Aer., Lower Tank Temp	5,056	31,394	0	31,394	26,338	6.21	2.5
Hot Water	38	FH-2 to 4-03	2 to 4 Unit Buildings	gas shw heater	Wrap Old Gas Tank w. Ins., Ins. Pipe, LFSHs, Aerators	12,925	41,890	0	41,890	28,965	3.24	4.8
Hot Water	36	FH-2 to 4-10	2 to 4 Unit Buildings	gas shw heater	Wrap Old Gas Tank w. Ins., Ins. Pipe, LFSHs, Aerators	29,444	78,081	0	78,081	48,637	2.65	5.9
Hot Water	41	FH-2 to 4-09	2 to 4 Unit Buildings	electric shw heater	Better Elec. WH (RES), Ins. Pipe, LFSHs, Aer., Lower Tank Temp	936	2,803	0	2,803	1,867	2.99	5.2
Hot Water	35	FH-2 to 4-01	2 to 4 Unit Buildings	electric shw heater	0.85 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	2,734	31,268	0	31,268	28,534	11.44	1.4
Hot Water	37	FH-2 to 4-12	2 to 4 Unit Buildings	electric shw heater	Better Elec. WH (RES), Ins. Pipe, LFSHs, Aer., Lower Tank Temp	12,439	100,412	0	100,412	87,973	8.07	1.9
Hot Water	36	FH-2 to 4-10	2 to 4 Unit Buildings	electric shw heater	0.85 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	1,341	16,535	0	16,535	15,194	12.33	1.3
Hot Water	33	FH-2 to 4-01	2 to 4 Unit Buildings	gas shw heater	0.85 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	84	141	0	141	57	1.68	9.3
Hot Water	42	FH-5 or More-01	5 or More Unit Buildings	electric shw heater	Better Elec. WH (RES), Ins. Pipe, LFSHs, Aer., Lower Tank Temp	5,867	20,282	0	20,282	14,415	3.46	4.5
Hot Water	10	Assembly-23	Assembly	hot water central heat	none	0	0	0	0	0	NA	NA
Hot Water	6	Assembly-19	Assembly	oil shw heater	Wrap Old Oil Tank, Ins., Pipe, LFSHs, Aer., Lower Tank Temp	792	2,065	0	2,065	1,273	2.61	6.0
Hot Water	5	Assembly-18	Assembly	hot water central heat	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	3,353	38,724	0	38,724	35,171	10.60	1.4
Hot Water	4	Assembly-16	Assembly	oil central boiler	Oil, Wrap Tank w. Insulation, LFSHs, Aerators	519	31,936	0	31,936	31,426	62.62	0.2
Hot Water	9	Assembly-22	Assembly	electric shw heater	Wrap Old Electric Tank w. Ins., Ins. Pipe, LFSHs, Aeration	104	157	0	157	53	1.51	10.3
Hot Water	13	Assembly-04	Assembly	other shw heater	Better Elec. WH (COM), Ins. Pipe, LFSHs, Aer., Lower Tank Temp	2,942	2,936	0	2,936	294	1.11	14.1
Hot Water	17	Assembly-09	Assembly	gas shw heater	Wrap Old Gas Tank, Ins., Pipe, LFSHs, Aer., Lower Tank Temp	540	1,223	0	1,223	683	2.26	6.9
Hot Water	11	Assembly-24	Assembly	hot water central heat	none	0	0	0	0	0	NA	NA
Hot Water	14	Assembly-03	Assembly	oil central boiler	Oil, Wrap Tank w. Insulation, LFSHs, Aerators	245	17,274	0	17,274	17,029	70.51	0.2

Table 3.6a
All Building ERCs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings w/ Invest Ratio	Discounted Payback
Hot Water	0	Assembly-01	Assembly	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	948	3,899	0	3,899	2,951	4.11	3.8
Hot Water	9	Assembly-22	Assembly	gas shw heater	none	0	0	0	0	0	NA	NA
Hot Water	8	Assembly-20	Assembly	gas shw heater	none	0	0	0	0	0	NA	NA
Hot Water	1	Assembly-10	Assembly	electric shw heater	Wrap Old Electric Tank w/ Ins , Ins Pipe, LFSHs, Aerators	159	960	0	960	801	6.04	2.6
Hot Water	12	Assembly-03	Assembly	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	496	19,047	0	19,047	18,551	38.40	0.4
Hot Water	2	Assembly-13	Assembly	hot water central haer	none	0	0	0	0	0	NA	NA
Hot Water	5	Assembly-18	Assembly	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	498	1,845	0	1,845	1,347	3.70	4.2
Hot Water	4	Assembly-16	Assembly	hot water central haer	none	0	0	0	0	0	NA	NA
Hot Water	1	Assembly-10	Assembly	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	86	4,197	0	4,197	4,111	48.80	0.3
Hot Water	7	Assembly-02	Assembly	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	70	160	0	160	90	2.29	6.8
Hot Water	19	Education-11	Education	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	356	1,822	0	1,822	1,466	5.12	3.1
Hot Water	20	Education-12	Education	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	120	6,761	0	6,761	6,641	56.34	0.3
Hot Water	32	Education-07	Education	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	335	16,246	0	16,246	15,911	48.50	0.3
Hot Water	24	Education-17	Education	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	1,712	13,053	0	13,053	13,341	8.79	1.8
Hot Water	33	Education-08	Education	other shw heater	0.76 Gas WH (COM), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	4,613	12,378	0	12,378	7,765	2.68	3.8
Hot Water	26	Education-19	Education	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	1,202	2,037	0	2,037	835	1.69	9.2
Hot Water	27	Education-02	Education	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	238	900	0	900	662	3.78	4.1
Hot Water	33	Education-08	Education	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	468	6,874	0	6,874	6,406	14.69	1.1
Hot Water	34	Education-09	Education	hot water central haer	none	0	0	0	0	0	NA	NA
Hot Water	32	Education-07	Education	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	79	634	0	634	555	8.03	1.9
Hot Water	24	Education-17	Education	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	203	376	0	376	173	1.85	8.4
Hot Water	33	Education-08	Education	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	175	688	0	688	513	3.93	4.0
Hot Water	31	Education-04	Education	other shw heater	0.76 Gas WH (COM), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	2,203	5,317	0	5,317	3,114	2.41	6.5
Hot Water	22	Education-15	Education	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	65	256	0	256	191	3.94	4.0
Hot Water	29	Education-23	Education	hot water central haer	none	0	0	0	0	0	NA	NA
Hot Water	30	Education-24	Education	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	1,380	2,236	0	2,236	856	1.62	9.6
Hot Water	25	Education-18	Education	hot water central haer	none	0	0	0	0	0	NA	NA
Hot Water	18	Education-01	Education	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	389	2,372	0	2,372	1,983	6.10	2.6
Hot Water	25	Education-18	Education	oil central boiler	Oil Wrap Tank w/ Insulation, LFSHs, Aerators	143	10,217	0	10,217	10,072	70.46	0.2
Hot Water	28	Education-22	Education	gas shw heater	none	0	0	0	0	0	NA	NA
Hot Water	31	Education-04	Education	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	408	1,496	0	1,496	1,088	3.67	4.3
Hot Water	21	Education-14	Education	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	70	4,080	0	4,080	4,010	58.29	0.3
Hot Water	52	Food Sales-01	Food Sales	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	1,127	2,440	0	2,440	1,313	2.17	7.2
Hot Water	56	Food Service-13	Food Service	gas shw heater	none	0	0	0	0	0	NA	NA
Hot Water	55	Food Service-12	Food Service	oil shw heater	Wrap Old Oil Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	487	676	0	676	189	1.39	11.3
Hot Water	53	Food Service-01	Food Service	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	910	3,801	0	3,801	2,891	4.18	3.7
Hot Water	57	Food Service-15	Food Service	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	459	31,468	0	31,468	31,009	68.56	0.2
Hot Water	58	Food Service-17	Food Service	gas central boiler	Gas Wrap Tank w Insulation, LFSHs, Aerators	2,631	124,625	0	124,625	121,994	47.37	0.3
Hot Water	59	Food Service-02	Food Service	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	1,980	8,280	0	8,280	6,300	4.18	3.7
Hot Water	60	Food Service-04	Food Service	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	14,034	58,605	0	58,605	44,571	4.18	3.7
Hot Water	54	Food Service-11	Food Service	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	22,402	222,379	0	222,379	199,977	9.93	1.6
Hot Water	61	Food Service-07	Food Service	hot water central haer	none	0	0	0	0	0	NA	NA
Hot Water	63	Food Service-09	Food Service	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	1,140	4,884	0	4,884	3,744	4.28	3.6
Hot Water	62	Food Service-08	Food Service	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	11,498	49,340	0	49,340	37,842	4.29	3.6
Hot Water	69	Health Care-07	Health Care	hot water central haer	Conventional Gas Boiler, Wrap Tank w Insulation, LFSHs, Aerators	104,453	1,047,232	0	1,047,232	942,779	10.03	1.6
Hot Water	65	Health Care-02	Health Care	other shw heater	0.76 Gas WH (COM), Insulate Pipe, Low Flow SHs, Aerators	1,191	1,536	0	1,536	345	1.29	12.1
Hot Water	67	Health Care-04	Health Care	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	1,721	13,945	0	13,945	12,224	8.10	1.9
Hot Water	68	Health Care-06	Health Care	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	4,872	36,125	0	36,125	31,253	7.41	2.1
Hot Water	66	Health Care-03	Health Care	hot water central haer	none	0	0	0	0	0	NA	NA
Hot Water	67	Health Care-04	Health Care	other shw heater	0.76 Gas WH (COM), Insulate Pipe, Low Flow SHs, Aerators	2,549	4,163	0	4,163	1,614	1.63	9.6
Hot Water	78	Lodging-02	Lodging	gas shw heater	Wrap Old Gas Tank w Ins , Ins Pipe, LFSHs, Aerators	533	2,056	0	2,056	1,523	3.86	4.0
Hot Water	75	Lodging-15	Lodging	gas central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	2,967	7,908	0	7,908	4,941	3.39	4.6
Hot Water	73	Lodging-12	Lodging	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	4,077	82,546	0	82,546	78,469	20.25	0.8
Hot Water	74	Lodging-13	Lodging	hot water central haer	none	0	0	0	0	0	NA	NA
Hot Water	72	Lodging-11	Lodging	hot water central haer	none	0	0	0	0	0	NA	NA
Hot Water	79	Lodging-05	Lodging	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	3,699	16,344	0	16,344	12,645	4.42	3.5
Hot Water	78	Lodging-02	Lodging	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	1,681	39,210	0	39,210	37,529	23.33	0.7
Hot Water	76	Lodging-16	Lodging	gas central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	2,735	31,370	0	31,370	28,635	11.47	1.4
Hot Water	77	Lodging-19	Lodging	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	13,686	148,804	0	148,804	135,118	10.87	1.4
Hot Water	147	Service-03	Mercantile & Service	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	2,210	24,921	0	24,921	22,711	11.28	1.4
Hot Water	150	Service-06	Mercantile & Service	gas shw heater	none	0	0	0	0	0	NA	NA
Hot Water	151	Service-07	Mercantile & Service	hot water central haer	none	0	0	0	0	0	NA	NA
Hot Water	152	Service-08	Mercantile & Service	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	317	21,136	0	21,136	20,823	67.33	0.2
Hot Water	146	Service-01	Mercantile & Service	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	91	255	0	255	164	2.86	5.6
Hot Water	83	Office-01g	Office	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	198	760	0	760	562	3.84	4.4
Hot Water	97	Office-26	Office	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	2,389	27,726	0	27,726	25,337	10.79	1.4
Hot Water	106	Office-38	Office	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	218	596	0	596	378	2.73	5.7
Hot Water	107	Office-04	Office	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	110	515	0	515	405	4.68	3.3
Hot Water	100	Office-03	Office	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	243	13,851	0	13,851	13,608	57.05	0.3

Table 3.6a
All Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Hot Water	85	Office-13	Office	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	187	596	0	596	409	3.19	4.9
Hot Water	82	Office-01	Office	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	74	599	0	599	525	8.09	1.9
Hot Water	89	Office-16	Office	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	124	554	0	554	430	4.47	3.5
Hot Water	88	Office-15ug	Office	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	1,032	4,413	0	4,413	3,381	4.28	3.7
Hot Water	98	Office-28	Office	oil central boiler	Oil Wrap Tank w/ Insulation, LFSHs, Aerators	32	3,104	0	3,104	3,032	99.69	0.3
Hot Water	90	Office-17	Office	oil central boiler	Oil Wrap Tank w/ Insulation, LFSHs, Aerators	59	2,414	0	2,414	2,355	40.92	0.4
Hot Water	86	Office-14	Office	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	916	3,666	0	3,666	2,750	4.00	3.9
Hot Water	82	Office-01	Office	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	74	267	0	262	188	3.54	4.4
Hot Water	92	Office-02	Office	oil shw heater	Wrap Old Oil Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	120	426	0	426	306	3.55	4.4
Hot Water	104	Office-35	Office	hot water central haer	none	0	0	0	0	0	NA	NA
Hot Water	93	Office-02g	Office	other shw heater	Better Elec WH (COM), Ins Pipe, LFSHs, Aer , Lower Tank Temp	551	606	0	606	55	1.10	14.2
Hot Water	92	Office-02	Office	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	80	135	0	135	55	1.69	9.3
Hot Water	94	Office-20	Office	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	137	172	0	172	35	1.26	12.4
Hot Water	103	Office-34	Office	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	72	84	0	84	12	1.17	13.4
Hot Water	87	Office-15	Office	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	1,536	10,273	0	10,273	8,737	6.69	2.3
Hot Water	105	Office-37	Office	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	605	10,539	0	10,539	9,934	17.42	0.9
Hot Water	84	Office-10	Office	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	48	143	0	143	95	2.98	5.2
Hot Water	96	Office-22	Office	hot water central haer	none	0	0	0	0	0	NA	NA
Hot Water	91	Office-18	Office	hot water central haer	none	0	0	0	0	0	NA	NA
Hot Water	109	Office-08	Office	oil central boiler	Oil Wrap Tank w/ Insulation, LFSHs, Aerators	312	11,574	0	11,574	11,262	37.10	0.4
Hot Water	105	Office-37	Office	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	1,211	12,566	0	12,566	11,355	10.38	1.5
Hot Water	101	Office-30	Office	gas shw heater	none	0	0	0	0	0	NA	NA
Hot Water	96	Office-22	Office	oil central boiler	Oil Wrap Tank w/ Insulation, LFSHs, Aerators	69	4,551	0	4,551	4,482	65.96	0.2
Hot Water	107	Office-04	Office	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	55	113	0	113	58	2.05	7.6
Hot Water	95	Office-21	Office	oil central boiler	Oil Wrap Tank w/ Insulation, LFSHs, Aerators	98	6,389	0	6,389	6,291	65.19	0.2
Hot Water	110	Office-09	Office	oil shw heater	Wrap Old Oil Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	76	251	0	251	175	3.30	4.7
Hot Water	102	Office-31	Office	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	754	5,340	0	5,340	4,586	7.08	2.2
Hot Water	100	Office-03	Office	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	71	366	0	366	295	5.15	3.0
Hot Water	84	Office-10	Office	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	48	327	0	327	279	6.81	2.3
Hot Water	92	Office-02	Office	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	160	353	0	353	193	2.21	7.1
Hot Water	82	Office-01	Office	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	2,764	36,146	0	36,146	33,382	13.08	1.2
Hot Water	107	Office-04	Office	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	384	6,020	0	6,020	5,636	15.68	1.0
Hot Water	87	Office-15	Office	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	146	294	0	294	148	2.01	7.8
Hot Water	108	Office-07	Office	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	147	308	0	308	161	2.10	7.5
Hot Water	123	Other-24	Other	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	84	133	0	133	49	1.58	9.9
Hot Water	133	Other-38	Other	hot water central haer	none	0	0	0	0	0	NA	NA
Hot Water	120	Other-02	Other	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	125	238	0	238	113	1.90	8.2
Hot Water	128	Other-30	Other	gas shw heater	none	0	0	0	0	0	NA	NA
Hot Water	129	Other-31	Other	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	294	1,127	0	1,127	833	3.83	4.1
Hot Water	135	Other-42	Other	gas shw heater	none	0	0	0	0	0	NA	NA
Hot Water	115	Other-16	Other	oil central boiler	none	0	0	0	0	0	NA	NA
Hot Water	130	Other-32	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	1,039	21,038	0	21,038	19,999	20.25	0.8
Hot Water	130	Other-32	Other	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	2,429	23,826	0	23,826	21,397	9.81	1.6
Hot Water	113	Other-10	Other	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	118	316	0	316	198	2.68	5.8
Hot Water	119	Other-19	Other	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	73	139	0	139	66	1.90	8.2
Hot Water	112	Other-01g	Other	oil shw heater	0.80 Oil WH (COM), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	15,035	50,823	0	50,823	35,788	3.38	4.6
Hot Water	139	Other-09	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	52	409	0	409	357	7.87	2.0
Hot Water	124	Other-26	Other	oil central boiler	Oil Wrap Tank w/ Insulation, LFSHs, Aerators	36	1,483	0	1,483	1,447	41.19	0.4
Hot Water	127	Other-03	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	257	2,777	0	2,777	2,520	10.81	1.4
Hot Water	134	Other-41	Other	oil central boiler	Oil Wrap Tank w/ Insulation, LFSHs, Aerators	170	9,486	0	9,486	9,316	55.80	0.3
Hot Water	131	Other-36	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	385	9,038	0	9,038	8,653	23.48	0.7
Hot Water	131	Other-36	Other	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	772	9,271	0	9,271	8,499	12.01	1.3
Hot Water	117	Other-17ug	Other	oil shw heater	0.80 Oil WH (COM), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	26,683	164,667	0	164,667	137,984	6.17	2.5
Hot Water	125	Other-27	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	338	7,050	0	7,050	6,712	20.86	0.7
Hot Water	137	Other-07	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	285	6,281	0	6,281	5,996	22.04	0.7
Hot Water	138	Other-08	Other	hot water central haer	none	0	0	0	0	0	NA	NA
Hot Water	116	Other-17	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	475	2,090	0	2,090	1,615	4.40	3.6
Hot Water	145	Public Order-05	Public Order Safety	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	346	651	0	651	305	1.88	8.3
Hot Water	50	FH-attached-04	Single Family Attached	gas shw heater	none	0	0	0	0	0	NA	NA
Hot Water	49	FH-attached-03	Single Family Attached	gas shw heater	none	0	0	0	0	0	NA	NA
Hot Water	51	FH-attached-05	Single Family Attached	electric shw heater	Wrap Old Electric Tank w/ Ins , Ins Pipe, LFSHs, Aerators	15,630	82,022	0	82,022	66,392	5.25	3.0
Hot Water	48	FH-attached-01	Single Family Attached	electric shw heater	0.76 Gas WH (RES), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	14,624	71,303	0	71,303	56,679	4.88	3.2
Hot Water	43	FH-Detached-01	Single Family Detached	gas shw heater	0.85 Gas WH (RES), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	118	241	0	241	123	2.04	7.6
Hot Water	46	FH-Detached-03	Single Family Detached	gas shw heater	Wrap Old Gas Tank w/ Ins , Ins Pipe, LFSHs, Aerators	452	468	0	468	16	1.04	15.1
Hot Water	47	FH-Detached-07	Single Family Detached	gas shw heater	none	0	0	0	0	0	NA	NA
Hot Water	43	FH-Detached-01	Single Family Detached	electric shw heater	0.85 Gas WH (RES), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	118	1,695	0	1,695	1,577	14.36	1.1
Hot Water	45	FH-Detached-04	Single Family Detached	gas shw heater	none	0	0	0	0	0	NA	NA
Hot Water	44	FH-Detached-03	Single Family Detached	other shw heater	0.85 LPG WH (RES), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	65	147	0	147	82	2.26	6.6
Hot Water	165	Warehouse-25	Warehouse & Storage	gas shw heater	none	0	0	0	0	0	NA	NA

Table 3.6a
All Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Hot Water	168	Warehouse-03	Warehouse & Storage	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	239	413	0	413	174	1 73	9 0
Hot Water	168	Warehouse-03	Warehouse & Storage	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	253	3,578	0	3,578	3,325	14 14	1 1
Hot Water	164	Warehouse-24	Warehouse & Storage	hot water central heat	none	0	0	0	0	0	NA	NA
Hot Water	171	Warehouse-05	Warehouse & Storage	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	10	389	0	389	379	38 90	0 4
Hot Water	163	Warehouse-23	Warehouse & Storage	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	284	1,926	0	1,926	1,642	6 78	2 3
Lights	39	FH-2 to 4-06	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	44,858	76,224	49,638	125,862	81,004	2 81	5 6
Lights	41	FH-2 to 4-09	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	10,404	17,569	11,640	29,149	18,745	2 80	5 6
Lights	37	FH-2 to 4-12	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	13,269	20,401	11,334	31,735	18,466	2 39	6 5
Lights	40	FH-2 to 4-07	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	38,180	96,593	37,417	134,010	95,830	3 51	4 5
Lights	40	FH-2 to 4-07	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL173 CFL 27 INTEGRAL UNIT	26,214	101,114	63,298	164,412	138,198	6 27	2 5
Lights	36	FH-2 to 4-10	2 to 4 Unit Buildings	IN9 INC 2-75 CEIL	none	0	0	0	0	0	NA	NA
Lights	35	FH-2 to 4-01	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	23,014	41,701	25,748	67,449	44,435	2 93	5 3
Lights	40	FH-2 to 4-07	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	2,608	10,522	3,167	13,689	13,081	6 02	2 6
Lights	36	FH-2 to 4-10	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL173 CFL 27 INTEGRAL UNIT	14,519	56,744	35,059	91,803	77,284	6 32	2 5
Lights	39	FH-2 to 4-06	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	13,530	17,626	8,523	26,149	12,619	1 93	8 1
Lights	40	FH-2 to 4-07	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	20,453	25,653	13,236	38,889	18,436	1 90	8 2
Lights	36	FH-2 to 4-10	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	60,231	103,927	67,386	171,313	111,082	2 84	5 5
Lights	37	FH-2 to 4-12	2 to 4 Unit Buildings	FL5 FL 1X4 1F40T12 STD1	none	0	0	0	0	0	NA	NA
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	31,310	39,857	26,750	66,607	35,291	2 13	7 3
Lights	36	FH-2 to 4-10	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	50,055	130,015	49,053	179,068	129,013	3 58	4 4
Lights	41	FH-2 to 4-09	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	13,623	17,569	11,637	29,146	15,523	2 14	7 3
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN9 INC 2-75 CEIL	none	0	0	0	0	0	NA	NA
Lights	35	FH-2 to 4-01	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL173 CFL 27 INTEGRAL UNIT	2,852	11,872	6,886	18,758	15,906	6 58	2 4
Lights	35	FH-2 to 4-01	2 to 4 Unit Buildings	IN9 INC 2-75 CEIL	none	0	0	0	0	0	NA	NA
Lights	40	FH-2 to 4-07	2 to 4 Unit Buildings	IN9 INC 2-75 CEIL	none	0	0	0	0	0	NA	NA
Lights	37	FH-2 to 4-12	2 to 4 Unit Buildings	IN9 INC 2-75 CEIL	none	0	0	0	0	0	NA	NA
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL173 CFL 27 INTEGRAL UNIT	1,450	5,985	3,502	9,487	8,037	6 54	2 4
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN10 INC 3-75 CEIL	none	0	0	0	0	0	NA	NA
Lights	36	FH-2 to 4-10	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	1,514	7,213	3,000	10,213	8,699	6 75	2 3
Lights	35	FH-2 to 4-01	2 to 4 Unit Buildings	IN10 INC 3-75 CEIL	none	0	0	0	0	0	NA	NA
Lights	37	FH-2 to 4-12	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	84,749	155,618	94,817	250,435	165,686	2 96	5 3
Lights	40	FH-2 to 4-07	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	111,717	188,830	124,988	313,818	202,101	2 81	5 6
Lights	37	FH-2 to 4-12	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	36,917	54,473	23,890	78,363	41,446	2 12	7 4
Lights	36	FH-2 to 4-10	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	26,595	32,141	17,210	49,351	22,756	1 86	8 4
Lights	41	FH-2 to 4-09	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	1,010	3,432	2,001	5,433	4,423	5 38	2 9
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	12,519	15,859	8,101	23,960	11,441	1 91	8 2
Lights	35	FH-2 to 4-01	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	10,408	14,291	6,735	21,026	10,618	2 02	7 7
Lights	37	FH-2 to 4-12	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL173 CFL 27 INTEGRAL UNIT	2,255	10,333	5,444	15,977	13,722	7 09	2 2
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	2,326	8,837	4,608	13,445	11,119	5 78	2 7
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	35,741	60,727	39,987	100,714	64,973	2 82	5 5
Lights	41	FH-2 to 4-09	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	3,138	3,689	2,031	5,720	2,582	1 82	8 6
Lights	37	FH-2 to 4-12	2 to 4 Unit Buildings	FL4 FL 1X4 2F40T12 STD2	FL52 FL 1X4 2F32T8 ELC2	16,683	12,623	7,626	20,249	3,566	1 21	12 9
Lights	39	FH-2 to 4-06	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	4,355	16,903	8,397	25,300	20,945	5 81	2 7
Lights	39	FH-2 to 4-06	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	58,740	76,224	49,626	125,850	67,110	2 14	7 3
Lights	42	FH-5 or More-01	5 or More Unit Buildings	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	13,941	18,086	11,909	29,995	16,054	2 15	7 3
Lights	42	FH-5 or More-01	5 or More Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	16,409	22,370	10,619	32,989	16,580	2 01	7 8
Lights	42	FH-5 or More-01	5 or More Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	32,366	57,348	36,211	93,559	61,193	2 89	5 4
Lights	42	FH-5 or More-01	5 or More Unit Buildings	FL4 FL 1X4 2F40T12 STD2	FL52 FL 1X4 2F32T8 ELC2	12,656	8,990	5,786	14,776	2,120	1 17	13 4
Lights	42	FH-5 or More-01	5 or More Unit Buildings	FL5 FL 1X4 1F40T12 STD1	none	0	0	0	0	0	NA	NA
Lights	8	Assembly-20	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	13,251	17,598	7,382	24,980	11,729	1 89	8 3
Lights	3	Assembly-15	Assembly	FL79 FL 2X4 4F40T12ES STD2	none	0	0	0	0	0	NA	NA
Lights	6	Assembly-19	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5,402	9,871	7,206	17,077	11,675	3 16	4 9
Lights	13	Assembly-07	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	1,355	1,718	1,556	3,274	1,919	2 42	6 5
Lights	15	Assembly-07	Assembly	FL81 FL 2X4 2F40T12ES STD2	none	0	0	0	0	0	NA	NA
Lights	7	Assembly-02	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	480	891	641	1,532	1,052	3 19	4 9
Lights	0	Assembly-01	Assembly	FL81 FL 2X4 2F40T12ES STD2	none	0	0	0	0	0	NA	NA
Lights	13	Assembly-04	Assembly	FL79 FL 2X4 4F40T12ES STD2	none	0	0	0	0	0	NA	NA
Lights	13	Assembly-04	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	21,869	17,482	15,036	32,518	10,709	1 49	10 5
Lights	9	Assembly-22	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5,401	8,092	7,205	15,207	9,806	2 82	5 5
Lights	9	Assembly-22	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	7,646	4,550	4,435	8,985	1,339	1 18	13 3
Lights	14	Assembly-05	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	3,110	2,918	1,681	4,599	1,489	1 48	10 6
Lights	12	Assembly-03	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	6,689	9,498	5,508	15,006	8,326	2 25	7 0
Lights	2	Assembly-13	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	2,916	3,316	2,023	5,339	2,423	1 83	8 5
Lights	16	Assembly-08	Assembly	FL81 FL 2X4 2F40T12ES STD2	none	0	0	0	0	0	NA	NA
Lights	6	Assembly-19	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	6,120	10,899	4,815	15,714	9,594	2 57	6 1
Lights	10	Assembly-23	Assembly	FL81 FL 2X4 2F40T12ES STD2	none	0	0	0	0	0	NA	NA
Lights	16	Assembly-08	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,095	1,685	1,461	3,146	2,051	2 87	5 4
Lights	12	Assembly-03	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	8,347	6,521	4,842	11,363	3,016	1 36	11 5
Lights	7	Assembly-02	Assembly	FL81 FL 2X4 2F40T12ES STD2	none	0	0	0	0	0	NA	NA

Table 3.6a
All Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Lights	13	Assembly-04	Assembly	FL81: FL 2X4 2F40T12ES STD2	none	0	0	0	0	0	NA	NA
Lights	3	Assembly-15	Assembly	FL81: FL 2X4 2F40T12ES STD2	none	0	0	0	0	0	NA	NA
Lights	0	Assembly-01	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	8,061	4,573	3,822	8,395	334	1.04	15.0
Lights	14	Assembly-05	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	2,197	4,256	2,931	7,187	4,990	3.27	4.8
Lights	2	Assembly-13	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	2,574	4,076	3,434	7,510	4,936	2.92	5.4
Lights	11	Assembly-24	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	3,930	5,282	3,241	8,523	4,593	2.17	7.2
Lights	2	Assembly-13	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	3,644	2,187	2,033	4,220	576	1.16	13.5
Lights	17	Assembly-09	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	4,577	4,878	3,674	8,552	3,975	1.87	8.4
Lights	3	Assembly-15	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,337	2,183	1,783	3,966	2,629	2.97	5.3
Lights	12	Assembly-03	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	5,896	10,333	7,866	18,199	12,303	3.09	5.1
Lights	15	Assembly-07	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	231	299	308	607	376	2.63	5.9
Lights	7	Assembly-02	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	2,820	4,154	2,596	6,750	3,930	2.39	6.5
Lights	10	Assembly-23	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,512	2,486	2,017	4,503	2,991	2.98	5.2
Lights	6	Assembly-19	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	7,648	7,541	4,004	11,545	3,897	1.51	10.3
Lights	14	Assembly-05	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	2,489	4,253	1,970	6,223	3,734	2.50	6.2
Lights	1	Assembly-10	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	2,771	4,159	3,697	7,856	5,085	2.84	5.5
Lights	9	Assembly-22	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	6,118	6,657	5,045	11,702	5,584	1.91	8.2
Lights	4	Assembly-16	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	11,556	10,424	6,703	17,127	5,571	1.48	10.5
Lights	10	Assembly-23	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	1,713	1,391	1,142	2,533	820	1.48	10.6
Lights	1	Assembly-10	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	3,923	2,775	2,276	5,051	1,128	1.29	12.1
Lights	16	Assembly-08	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	1,241	687	584	1,271	30	1.02	15.3
Lights	1	Assembly-10	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	3,140	4,064	2,621	6,685	3,545	2.13	7.3
Lights	11	Assembly-24	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	3,469	6,599	4,628	11,227	7,758	3.24	4.8
Lights	17	Assembly-09	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	4,040	6,108	5,390	11,498	7,458	2.85	5.5
Lights	13	Assembly-04	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	3,716	6,090	4,957	11,047	7,331	2.97	5.3
Lights	3	Assembly-15	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	7,845	8,581	5,733	14,314	6,469	1.82	8.6
Lights	16	Assembly-08	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	6,429	6,744	5,680	12,424	5,995	1.93	8.1
Lights	7	Assembly-02	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	544	366	256	622	78	1.14	13.7
Lights	4	Assembly-16	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	9,247	14,713	7,721	22,434	13,187	2.43	6.4
Lights	15	Assembly-07	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	262	169	177	346	84	1.32	11.8
Lights	11	Assembly-24	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	4,911	3,418	2,849	6,267	1,356	1.28	12.2
Lights	17	Assembly-09	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	5,720	3,328	3,190	6,518	798	1.14	13.7
Lights	5	Assembly-18	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	14,255	11,995	8,268	20,263	6,008	1.42	11.0
Lights	0	Assembly-01	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	7,115	9,817	9,492	19,309	12,194	2.71	5.8
Lights	1	Assembly-10	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	16,265	42,007	20,999	63,006	46,741	3.87	4.0
Lights	6	Assembly-19	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	31,704	119,740	53,397	173,337	141,633	5.47	2.9
Lights	12	Assembly-03	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	34,604	99,654	42,512	142,166	107,562	4.11	3.8
Lights	4	Assembly-16	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	8,162	15,997	10,889	26,886	18,724	3.29	4.7
Lights	5	Assembly-18	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	11,407	16,740	9,524	26,264	14,857	2.30	6.8
Lights	10	Assembly-23	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	8,875	14,485	9,634	24,119	15,244	2.72	5.7
Lights	9	Assembly-22	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	31,697	70,734	38,940	109,674	77,977	3.46	4.5
Lights	17	Assembly-09	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	23,713	49,599	26,328	75,927	52,214	3.20	4.9
Lights	0	Assembly-01	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	41,761	52,340	37,903	90,243	48,482	2.16	7.2
Lights	8	Assembly-20	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	9,360	20,097	12,487	32,584	23,224	3.48	4.5
Lights	8	Assembly-20	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	10,604	25,050	9,345	34,395	23,791	3.24	4.8
Lights	11	Assembly-24	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	20,359	58,754	24,739	83,493	63,134	4.10	3.8
Lights	14	Assembly-05	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	12,893	44,691	20,855	65,546	32,653	5.08	3.1
Lights	4	Assembly-16	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	47,906	160,414	61,850	222,264	174,358	4.64	3.4
Lights	5	Assembly-18	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	59,095	176,224	76,295	252,519	193,424	4.27	3.7
Lights	5	Assembly-18	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	10,069	18,311	13,432	31,743	21,674	3.15	5.0
Lights	8	Assembly-20	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	54,935	250,842	106,170	357,012	302,077	6.50	2.4
Lights	2	Assembly-13	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	15,108	33,444	18,277	51,721	36,613	3.42	4.6
Lights	34	Education-09	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,600	2,510	2,135	4,645	3,045	2.90	5.4
Lights	19	Education-11	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	4,841	4,659	3,176	7,835	2,994	1.62	9.7
Lights	31	Education-04	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	6,590	12,236	8,792	21,028	14,438	3.19	4.9
Lights	26	Education-19	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	49,055	34,390	29,595	63,985	14,930	1.30	12.0
Lights	27	Education-02	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,642	2,854	2,190	5,044	3,402	3.07	5.1
Lights	29	Education-23	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,925	3,071	2,568	5,639	3,714	2.93	5.3
Lights	20	Education-12	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,945	3,203	2,595	5,798	3,853	2.98	5.2
Lights	18	Education-01	Education	FL79: FL 2X4 4F40T12ES STD2	none	0	0	0	0	0	NA	NA
Lights	19	Education-11	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	960	1,464	1,281	2,745	1,785	2.86	5.5
Lights	25	Education-18	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	70,943	70,792	46,545	117,337	46,394	1.65	9.4
Lights	23	Education-16	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	350	550	468	1,018	668	2.91	5.4
Lights	33	Education-08	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	9,378	15,983	12,512	28,495	19,117	3.04	5.1
Lights	30	Education-24	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	12,961	17,366	16,091	33,457	21,396	2.77	5.6
Lights	32	Education-07	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	17,358	19,397	11,643	31,040	13,682	1.79	8.7
Lights	25	Education-18	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	14,072	22,757	18,773	41,530	27,458	2.95	5.3
Lights	31	Education-04	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	33,226	41,376	22,535	63,911	30,685	1.92	8.1
Lights	22	Education-15	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	467	688	623	1,311	844	2.81	5.6

Table 3.6a
All Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Lights		21 Education-14	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,283	1,966	1,712	3,678	2,395	2.87	5.4
Lights		24 Education-17	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	21,094	20,090	14,306	34,396	13,302	1.63	9.6
Lights		23 Education-16	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	1,767	1,895	1,159	3,054	1,287	1.73	9.0
Lights		33 Education-08	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	47,282	52,158	31,715	83,873	36,591	1.77	8.8
Lights		22 Education-15	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	2,354	2,651	1,544	4,195	1,841	1.78	8.8
Lights		18 Education-01	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	2,795	3,289	3,729	7,018	4,223	2.51	6.2
Lights		26 Education-19	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	9,730	15,617	12,981	28,598	18,868	2.94	5.3
Lights		32 Education-07	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	3,443	5,208	4,593	9,801	6,358	2.85	5.5
Lights		24 Education-17	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	4,184	6,163	5,582	11,745	7,561	2.81	5.6
Lights		28 Education-22	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	3,475	5,076	4,635	9,711	6,236	2.79	5.6
Lights		29 Education-23	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	9,704	10,869	6,732	17,601	7,897	1.81	8.6
Lights		21 Education-14	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	6,469	7,436	4,487	11,923	5,454	1.84	8.5
Lights		20 Education-12	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	9,807	12,634	6,802	19,436	9,629	1.98	7.9
Lights		30 Education-24	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	60,809	34,910	38,154	73,064	12,255	1.20	13.0
Lights		28 Education-22	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	17,518	18,060	11,750	29,810	12,292	1.70	9.2
Lights		27 Education-02	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	8,276	10,020	5,551	15,571	7,295	1.88	8.3
Lights		34 Education-09	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	8,068	8,944	5,597	14,541	6,473	1.80	8.7
Lights		52 Food Sales-01	Food Sales	FL62: FL 1X8 2F96T12 STD2	FL131: FL 1X8 2F96T12ES ELC2 REF	104,776	219,031	16,720	235,751	130,975	2.25	6.9
Lights		52 Food Sales-01	Food Sales	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	43,551	154,247	17,073	171,320	127,769	3.93	4.0
Lights		52 Food Sales-01	Food Sales	HS17: HPS 250 PEND	LS5: LPS 135 PEND	32,053	61,707	-6,831	54,876	22,823	1.71	9.1
Lights		52 Food Sales-01	Food Sales	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,624	3,271	2,167	5,438	3,814	3.35	4.7
Lights		61 Food Service-07	Food Service	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	2,204	2,251	453	2,704	500	1.23	12.7
Lights		58 Food Service-17	Food Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	4,687	9,310	6,253	15,563	10,876	3.32	4.7
Lights		53 Food Service-01	Food Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	788	1,362	1,051	2,413	1,625	3.06	5.1
Lights		54 Food Service-11	Food Service	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	12,954	12,849	6,781	19,630	6,676	1.52	10.3
Lights		53 Food Service-01	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	2,869	2,298	1,862	4,160	1,291	1.45	10.8
Lights		62 Food Service-08	Food Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	9,836	17,454	13,122	30,576	20,740	3.11	5.0
Lights		56 Food Service-13	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	1,416	2,323	1,273	3,596	2,180	2.54	6.2
Lights		58 Food Service-17	Food Service	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	10,026	11,034	5,415	16,449	6,423	1.64	9.5
Lights		63 Food Service-09	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	3,554	2,644	2,307	4,951	1,397	1.39	11.2
Lights		54 Food Service-11	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	22,052	39,826	17,234	57,060	35,008	2.59	6.0
Lights		62 Food Service-08	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	35,818	26,374	23,245	49,619	13,801	1.39	11.3
Lights		56 Food Service-13	Food Service	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	832	755	453	1,208	376	1.45	10.8
Lights		55 Food Service-12	Food Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	418	1,004	557	1,561	1,143	3.73	4.2
Lights		58 Food Service-17	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	17,068	34,398	15,609	50,007	32,939	2.93	5.3
Lights		56 Food Service-13	Food Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	389	670	519	1,189	800	3.06	5.1
Lights		60 Food Service-04	Food Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	12,056	19,094	16,084	35,178	23,122	2.92	5.4
Lights		55 Food Service-12	Food Service	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	893	1,022	486	1,508	615	1.69	9.3
Lights		60 Food Service-04	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	43,905	33,014	28,299	61,313	17,408	1.40	11.2
Lights		61 Food Service-07	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	3,752	6,545	1,793	8,338	4,586	2.22	7.0
Lights		63 Food Service-09	Food Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	976	1,572	1,302	2,874	1,898	2.94	5.3
Lights		57 Food Service-15	Food Service	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	3,942	4,383	2,146	6,529	2,587	1.66	9.4
Lights		55 Food Service-12	Food Service	MH33: MH 70 HE PEND	none	0	0	0	0	0	NA	NA
Lights		53 Food Service-01	Food Service	MH33: MH 70 HE PEND	none	0	0	0	0	0	NA	NA
Lights		61 Food Service-07	Food Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,030	2,253	1,375	3,628	2,598	3.52	4.4
Lights		56 Food Service-13	Food Service	MH33: MH 70 HE PEND	none	0	0	0	0	0	NA	NA
Lights		53 Food Service-01	Food Service	FL81: FL 2X4 2F40T12ES STD2	none	0	0	0	0	0	NA	NA
Lights		60 Food Service-04	Food Service	FL81: FL 2X4 2F40T12ES STD2	none	0	0	0	0	0	NA	NA
Lights		62 Food Service-08	Food Service	MH33: MH 70 HE PEND	none	0	0	0	0	0	NA	NA
Lights		54 Food Service-11	Food Service	MH33: MH 70 HE PEND	none	0	0	0	0	0	NA	NA
Lights		59 Food Service-02	Food Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,718	3,140	2,291	5,431	3,713	3.16	4.9
Lights		61 Food Service-07	Food Service	MH33: MH 70 HE PEND	none	0	0	0	0	0	NA	NA
Lights		57 Food Service-15	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	6,711	14,941	6,059	21,000	14,289	3.13	5.0
Lights		57 Food Service-15	Food Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,843	4,291	2,458	6,749	4,906	3.66	4.3
Lights		59 Food Service-02	Food Service	MH33: MH 70 HE PEND	none	0	0	0	0	0	NA	NA
Lights		63 Food Service-09	Food Service	MH33: MH 70 HE PEND	none	0	0	0	0	0	NA	NA
Lights		57 Food Service-15	Food Service	MH33: MH 70 HE PEND	none	0	0	0	0	0	NA	NA
Lights		62 Food Service-08	Food Service	FL81: FL 2X4 2F40T12ES STD2	none	0	0	0	0	0	NA	NA
Lights		63 Food Service-09	Food Service	FL81: FL 2X4 2F40T12ES STD2	none	0	0	0	0	0	NA	NA
Lights		59 Food Service-02	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	6,255	5,046	4,032	9,078	2,823	1.45	10.8
Lights		59 Food Service-02	Food Service	FL81: FL 2X4 2F40T12ES STD2	none	0	0	0	0	0	NA	NA
Lights		60 Food Service-04	Food Service	MH33: MH 70 HE PEND	none	0	0	0	0	0	NA	NA
Lights		54 Food Service-11	Food Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	6,055	13,018	8,078	21,096	15,041	3.48	4.5
Lights		58 Food Service-17	Food Service	MH33: MH 70 HE PEND	none	0	0	0	0	0	NA	NA
Lights		55 Food Service-12	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	1,521	3,365	1,367	4,732	3,211	3.11	5.0
Lights		64 Health Care-01	Health Care	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	712	828	648	1,476	764	2.07	7.5
Lights		66 Health Care-03	Health Care	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	5,380	10,583	4,821	15,404	10,024	2.86	5.5
Lights		67 Health Care-04	Health Care	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	7,321	8,514	3,921	12,440	5,119	1.70	9.2
Lights		67 Health Care-04	Health Care	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	34,441	[illegible]	45,452	155,881	121,440	4.53	3.5

Table 3.6a
All Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Lights	67	Health Care-04	Health Care	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	28,297	57,990	25,897	83,887	55,590	2.96	5.3
Lights	65	Health Care-02	Health Care	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	6,193	8,106	4,315	12,421	6,228	2.01	7.8
Lights	68	Health Care-06	Health Care	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	7,234	7,612	4,012	11,624	4,390	1.61	9.7
Lights	69	Health Care-07	Health Care	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	495,203	1,345,174	537,549	2,082,723	1,587,520	4.21	3.7
Lights	66	Health Care-03	Health Care	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	6,548	19,741	9,186	28,927	22,379	4.42	3.5
Lights	69	Health Care-07	Health Care	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	128,118	223,070	76,509	299,579	171,461	2.34	6.7
Lights	69	Health Care-07	Health Care	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	24,467	50,952	32,640	83,592	59,125	3.42	4.6
Lights	65	Health Care-02	Health Care	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	306	551	408	959	653	3.13	5.0
Lights	66	Health Care-03	Health Care	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	1,392	1,563	797	2,360	968	1.70	9.2
Lights	65	Health Care-02	Health Care	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	1,602	1,145	894	2,039	437	1.27	12.3
Lights	68	Health Care-06	Health Care	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,381	2,695	1,843	4,538	3,157	3.29	4.8
Lights	64	Health Care-01	Health Care	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	866	1,424	1,028	2,452	1,586	2.83	5.5
Lights	68	Health Care-06	Health Care	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	34,032	99,031	42,579	141,610	107,578	4.16	3.8
Lights	66	Health Care-03	Health Care	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	266	460	355	815	549	3.06	5.1
Lights	67	Health Care-04	Health Care	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,398	2,869	1,865	4,734	3,336	3.39	4.6
Lights	68	Health Care-06	Health Care	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	27,960	52,896	25,839	78,735	50,775	2.82	5.5
Lights	69	Health Care-07	Health Care	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	602,728	2,919,411	1,042,899	3,962,310	3,359,582	6.57	2.4
Lights	65	Health Care-02	Health Care	IN5: INC 60 CEIL	FL174: CFL 18 GLOBE UNIT	3,352	13,809	3,762	17,571	14,219	5.24	3.0
Lights	64	Health Care-01	Health Care	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	184	120	99	219	35	1.19	13.1
Lights	73	Lodging-12	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	14,780	25,552	19,718	45,270	30,490	3.06	5.1
Lights	74	Lodging-13	Lodging	IN23: INC 60 WALL	FL174: CFL 18 GLOBE UNIT	2,473	8,333	3,100	11,433	8,962	4.62	3.4
Lights	81	Lodging-08	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	2,358	3,766	3,146	6,912	4,554	2.93	5.3
Lights	77	Lodging-19	Lodging	IN15: INC 60 TABLE LAMP	FL174: CFL 18 GLOBE UNIT	3,673	11,292	4,582	15,874	12,201	4.32	3.6
Lights	74	Lodging-13	Lodging	FL5: FL 1X4 1F40T12 STD1	none	0	0	0	0	0	NA	NA
Lights	72	Lodging-11	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	116,955	206,490	156,028	362,518	245,563	3.10	5.0
Lights	76	Lodging-16	Lodging	IN23: INC 60 WALL	FL174: CFL 18 GLOBE UNIT	1,143	4,137	1,440	5,577	4,434	4.88	3.2
Lights	73	Lodging-12	Lodging	IN15: INC 60 TABLE LAMP	FL181: CFL 13 + BLST UNIT	4,739	7,318	3,922	11,240	6,501	2.37	6.6
Lights	71	Lodging-10	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	34,470	47,454	45,985	93,439	58,969	2.71	5.8
Lights	73	Lodging-12	Lodging	IN23: INC 60 WALL	FL174: CFL 18 GLOBE UNIT	1,989	6,142	2,493	8,635	6,646	4.34	3.6
Lights	75	Lodging-15	Lodging	FL5: FL 1X4 1F40T12 STD1	FL29: FL 1X4 1F40T12 ELC1	2,072	1,158	1,070	2,228	156	1.08	14.5
Lights	76	Lodging-16	Lodging	FL5: FL 1X4 1F40T12 STD1	none	0	0	0	0	0	NA	NA
Lights	72	Lodging-11	Lodging	IN23: INC 60 WALL	FL174: CFL 18 GLOBE UNIT	15,736	40,412	19,730	60,142	44,406	3.82	4.1
Lights	80	Lodging-07	Lodging	FL5: FL 1X4 1F40T12 STD1	none	0	0	0	0	0	NA	NA
Lights	78	Lodging-02	Lodging	IN23: INC 60 WALL	FL174: CFL 18 GLOBE UNIT	435	1,485	542	2,027	1,592	4.66	3.4
Lights	72	Lodging-11	Lodging	FL5: FL 1X4 1F40T12 STD1	none	0	0	0	0	0	NA	NA
Lights	70	Lodging-01	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,024	1,445	1,366	2,811	1,787	2.75	5.7
Lights	74	Lodging-13	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	18,378	31,724	24,517	56,241	37,863	3.06	5.1
Lights	74	Lodging-13	Lodging	IN15: INC 60 TABLE LAMP	FL174: CFL 18 GLOBE UNIT	2,620	8,960	3,285	12,245	9,625	4.67	3.3
Lights	75	Lodging-15	Lodging	IN15: INC 60 TABLE LAMP	FL181: CFL 13 + BLST UNIT	855	1,629	809	2,438	1,583	2.85	5.5
Lights	76	Lodging-16	Lodging	IN15: INC 60 TABLE LAMP	FL174: CFL 18 GLOBE UNIT	1,211	4,472	1,526	5,998	4,787	4.95	3.2
Lights	75	Lodging-15	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	2,668	4,703	3,559	8,262	5,594	3.10	5.0
Lights	79	Lodging-05	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	20,576	31,746	27,450	59,196	38,620	2.88	5.4
Lights	78	Lodging-02	Lodging	FL5: FL 1X4 1F40T12 STD1	none	0	0	0	0	0	NA	NA
Lights	73	Lodging-12	Lodging	FL5: FL 1X4 1F40T12 STD1	none	0	0	0	0	0	NA	NA
Lights	75	Lodging-15	Lodging	IN23: INC 60 WALL	FL181: CFL 13 + BLST UNIT	807	1,469	763	2,223	1,416	2.75	5.7
Lights	79	Lodging-05	Lodging	IN15: INC 60 TABLE LAMP	FL174: CFL 18 GLOBE UNIT	2,933	7,439	3,678	11,117	8,184	3.79	4.1
Lights	77	Lodging-19	Lodging	FL5: FL 1X4 1F40T12 STD1	none	0	0	0	0	0	NA	NA
Lights	79	Lodging-05	Lodging	IN23: INC 60 WALL	FL174: CFL 18 GLOBE UNIT	2,768	7,419	3,471	10,890	8,122	3.93	4.0
Lights	78	Lodging-02	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	3,232	6,162	4,312	10,474	7,242	3.24	4.8
Lights	81	Lodging-08	Lodging	FL5: FL 1X4 1F40T12 STD1	none	0	0	0	0	0	NA	NA
Lights	71	Lodging-10	Lodging	IN23: INC 60 WALL	FL174: CFL 18 GLOBE UNIT	4,638	4,288	2,889	7,177	2,539	1.55	10.1
Lights	70	Lodging-01	Lodging	IN15: INC 60 TABLE LAMP	FL174: CFL 18 GLOBE UNIT	146	156	91	247	101	1.69	9.2
Lights	80	Lodging-07	Lodging	IN15: INC 60 TABLE LAMP	FL174: CFL 18 GLOBE UNIT	8,104	9,907	5,049	14,956	6,852	1.85	8.5
Lights	71	Lodging-10	Lodging	FL5: FL 1X4 1F40T12 STD1	none	0	0	0	0	0	NA	NA
Lights	79	Lodging-05	Lodging	FL5: FL 1X4 1F40T12 STD1	none	0	0	0	0	0	NA	NA
Lights	70	Lodging-01	Lodging	IN23: INC 60 WALL	FL174: CFL 18 GLOBE UNIT	138	145	86	231	93	1.67	9.3
Lights	80	Lodging-07	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	56,844	91,946	75,834	167,780	110,936	2.95	5.3
Lights	72	Lodging-11	Lodging	IN15: INC 60 TABLE LAMP	FL174: CFL 18 GLOBE UNIT	16,673	47,617	20,905	68,522	51,849	4.11	3.8
Lights	77	Lodging-19	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	25,767	43,369	34,375	77,744	51,977	3.02	5.2
Lights	77	Lodging-19	Lodging	IN23: INC 60 WALL	FL174: CFL 18 GLOBE UNIT	3,467	10,478	4,324	14,802	11,335	4.27	3.7
Lights	70	Lodging-01	Lodging	FL5: FL 1X4 1F40T12 STD1	none	0	0	0	0	0	NA	NA
Lights	71	Lodging-10	Lodging	IN15: INC 60 TABLE LAMP	FL174: CFL 18 GLOBE UNIT	4,914	4,618	3,062	7,680	2,766	1.56	10.0
Lights	80	Lodging-07	Lodging	IN23: INC 60 WALL	FL174: CFL 18 GLOBE UNIT	7,648	9,658	4,765	14,423	6,775	1.89	8.3
Lights	76	Lodging-16	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	8,495	14,765	11,333	26,098	17,603	3.07	5.1
Lights	81	Lodging-08	Lodging	IN23: INC 60 WALL	FL174: CFL 18 GLOBE UNIT	317	980	297	780	463	2.46	6.3
Lights	81	Lodging-08	Lodging	IN15: INC 60 TABLE LAMP	FL174: CFL 18 GLOBE UNIT	336	694	212	816	480	2.43	6.4
Lights	78	Lodging-02	Lodging	IN15: INC 60 TABLE LAMP	FL174: CFL 18 GLOBE UNIT	461	1,384	555	2,159	1,698	4.68	3.3
Lights	153	Service-09	Mercantile & Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	191	436	255	685	494	3.59	4.4
Lights	153	Service-09	Mercantile & Service	MV3: MERC 100 PEND	none	0	0	0	0	0	NA	NA

Table 3.6a
All Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Lights	146	Service-01	Mercantile & Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	12,167	28,297	12,186	40,483	28,316	3.33	4.7
Lights	151	Service-07	Mercantile & Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	490	876	653	1,529	1,039	3.12	5.0
Lights	149	Service-05	Mercantile & Service	MV3: MERC 100 PEND	none	0	0	0	0	0	NA	NA
Lights	148	Service-04	Mercantile & Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	274	546	366	912	638	3.33	4.7
Lights	153	Service-09	Mercantile & Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	2,831	7,361	2,835	10,196	7,365	3.60	4.3
Lights	150	Service-06	Mercantile & Service	MV3: MERC 100 PEND	none	0	0	0	0	0	NA	NA
Lights	146	Service-01	Mercantile & Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	821	1,466	1,095	2,561	1,740	3.12	5.0
Lights	150	Service-06	Mercantile & Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	9,126	18,060	8,202	26,262	17,136	2.88	5.4
Lights	149	Service-05	Mercantile & Service	IN39: INC 150 FLD	HS31: HPS 70 FLD	30,215	44,774	61,376	106,150	75,935	3.51	4.4
Lights	150	Service-06	Mercantile & Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	616	1,329	821	2,150	1,534	3.49	4.5
Lights	146	Service-01	Mercantile & Service	MV3: MERC 100 PEND	none	0	0	0	0	0	NA	NA
Lights	151	Service-07	Mercantile & Service	IN39: INC 150 FLD	HS31: HPS 70 FLD	67,057	80,812	136,212	217,024	149,967	3.24	4.8
Lights	150	Service-06	Mercantile & Service	IN39: INC 150 FLD	HS31: HPS 70 FLD	84,325	93,371	144,659	238,030	153,705	2.82	5.5
Lights	152	Service-08	Mercantile & Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	3,242	6,913	4,325	11,238	7,996	3.47	4.5
Lights	148	Service-04	Mercantile & Service	IN39: INC 150 FLD	HS31: HPS 70 FLD	37,570	51,569	76,316	127,885	90,315	3.40	4.6
Lights	149	Service-05	Mercantile & Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	3,270	8,731	3,273	12,006	8,736	3.67	4.3
Lights	149	Service-05	Mercantile & Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	221	455	294	749	528	3.39	4.6
Lights	152	Service-08	Mercantile & Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	48,048	112,499	48,119	160,618	112,570	3.34	4.7
Lights	152	Service-08	Mercantile & Service	IN39: INC 150 FLD	HS31: HPS 70 FLD	443,954	570,867	901,799	1,472,666	1,028,712	3.32	4.7
Lights	151	Service-07	Mercantile & Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	7,257	15,801	7,268	23,069	15,812	3.18	4.9
Lights	147	Service-03	Mercantile & Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,620	3,042	2,161	5,203	3,583	3.21	4.9
Lights	146	Service-01	Mercantile & Service	IN39: INC 150 FLD	HS31: HPS 70 FLD	112,426	144,985	228,370	373,355	260,929	3.32	4.7
Lights	147	Service-03	Mercantile & Service	HS19: HPS 400 PEND	none	0	0	0	0	0	NA	NA
Lights	148	Service-04	Mercantile & Service	MV3: MERC 100 PEND	none	0	0	0	0	0	NA	NA
Lights	151	Service-07	Mercantile & Service	MV3: MERC 100 PEND	none	0	0	0	0	0	NA	NA
Lights	148	Service-04	Mercantile & Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	4,066	10,162	4,072	14,234	10,168	3.50	4.5
Lights	153	Service-09	Mercantile & Service	IN39: INC 150 FLD	HS31: HPS 70 FLD	26,160	37,097	53,139	90,236	64,076	3.45	4.5
Lights	152	Service-08	Mercantile & Service	MV3: MERC 100 PEND	none	0	0	0	0	0	NA	NA
Lights	106	Office-38	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	27,381	51,264	21,400	72,664	45,283	2.65	5.9
Lights	100	Office-03	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	1,450	2,030	227	2,257	807	1.56	10.0
Lights	99	Office-29	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	48	38	10	48	0	1.00	15.6
Lights	97	Office-26	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	66,741	101,637	31,890	133,527	66,786	2.00	7.8
Lights	103	Office-34	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	100	125	21	146	46	1.46	10.7
Lights	94	Office-20	Office	FL62: FL 1X8 2F96T12 STD2	none	0	0	0	0	0	NA	NA
Lights	98	Office-28	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	2,160	4,190	400	4,590	2,430	2.13	7.4
Lights	108	Office-07	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	17,236	31,019	3,246	34,265	17,029	1.99	7.9
Lights	106	Office-38	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	5,544	12,595	7,396	19,991	14,447	3.61	4.3
Lights	98	Office-28	Office	FL82: FL 1X4 2F40T12ES STD2	none	0	0	0	0	0	NA	NA
Lights	99	Office-29	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	1,064	1,770	193	1,963	899	1.84	8.5
Lights	89	Office-16	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	6,467	5,861	3,006	8,867	2,400	1.37	11.4
Lights	92	Office-02	Office	FL116: FL 1X8 2F96T12ES STD2	none	0	0	0	0	0	NA	NA
Lights	93	Office-02g	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	6,637	6,048	3,206	9,254	2,617	1.39	11.2
Lights	96	Office-22	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	13,944	15,653	1,028	16,681	2,737	1.20	13.1
Lights	97	Office-26	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	13,512	24,912	18,027	42,939	29,427	3.18	4.9
Lights	102	Office-31	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,497	2,649	1,997	4,646	3,149	3.10	5.0
Lights	110	Office-09	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,397	2,948	1,863	4,811	3,414	3.44	4.5
Lights	94	Office-20	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	2,258	5,296	418	5,624	3,366	2.49	6.3
Lights	94	Office-20	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	3,140	6,343	4,189	10,532	7,392	3.35	4.7
Lights	104	Office-35	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	11,388	23,874	2,192	26,066	14,678	2.29	6.8
Lights	109	Office-08	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	23,929	29,337	7,096	36,433	12,504	1.52	10.3
Lights	85	Office-13	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	8,122	13,642	1,530	15,172	7,050	1.87	8.4
Lights	87	Office-15	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	8,859	8,903	653	9,556	697	1.08	14.5
Lights	83	Office-01g	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,980	3,415	2,641	6,056	4,076	3.06	5.1
Lights	106	Office-38	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	1,198	1,602	355	1,957	759	1.63	9.6
Lights	100	Office-03	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	49,499	87,216	9,323	96,539	47,040	1.95	8.0
Lights	83	Office-01g	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	10,783	10,392	4,820	15,212	4,429	1.41	11.1
Lights	95	Office-21	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	4,504	7,671	848	8,519	4,015	1.89	8.3
Lights	84	Office-10	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,106	2,261	1,475	3,736	2,630	3.38	4.6
Lights	93	Office-02g	Office	FL116: FL 1X8 2F96T12ES STD2	none	0	0	0	0	0	NA	NA
Lights	90	Office-17	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	934	1,957	1,325	3,282	2,288	3.30	4.7
Lights	95	Office-21	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	202	196	45	241	39	1.19	13.1
Lights	96	Office-22	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	77,844	123,017	14,661	137,678	59,834	1.77	8.8
Lights	82	Office-01	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	40,849	68,703	7,398	76,101	35,252	1.86	8.4
Lights	104	Office-35	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	15,839	30,155	21,131	51,286	35,447	3.24	4.8
Lights	100	Office-03	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	5,414	11,127	7,223	18,350	12,936	3.39	4.6
Lights	99	Office-29	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	882	1,778	1,177	2,955	2,073	3.35	4.7
Lights	109	Office-08	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	1,732	2,991	795	3,786	2,054	2.19	7.1
Lights	104	Office-35	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	75,234	113,471	38,261	151,732	75,498	1.97	8.0
Lights	85	Office-13	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	888	1,689	1,185	2,874	1,986	3.24	4.8

Table 3.6a
All Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Lights	108	Office-07	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,885	4,015	2,515	6,530	4,645	3.46	4.5
Lights	102	Office-31	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	1,076	2,155	199	2,354	1,278	2.19	7.1
Lights	87	Office-15	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	2,393	4,493	3,193	7,686	5,293	3.21	4.9
Lights	104	Office-35	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	857	679	190	869	12	1.01	15.4
Lights	101	Office-30	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	4,166	8,233	771	9,004	4,838	2.16	7.2
Lights	91	Office-18	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	3,903	3,763	224	3,987	84	1.02	15.3
Lights	86	Office-14	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	2,363	3,243	942	4,185	1,822	1.77	8.8
Lights	103	Office-34	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,848	4,472	2,465	6,937	5,089	3.75	4.2
Lights	109	Office-08	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	6,465	14,525	8,625	23,150	16,685	3.58	4.4
Lights	89	Office-16	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,167	1,749	1,584	3,333	2,146	2.81	5.6
Lights	105	Office-37	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	44,119	67,937	20,747	88,684	44,565	2.01	7.8
Lights	97	Office-26	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	16,304	26,376	2,966	29,342	13,038	1.80	8.7
Lights	83	Office-01g	Office	FL116 FL 1X8 2F96T12ES STD2	none	0	0	0	0	0	NA	NA
Lights	100	Office-03	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	20,040	20,850	1,477	22,327	2,287	1.11	14.0
Lights	109	Office-08	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	59,104	122,625	23,103	145,728	86,624	2.47	6.3
Lights	102	Office-31	Office	FL82 FL 1X4 2F40T12ES STD2	none	0	0	0	0	0	NA	NA
Lights	91	Office-18	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,054	1,889	1,407	3,296	2,242	3.13	5.0
Lights	82	Office-01	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	16,538	16,476	1,172	17,648	1,110	1.07	14.6
Lights	107	Office-04	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	2,664	5,153	3,553	8,706	6,042	3.27	4.8
Lights	102	Office-31	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	7,393	10,961	3,477	13,538	6,145	1.83	8.5
Lights	94	Office-20	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	13,511	24,615	7,294	31,909	16,398	2.06	7.6
Lights	103	Office-34	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	2,230	4,043	404	4,447	2,217	1.99	7.8
Lights	98	Office-28	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	3,004	5,029	4,008	9,037	6,033	3.01	5.2
Lights	86	Office-14	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	80,633	136,228	27,484	163,712	83,079	2.03	7.7
Lights	108	Office-07	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	6,978	7,629	514	8,143	1,165	1.17	13.4
Lights	99	Office-29	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	4,357	6,878	2,049	8,927	4,570	2.05	7.6
Lights	93	Office-02g	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,218	1,785	1,625	3,410	2,192	2.80	5.6
Lights	93	Office-02g	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	326	199	145	344	18	1.06	14.8
Lights	94	Office-20	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	170	150	36	186	16	1.09	14.3
Lights	97	Office-26	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	2,921	3,375	168	3,543	622	1.21	12.9
Lights	82	Office-01	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	1,197	1,588	180	1,768	571	1.48	10.6
Lights	105	Office-37	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	10,778	17,585	1,952	19,537	8,759	1.81	8.6
Lights	96	Office-22	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	3,493	3,029	774	3,803	310	1.09	14.3
Lights	83	Office-01g	Office	FL3 FL 2X4 2F40T12 STD2	none	0	0	0	0	0	NA	NA
Lights	88	Office-15ng	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	9,683	15,957	12,918	28,875	19,192	2.98	5.2
Lights	92	Office-02	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	1,060	1,284	160	1,444	384	1.36	11.5
Lights	96	Office-22	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	64,516	121,227	86,069	207,296	142,780	3.21	4.9
Lights	90	Office-17	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	266	368	42	410	144	1.54	10.1
Lights	102	Office-31	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	324	360	23	383	59	1.18	13.2
Lights	103	Office-34	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	399	513	28	541	142	1.36	11.5
Lights	108	Office-07	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	505	661	79	740	235	1.47	10.7
Lights	85	Office-13	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	3,288	3,281	242	3,523	235	1.07	14.6
Lights	106	Office-38	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	300	277	157	434	134	1.45	10.8
Lights	86	Office-14	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	8,820	16,602	11,766	28,368	19,548	3.22	4.9
Lights	95	Office-21	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	807	959	59	1,018	211	1.26	12.4
Lights	101	Office-30	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	28,619	38,443	13,458	51,901	23,282	1.81	8.6
Lights	97	Office-26	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	731	698	150	848	117	1.16	13.5
Lights	82	Office-01	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	4,468	9,100	5,961	15,061	10,593	3.37	4.6
Lights	106	Office-38	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	6,689	13,577	2,280	15,857	9,168	2.37	6.6
Lights	103	Office-34	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	9,127	15,395	4,292	19,687	10,560	2.16	7.2
Lights	107	Office-04	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	14,510	29,534	2,686	32,220	17,710	2.22	7.0
Lights	86	Office-14	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	32,643	33,529	9,681	43,210	10,565	1.32	11.8
Lights	95	Office-21	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	18,439	29,693	9,018	38,711	20,272	2.10	7.4
Lights	98	Office-28	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	649	664	46	710	61	1.09	14.3
Lights	110	Office-09	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	5,170	5,175	366	5,541	371	1.07	14.6
Lights	107	Office-04	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	714	869	107	916	202	1.28	12.2
Lights	93	Office-21	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	3,733	7,548	4,980	12,528	8,795	3.36	4.7
Lights	84	Office-10	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	296	430	45	475	179	1.60	9.7
Lights	110	Office-09	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	7,669	16,397	1,408	17,805	10,196	2.34	6.7
Lights	91	Office-18	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	282	367	40	407	125	1.44	10.8
Lights	84	Office-10	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	10,110	16,780	1,831	18,611	8,501	1.84	8.5
Lights	101	Office-30	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	1,252	1,261	89	1,350	98	1.08	14.3
Lights	89	Office-16	Office	FL116 FL 1X8 2F96T12ES STD2	none	0	0	0	0	0	NA	NA
Lights	85	Office-13	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	248	305	37	342	104	1.44	10.9
Lights	104	Office-35	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	3,424	3,574	252	3,926	502	1.15	13.6
Lights	98	Office-28	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	14,838	20,039	6,978	27,017	12,179	1.82	8.6
Lights	88	Office-15ng	Office	FL3 FL 2X4 2F40T12 STD2	none	0	0	0	0	0	NA	NA
Lights	99	Office-29	Office	FL62 FL 1X8 2F96T12 STD2	none	0	0	0	0	0	NA	NA
Lights	107	Office-04	Office	FL116 FL 1X8 2F96T12ES STD2	none	0	0	0	0	0	NA	NA

Table 3.6a
All Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Lights		89 Office-16	Office	FL3 FL 2X4 2F40T12 STD2	none	0	0	0	0	0	NA	NA
Lights		101 Office-30	Office	FL82 FL 1X4 2F40T12ES STD2	none	0	0	0	0	0	NA	NA
Lights		88 Office-15ng	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	52,747	49,581	25,171	74,752	22,005	1.42	11.0
Lights		91 Office-18	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	5,744	12,291	1,035	13,326	7,582	2.32	6.7
Lights		87 Office-15	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	641	803	100	903	262	1.41	11.1
Lights		84 Office-10	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	4,093	4,098	290	4,388	295	1.07	14.6
Lights		105 Office-37	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	1,931	2,346	137	2,483	552	1.29	12.1
Lights		105 Office-37	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	8,932	18,754	11,917	30,671	21,739	3.43	4.5
Lights		92 Office-02	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	21,548	43,507	3,988	47,495	25,947	2.20	7.1
Lights		88 Office-15ng	Office	FL116 FL 1X8 2F96T12ES STD2	none	0	0	0	0	0	NA	NA
Lights		87 Office-15	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	21,881	36,111	4,121	40,232	18,351	1.84	8.5
Lights		90 Office-17	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	3,677	3,838	271	4,109	432	1.12	14.0
Lights		101 Office-30	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5,794	10,024	7,730	17,754	11,960	3.06	5.1
Lights		96 Office-22	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	318,658	465,347	155,843	621,190	302,532	1.95	8.0
Lights		110 Office-09	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	374	561	56	617	243	1.65	9.5
Lights		90 Office-17	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	9,083	15,580	1,711	17,211	8,128	1.89	8.2
Lights		105 Office-37	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	484	466	103	569	85	1.18	13.3
Lights		92 Office-02	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	3,956	6,731	5,277	12,008	8,052	3.04	5.1
Lights		111 Other-01	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	943	597	547	1,144	201	1.21	12.9
Lights		139 Other-09	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5,185	8,583	6,917	15,500	10,315	2.99	5.2
Lights		140 Other-09g	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	626	1,752	705	2,457	1,831	3.92	4.0
Lights		133 Other-38	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	141,347	271,490	78,893	350,383	209,036	2.48	6.3
Lights		139 Other-09	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1,067	680	619	1,299	232	1.22	12.8
Lights		116 Other-17	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	57	91	32	123	66	2.16	7.2
Lights		136 Other-05	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	926	1,768	1,235	3,003	2,077	3.24	4.8
Lights		116 Other-17	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	2,548	4,038	3,400	7,438	4,890	2.92	5.4
Lights		127 Other-03	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	600	1,823	652	2,475	1,875	4.13	3.8
Lights		126 Other-29	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	1,503	2,596	733	3,329	1,826	2.21	7.1
Lights		117 Other-17ng	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	3,223	1,725	1,729	3,454	231	1.07	14.6
Lights		118 Other-18	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	123	182	164	346	223	2.81	5.6
Lights		130 Other-32	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	20,473	34,415	27,312	61,727	41,254	3.02	5.2
Lights		120 Other-02	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	1,957	2,941	1,092	4,033	2,076	2.06	7.6
Lights		140 Other-09g	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	161	86	86	172	11	1.07	14.6
Lights		121 Other-20	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	3,413	12,345	3,709	16,054	12,641	4.70	3.3
Lights		122 Other-23	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	1,733	3,007	844	3,851	2,118	2.22	7.0
Lights		117 Other-17ng	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	1,239	3,484	1,396	4,880	3,641	3.94	4.0
Lights		131 Other-36	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	31,747	62,782	26,748	89,530	57,783	2.82	5.5
Lights		132 Other-08	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	15,361	46,938	16,695	63,633	48,272	4.14	3.8
Lights		111 Other-01	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	7,336	12,512	6,181	18,693	11,357	2.55	6.1
Lights		117 Other-17ng	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	8,519	13,154	11,365	24,519	16,000	2.88	5.4
Lights		130 Other-32	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	461	289	268	557	96	1.21	12.9
Lights		124 Other-26	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	3,869	15,125	4,205	19,330	15,461	5.00	3.1
Lights		126 Other-29	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	676	425	392	817	141	1.21	12.9
Lights		133 Other-38	Other	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	223,974	1,337,942	737,267	2,075,209	1,851,235	9.27	1.7
Lights		136 Other-05	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	425	273	246	519	94	1.22	12.8
Lights		126 Other-29	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	10,946	16,773	8,464	25,237	15,191	2.51	6.2
Lights		123 Other-24	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	279	202	162	364	85	1.30	12.0
Lights		117 Other-17ng	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	13,366	22,847	7,351	30,198	14,632	1.94	8.1
Lights		139 Other-09	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	3,368	5,730	1,641	7,371	4,003	2.19	7.1
Lights		128 Other-30	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	26,597	51,063	22,409	73,472	46,875	2.76	5.7
Lights		128 Other-30	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	466	392	271	663	197	1.42	11.0
Lights		128 Other-30	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	8,811	16,838	11,754	28,592	19,781	3.25	4.8
Lights		131 Other-36	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	9,295	18,083	12,400	30,483	21,188	3.28	4.8
Lights		116 Other-17	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	964	591	559	1,150	186	1.19	13.1
Lights		112 Other-01g	Other	HS17 HPS 250 PEND	none	0	0	0	0	0	NA	NA
Lights		113 Other-10	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5,301	8,884	7,072	15,956	10,655	3.01	5.2
Lights		123 Other-24	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	6,228	19,356	6,769	26,125	19,897	4.19	3.7
Lights		132 Other-37	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	885	1,307	1,181	2,488	1,603	2.81	5.6
Lights		112 Other-01g	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1,199	671	669	1,340	141	1.12	14.0
Lights		122 Other-23	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	338	213	196	409	71	1.21	12.9
Lights		137 Other-07	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	4,939	9,422	6,589	16,011	11,072	3.24	4.8
Lights		117 Other-17ng	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	190	261	83	344	154	1.81	8.6
Lights		138 Other-08	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	15,114	15,594	13,493	29,087	13,973	2.88	5.4
Lights		113 Other-10	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	30	20	18	38	8	1.27	12.3
Lights		118 Other-18	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	56	79	32	111	55	1.98	7.9
Lights		125 Other-27	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,725	2,909	2,302	5,211	3,486	3.02	5.2
Lights		115 Other-16	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	13,786	17,810	9,825	27,635	13,849	2.00	7.8
Lights		130 Other-32	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	54,234	111,954	54,120	165,714	101,480	2.58	6.1
Lights		122 Other-23	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	7,100	10,203	5,140	15,343	8,243	2.52	6.2

Table 3.6a
All Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Lights	120	Other-02	Other	HS15 HPS 150 PEND	none	0	0	0	0	0	NA	NA
Lights	111	Other-01	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	289	433	156	611	331	2.18	7.2
Lights	112	Other-01g	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	5,275	8,091	2,795	10,886	5,611	2.06	7.6
Lights	112	Other-01g	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	336	512	163	675	319	1.90	8.2
Lights	111	Other-01	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	4,490	7,638	5,990	13,648	9,158	3.04	5.1
Lights	111	Other-01	Other	HS17 HPS 250 PEND	none	0	0	0	0	0	NA	NA
Lights	119	Other-19	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	3,987	7,230	5,319	12,549	8,562	3.15	5.0
Lights	137	Other-07	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	886	684	514	1,198	312	1.35	11.6
Lights	137	Other-07	Other	HS15 HPS 150 PEND	none	0	0	0	0	0	NA	NA
Lights	124	Other-26	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	2,547	5,139	3,398	8,537	5,990	3.35	4.7
Lights	120	Other-02	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	6,721	10,845	8,967	19,812	13,091	2.95	5.3
Lights	123	Other-24	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	4,711	7,255	6,285	13,540	8,829	2.87	5.4
Lights	114	Other-15	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	4,336	7,327	5,785	13,112	8,776	3.02	5.2
Lights	121	Other-20	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	6,370	10,879	8,498	19,377	13,007	3.04	5.1
Lights	119	Other-19	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	13,618	26,312	11,473	37,785	24,167	2.77	5.6
Lights	122	Other-23	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	3,116	5,263	4,157	9,420	6,304	3.02	5.2
Lights	134	Other-41	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	21,739	78,998	23,627	101,725	79,986	4.68	3.3
Lights	116	Other-17	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	371	1,197	403	1,600	1,229	4.31	3.6
Lights	112	Other-01g	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	4,148	12,192	5,249	17,441	13,293	4.20	3.7
Lights	126	Other-29	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	4,482	7,696	5,980	13,586	9,104	3.03	5.2
Lights	135	Other-42	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	14,268	21,174	19,034	40,208	25,940	2.82	5.5
Lights	140	Other-09g	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	783	1,133	1,045	2,178	1,395	2.78	5.6
Lights	120	Other-02	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	4,232	7,205	3,566	10,771	6,539	2.55	6.1
Lights	115	Other-16	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	4,036	7,076	5,385	12,461	8,425	3.09	5.1
Lights	120	Other-02	Other	HS17 HPS 250 PEND	none	0	0	0	0	0	NA	NA
Lights	129	Other-31	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	289	467	386	853	564	2.95	5.3
Lights	114	Other-15	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	14,812	30,158	12,479	42,637	27,825	2.88	5.4
Lights	113	Other-10	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	17,880	30,917	15,064	45,981	28,101	2.57	6.1
Lights	116	Other-17	Other	HS17 HPS 250 PEND	none	0	0	0	0	0	NA	NA
Lights	128	Other-30	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	381	835	186	1,021	640	2.68	5.8
Lights	139	Other-09	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	4,145	13,541	4,505	18,046	13,901	4.35	3.6
Lights	132	Other-37	Other	FL81 FL 2X4 2F40T12ES STD2	none	0	0	0	0	0	NA	NA
Lights	120	Other-02	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1,746	1,035	1,013	2,048	302	1.17	13.3
Lights	111	Other-01	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	4,148	7,261	2,021	9,282	5,134	2.24	7.0
Lights	112	Other-01g	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5,709	7,798	7,616	15,324	9,615	2.68	5.8
Lights	116	Other-17	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	4,657	7,765	2,269	10,034	5,377	2.15	7.3
Lights	127	Other-03	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	395	590	527	1,117	722	2.83	5.5
Lights	125	Other-27	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	792	1,197	456	1,653	861	2.09	7.5
Lights	135	Other-42	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	6,546	3,539	3,797	7,336	790	1.12	13.9
Lights	140	Other-09g	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	569	744	240	984	475	1.93	8.1
Lights	126	Other-29	Other	HS17 HPS 250 PEND	none	0	0	0	0	0	NA	NA
Lights	134	Other-41	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	14,314	25,213	19,096	44,309	29,995	3.10	5.0
Lights	129	Other-31	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	439	1,392	478	1,870	1,431	4.26	3.7
Lights	130	Other-32	Other	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	2,490	2,019	2,068	4,087	1,597	1.64	9.5
Lights	121	Other-20	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1,893	1,550	1,098	2,648	755	1.40	11.2
Lights	122	Other-23	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	242	152	140	292	50	1.21	12.9
Lights	117	Other-17ng	Other	HS17 HPS 250 PEND	none	0	0	0	0	0	NA	NA
Lights	143	Public Order-03	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	879	895	533	1,428	1,058	3.86	4.0
Lights	145	Public Order-05	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	1,826	5,498	2,627	8,125	6,299	4.45	3.5
Lights	143	Public Order-03	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	405	647	540	1,187	782	2.93	5.3
Lights	141	Public Order-01	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	1,186	3,618	1,707	5,325	4,139	4.49	3.5
Lights	141	Public Order-01	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,297	2,713	1,730	4,443	3,146	3.43	4.6
Lights	142	Public Order-02	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	729	1,361	961	2,322	1,602	3.23	4.8
Lights	142	Public Order-02	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	659	1,900	948	2,848	2,189	4.32	3.6
Lights	144	Public Order-04	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	579	1,246	772	2,018	1,439	3.49	4.5
Lights	144	Public Order-04	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	530	1,655	762	2,417	1,887	4.56	3.4
Lights	145	Public Order-05	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,996	4,245	2,663	6,908	4,912	3.46	4.5
Lights	49	FH-attached-03	Single Family Attached	IN9 INC 2-75 CEIL	none	0	0	0	0	0	NA	NA
Lights	49	FH-attached-03	Single Family Attached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	3,695	4,929	2,391	7,320	3,625	1.98	7.9
Lights	50	FH-attached-04	Single Family Attached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	155	646	374	1,020	865	6.58	2.4
Lights	49	FH-attached-03	Single Family Attached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	8,171	15,689	9,142	24,831	16,660	3.04	5.1
Lights	48	FH-attached-01	Single Family Attached	FL5 FL 1X4 1F40T12 STD1	none	0	0	0	0	0	NA	NA
Lights	51	FH-attached-05	Single Family Attached	FL4 FL 1X4 2F40T12 STD2	FL52 FL 1X4 2F32T8 ELC2	10,268	9,196	4,692	13,861	3,598	1.35	11.6
Lights	49	FH-attached-03	Single Family Attached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	1,912	4,194	2,445	6,549	5,537	6.47	2.4
Lights	51	FH-attached-05	Single Family Attached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	28,996	47,474	18,738	66,212	37,236	2.29	6.8
Lights	50	FH-attached-04	Single Family Attached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	625	1,225	694	1,919	1,294	3.07	5.1
Lights	49	FH-attached-03	Single Family Attached	IN10 INC 3-75 CEIL	none	0	0	0	0	0	NA	NA
Lights	48	FH-attached-01	Single Family Attached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	40,015	52,321	25,894	78,215	38,200	1.95	8.0
Lights	50	FH-attached-04	Single Family Attached	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	2,437	3,928	2,766	5,694	3,257	2.32	6.7

Table 3.6a
All Building ERUs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Lights		50 FH-attached-04	Single Family Attached	IN9 INC 2-75 CEIL	none	0	0	0	0	0	NA	NA
Lights		48 FH-attached-01	Single Family Attached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	132,720	221,395	148,486	369,881	237,161	2.79	5.6
Lights		51 FH-attached-05	Single Family Attached	FL3 FL 1X4 1F40T12 STD1	none	0	0	0	0	0	NA	NA
Lights		51 FH-attached-05	Single Family Attached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	32,014	66,465	35,817	102,282	70,268	3.19	4.9
Lights		44 FH-Detached-03	Single Family Detached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	88	115	57	172	84	1.95	8.0
Lights		45 FH-Detached-04	Single Family Detached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	2,707	5,202	3,028	8,230	5,523	3.04	5.1
Lights		45 FH-Detached-04	Single Family Detached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	1,224	1,947	792	2,739	1,515	2.24	7.0
Lights		46 FH-Detached-05	Single Family Detached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	577	977	373	1,350	773	2.34	6.7
Lights		43 FH-Detached-01	Single Family Detached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	85	344	206	550	465	6.47	2.4
Lights		47 FH-Detached-07	Single Family Detached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	41	183	99	282	241	6.88	2.3
Lights		44 FH-Detached-03	Single Family Detached	IN9 INC 2-75 CEIL	none	0	0	0	0	0	NA	NA
Lights		47 FH-Detached-07	Single Family Detached	IN10 INC 3-75 CEIL	none	0	0	0	0	0	NA	NA
Lights		47 FH-Detached-07	Single Family Detached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	332	662	372	1,034	702	3.11	5.0
Lights		46 FH-Detached-05	Single Family Detached	IN10 INC 3-75 CEIL	none	0	0	0	0	0	NA	NA
Lights		46 FH-Detached-05	Single Family Detached	IN9 INC 2-75 CEIL	none	0	0	0	0	0	NA	NA
Lights		45 FH-Detached-04	Single Family Detached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	335	1,598	810	2,408	2,073	7.19	2.2
Lights		46 FH-Detached-05	Single Family Detached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	158	811	381	1,192	1,034	7.54	2.1
Lights		44 FH-Detached-03	Single Family Detached	IN10 INC 3-75 CEIL	none	0	0	0	0	0	NA	NA
Lights		47 FH-Detached-07	Single Family Detached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	150	240	97	337	187	2.25	7.0
Lights		45 FH-Detached-04	Single Family Detached	IN10 INC 3-75 CEIL	none	0	0	0	0	0	NA	NA
Lights		46 FH-Detached-05	Single Family Detached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	1,275	2,258	1,426	3,684	2,409	2.89	5.4
Lights		43 FH-Detached-01	Single Family Detached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	312	423	202	625	313	2.00	7.8
Lights		47 FH-Detached-07	Single Family Detached	IN9 INC 2-75 CEIL	none	0	0	0	0	0	NA	NA
Lights		43 FH-Detached-01	Single Family Detached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	689	1,277	771	2,048	1,359	2.97	5.3
Lights		44 FH-Detached-03	Single Family Detached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	195	333	218	551	356	2.83	5.5
Lights		44 FH-Detached-03	Single Family Detached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	24	88	58	146	122	6.08	2.6
Lights		43 FH-Detached-01	Single Family Detached	IN9 INC 2-75 CEIL	none	0	0	0	0	0	NA	NA
Lights		43 FH-Detached-01	Single Family Detached	IN10 INC 3-75 CEIL	none	0	0	0	0	0	NA	NA
Lights		45 FH-Detached-04	Single Family Detached	IN9 INC 2-75 CEIL	none	0	0	0	0	0	NA	NA
Lights		155 Warehouse-11	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	4,393	7,383	5,861	13,244	8,851	3.01	5.2
Lights		168 Warehouse-03	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	6,740	10,063	3,355	13,418	6,678	1.99	7.8
Lights		168 Warehouse-03	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	43,939	31,012	18,727	49,739	5,800	1.13	13.8
Lights		165 Warehouse-23	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5,220	8,415	6,964	15,379	10,159	2.95	5.3
Lights		154 Warehouse-01	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	2,800	4,637	3,735	8,372	5,572	2.99	5.2
Lights		170 Warehouse-04	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	2,950	4,425	3,935	8,360	5,410	2.83	5.5
Lights		160 Warehouse-19	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,831	3,069	2,443	5,512	3,681	3.01	5.2
Lights		169 Warehouse-30	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5,361	9,056	7,152	16,208	10,847	3.02	5.2
Lights		155 Warehouse-11	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	9,537	6,479	4,227	10,706	1,169	1.12	13.9
Lights		167 Warehouse-29	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	1,686	1,234	719	1,953	267	1.16	13.5
Lights		167 Warehouse-29	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	707	1,185	943	2,128	1,421	3.01	5.2
Lights		156 Warehouse-12	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	1,953	1,393	866	2,259	306	1.16	13.5
Lights		156 Warehouse-12	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	380	507	127	634	334	2.11	7.4
Lights		164 Warehouse-24	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	182	289	243	532	350	2.92	5.3
Lights		162 Warehouse-21	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	2,356	1,693	1,004	2,697	341	1.14	13.6
Lights		156 Warehouse-12	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	818	1,203	1,092	2,295	1,477	2.81	5.6
Lights		172 Warehouse-07	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	395	551	197	748	353	1.89	8.2
Lights		158 Warehouse-16	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	369	542	184	726	357	1.97	7.9
Lights		168 Warehouse-03	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	18,412	30,257	24,563	54,820	36,408	2.98	5.2
Lights		161 Warehouse-02	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	445	284	190	474	29	1.07	14.7
Lights		154 Warehouse-01	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	6,682	5,198	2,962	8,160	1,478	1.22	12.8
Lights		166 Warehouse-26	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	195	295	260	555	360	2.85	5.5
Lights		160 Warehouse-19	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	670	1,034	334	1,368	698	2.04	7.7
Lights		158 Warehouse-16	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	2,405	1,634	1,025	2,659	254	1.11	14.1
Lights		167 Warehouse-29	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	259	389	129	518	259	2.00	7.8
Lights		169 Warehouse-19	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	3,975	2,560	1,694	4,254	279	1.07	14.6
Lights		155 Warehouse-11	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	1,608	2,597	684	3,281	1,673	2.04	7.7
Lights		164 Warehouse-24	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	435	312	185	497	62	1.14	13.7
Lights		166 Warehouse-26	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	71	100	35	135	64	1.90	8.2
Lights		164 Warehouse-24	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	67	97	33	130	63	1.94	8.1
Lights		165 Warehouse-25	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	1,911	2,265	951	3,216	1,305	1.68	9.3
Lights		174 Warehouse-09	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	397	601	198	799	402	2.01	7.8
Lights		172 Warehouse-07	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	2,576	1,870	1,098	2,968	392	1.15	13.6
Lights		165 Warehouse-25	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	12,457	8,964	5,309	14,273	1,816	1.15	13.6
Lights		157 Warehouse-15	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	3,178	2,355	1,355	3,710	532	1.17	13.4
Lights		163 Warehouse-23	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	6,712	11,293	8,954	20,247	13,535	3.02	5.2
Lights		170 Warehouse-04	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	639	4,542	3,000	7,542	903	1.07	14.6
Lights		166 Warehouse-26	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	465	316	198	517	52	1.11	14.1
Lights		169 Warehouse-19	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	4,370	3,336	1,862	5,192	822	1.19	13.1
Lights		163 Warehouse-23	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	14,570	7,300	6,210	13,510	7,940	1.06	14.7

Table 3.6a
All Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Lights		169 Warehouse-30	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	11,637	7,441	4,960	12,401	764	1.07	14.7
Lights		162 Warehouse-21	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	2,990	2,186	1,104	3,290	700	1.27	12.3
Lights		157 Warehouse-15	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	488	738	243	981	493	2.01	7.8
Lights		154 Warehouse-01	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	1,025	1,578	436	2,014	989	1.96	8.0
Lights		162 Warehouse-21	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	397	677	198	875	478	2.20	7.1
Lights		161 Warehouse-02	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	205	345	274	619	414	3.02	5.2
Lights		173 Warehouse-08	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	3,073	2,194	1,311	3,505	430	1.14	13.7
Lights		159 Warehouse-18	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	613	944	818	1,762	1,149	2.87	5.4
Lights		171 Warehouse-05	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	1,158	702	493	1,195	37	1.03	15.1
Lights		170 Warehouse-04	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	1,080	1,606	538	2,144	1,064	1.99	7.9
Lights		173 Warehouse-08	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	472	685	235	920	448	1.95	8.0
Lights		171 Warehouse-05	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	533	817	712	1,529	996	2.87	5.4
Lights		174 Warehouse-09	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	2,589	1,938	1,104	3,042	453	1.17	13.3
Lights		159 Warehouse-18	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	1,331	801	567	1,368	37	1.03	15.2
Lights		170 Warehouse-04	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	6,403	3,878	2,729	6,607	204	1.03	15.1
Lights		154 Warehouse-01	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	6,075	4,084	2,694	6,778	700	1.12	14.0
Lights		171 Warehouse-05	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	19	293	97	390	195	2.00	7.8
Lights		158 Warehouse-16	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	2,187	1,324	932	2,256	69	1.03	15.1
Lights		173 Warehouse-08	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,289	1,975	1,719	3,694	2,405	2.87	5.5
Lights		163 Warehouse-23	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	2,457	3,717	1,223	4,940	2,487	2.01	7.8
Lights		153 Warehouse-11	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	10,484	8,346	4,647	12,993	2,509	1.24	12.6
Lights		165 Warehouse-25	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	11,331	6,509	4,830	11,339	8	1.00	15.6
Lights		164 Warehouse-24	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	395	234	169	403	8	1.02	15.3
Lights		161 Warehouse-02	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	75	114	37	151	76	2.01	7.8
Lights		157 Warehouse-15	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,332	2,215	1,777	3,992	2,660	3.00	5.2
Lights		162 Warehouse-21	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,085	1,901	1,448	3,349	2,264	3.09	5.1
Lights		163 Warehouse-23	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	16,017	11,992	6,827	18,819	2,802	1.17	13.3
Lights		166 Warehouse-26	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	423	244	180	424	1	1.00	15.6
Lights		156 Warehouse-12	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	1,776	1,098	787	1,885	109	1.06	14.7
Lights		173 Warehouse-08	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	none	0	0	0	0	0	NA	NA
Lights		167 Warehouse-29	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	1,534	975	654	1,629	95	1.06	14.7
Lights		161 Warehouse-02	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	489	366	209	575	86	1.18	13.3
Lights		174 Warehouse-09	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	2,355	1,505	1,004	2,509	154	1.07	14.7
Lights		172 Warehouse-07	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	none	0	0	0	0	0	NA	NA
Lights		169 Warehouse-30	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	12,793	9,571	5,453	15,024	2,231	1.17	13.3
Lights		169 Warehouse-30	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	1,962	2,984	977	3,961	1,999	2.02	7.7
Lights		159 Warehouse-18	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	1,464	1,025	624	1,649	185	1.13	13.9
Lights		158 Warehouse-16	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,008	1,529	1,344	2,873	1,865	2.85	5.5
Lights		172 Warehouse-07	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,079	1,767	1,440	3,207	2,128	2.97	5.3
Lights		174 Warehouse-09	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,085	1,829	1,448	3,277	2,192	3.02	5.2
Lights		171 Warehouse-05	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	1,273	904	542	1,446	173	1.14	13.8
Lights		157 Warehouse-15	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	2,891	1,829	1,232	3,061	170	1.06	14.8
Lights		168 Warehouse-03	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	39,967	25,160	17,034	42,194	2,227	1.06	14.8
Lights		159 Warehouse-18	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	225	299	112	411	186	1.83	8.6
Roof		37 FH-2 to 4-12	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling Increase Insulation by R-8	119,173	169,905	0	169,905	50,732	1.43	11.0
Roof		40 FH-2 to 4-07	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling Increase insulation by R-11	291,746	430,955	0	430,955	139,209	1.48	10.6
Roof		35 FH-2 to 4-01	2 to 4 Unit Buildings	roof insulation R-value 5.00	Attic Ceiling Increase insulation by R-19	120,604	431,017	0	431,017	310,413	3.57	4.4
Roof		36 FH-2 to 4-10	2 to 4 Unit Buildings	roof insulation R-value 19.00	none	0	0	0	0	0	NA	NA
Roof		38 FH-2 to 4-03	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling Increase insulation by R-11	94,710	139,360	0	139,360	44,650	1.47	10.6
Roof		39 FH-2 to 4-06	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling Increase Insulation by R-8	76,051	112,775	0	112,775	36,724	1.48	10.5
Roof		41 FH-2 to 4-09	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling Increase Insulation by R-8	17,638	24,368	0	24,368	6,730	1.38	11.3
Roof		42 FH-5 or More-01	5 or More Unit Buildings	roof insulation R-value 11.00	Attic Ceiling Increase Insulation by R-8	35,811	50,145	0	50,145	14,334	1.40	11.2
Roof		3 Assembly-15	Assembly	roof insulation R-value 8.90	none	0	0	0	0	0	NA	NA
Roof		13 Assembly-04	Assembly	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof		9 Assembly-22	Assembly	roof insulation R-value 30.00	none	0	0	0	0	0	NA	NA
Roof		1 Assembly-10	Assembly	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		10 Assembly-23	Assembly	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		11 Assembly-24	Assembly	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		8 Assembly-20	Assembly	roof insulation R-value 8.90	Suspended Ceiling Increase Insulation by R-8	22,084	38,514	0	38,514	16,430	1.74	9.0
Roof		2 Assembly-13	Assembly	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		16 Assembly-08	Assembly	roof insulation R-value 11.00	none	0	0	0	0	0	NA	NA
Roof		7 Assembly-02	Assembly	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-30	2,501	16,237	0	16,237	13,736	6.49	2.4
Roof		0 Assembly-01	Assembly	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	25,675	99,182	0	99,182	73,507	3.86	4.0
Roof		5 Assembly-18	Assembly	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		17 Assembly-09	Assembly	roof insulation R-value 13.00	none	0	0	0	0	0	NA	NA
Roof		4 Assembly-16	Assembly	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		15 Assembly-07	Assembly	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-11	689	1,112	0	1,112	423	1.61	9.7
Roof		12 Assembly-03	Assembly	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-19	25,367	58,834	0	58,834	33,467	2.32	7.7
Roof		14 Assembly-05	Assembly	roof insulation R-value 13.00	none	0	0	0	0	0	NA	NA

Table 3.6a
All Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Roof		6 Assembly-19	Assembly	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		33 Education-08	Education	roof insulation R-value 13.00	Suspended Ceiling Increase insulation by R-11	27,985	39,344	0	39,344	11,359	1.41	11.1
Roof		23 Education-16	Education	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		21 Education-14	Education	roof insulation R-value 21.00	none	0	0	0	0	0	NA	NA
Roof		26 Education-19	Education	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		24 Education-17	Education	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		19 Education-11	Education	roof insulation R-value 13.00	Suspended Ceiling Increase insulation by R-11	2,865	3,815	0	3,815	950	1.33	11.7
Roof		34 Education-09	Education	roof insulation R-value 13.30	Suspended Ceiling Increase Insulation by R-8	3,776	4,961	0	4,961	1,185	1.31	11.9
Roof		28 Education-22	Education	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		31 Education-04	Education	roof insulation R-value 11.00	Attic Ceiling Increase Insulation by R-8	12,806	17,298	0	17,298	4,492	1.35	11.6
Roof		22 Education-15	Education	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		25 Education-18	Education	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		20 Education-12	Education	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		18 Education-01	Education	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	10,087	26,728	0	26,728	16,641	2.65	5.9
Roof		32 Education-07	Education	roof insulation R-value 11.00	Attic Ceiling Increase insulation by R-11	8,602	13,561	0	13,561	4,959	1.58	9.9
Roof		30 Education-24	Education	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		29 Education-23	Education	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		27 Education-02	Education	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	5,924	35,569	0	35,569	29,645	6.00	2.6
Roof		52 Food Sales-01	Food Sales	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		54 Food Service-11	Food Service	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		56 Food Service-13	Food Service	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		60 Food Service-04	Food Service	roof insulation R-value 11.00	none	0	0	0	0	0	NA	NA
Roof		62 Food Service-08	Food Service	roof insulation R-value 13.00	none	0	0	0	0	0	NA	NA
Roof		61 Food Service-07	Food Service	roof insulation R-value 11.00	none	0	0	0	0	0	NA	NA
Roof		58 Food Service-17	Food Service	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		53 Food Service-01	Food Service	roof insulation R-value 0.00	Attic Ceiling Increase Insulation by R-8	2,734	6,353	0	6,353	3,619	2.32	6.7
Roof		55 Food Service-12	Food Service	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		63 Food Service-09	Food Service	roof insulation R-value 13.00	none	0	0	0	0	0	NA	NA
Roof		59 Food Service-02	Food Service	roof insulation R-value 0.00	Attic Ceiling Increase Insulation by R-8	5,960	13,397	0	13,397	7,437	2.25	6.9
Roof		57 Food Service-15	Food Service	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		64 Health Care-01	Health Care	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-30	486	1,397	0	1,397	911	2.87	5.4
Roof		68 Health Care-06	Health Care	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		66 Health Care-03	Health Care	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		67 Health Care-04	Health Care	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		69 Health Care-07	Health Care	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		65 Health Care-02	Health Care	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-19	2,912	4,769	0	4,769	1,857	1.64	9.5
Roof		71 Lodging-10	Lodging	roof insulation R-value 19.00	none	0	0	0	0	0	NA	NA
Roof		74 Lodging-13	Lodging	roof insulation R-value 8.90	Suspended Ceiling Increase Insulation by R-8	15,238	26,210	0	26,210	10,972	1.72	9.1
Roof		70 Lodging-01	Lodging	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	3,896	14,826	0	14,826	10,930	3.81	4.1
Roof		78 Lodging-02	Lodging	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	12,297	81,380	0	81,380	69,083	6.62	2.4
Roof		81 Lodging-08	Lodging	roof insulation R-value 8.00	Attic Ceiling Increase Insulation by R-8	4,830	6,333	0	6,333	1,503	1.31	11.9
Roof		76 Lodging-16	Lodging	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		72 Lodging-11	Lodging	roof insulation R-value 8.90	Suspended Ceiling Increase Insulation by R-8	96,978	211,549	0	211,549	114,571	2.18	7.2
Roof		79 Lodging-05	Lodging	roof insulation R-value 8.90	Suspended Ceiling Increase insulation by R-19	31,112	63,012	0	63,012	31,900	2.03	7.7
Roof		80 Lodging-07	Lodging	roof insulation R-value 8.00	Attic Ceiling Increase Insulation by R-8	116,450	121,333	0	121,333	4,883	1.04	15.0
Roof		75 Lodging-15	Lodging	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		73 Lodging-12	Lodging	roof insulation R-value 9.00	none	0	0	0	0	0	NA	NA
Roof		77 Lodging-19	Lodging	roof insulation R-value 8.90	Suspended Ceiling Increase Insulation by R-8	21,365	38,347	0	38,347	16,982	1.79	8.7
Roof		152 Service-08	Mercantile & Service	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		146 Service-01	Mercantile & Service	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	9,924	26,035	0	26,035	16,111	2.62	6.0
Roof		148 Service-04	Mercantile & Service	roof insulation R-value 11.00	none	0	0	0	0	0	NA	NA
Roof		150 Service-06	Mercantile & Service	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		149 Service-05	Mercantile & Service	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		147 Service-03	Mercantile & Service	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	16,893	70,390	0	70,390	53,497	4.17	3.7
Roof		153 Service-09	Mercantile & Service	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		151 Service-07	Mercantile & Service	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		88 Office-15ug	Office	roof insulation R-value 11.00	none	0	0	0	0	0	NA	NA
Roof		83 Office-01g	Office	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-11	9,226	12,216	0	12,216	2,990	1.32	11.8
Roof		89 Office-16	Office	roof insulation R-value 11.00	none	0	0	0	0	0	NA	NA
Roof		100 Office-03	Office	roof insulation R-value 6.00	Attic Ceiling Increase insulation by R-11	25,236	55,507	0	55,507	30,271	2.20	7.1
Roof		92 Office-02	Office	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	26,636	85,356	0	85,356	58,726	3.21	4.9
Roof		87 Office-15	Office	roof insulation R-value 11.00	none	0	0	0	0	0	NA	NA
Roof		95 Office-21	Office	roof insulation R-value 13.00	Suspended Ceiling Increase Insulation by R-8	7,726	7,822	0	7,822	96	1.01	13.4
Roof		102 Office-31	Office	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		99 Office-29	Office	roof insulation R-value 8.90	Suspended Ceiling Increase Insulation by R-8	1,826	2,944	0	2,944	1,118	1.61	9.7
Roof		93 Office-02g	Office	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-11	5,676	9,257	0	9,257	3,578	1.63	9.6
Roof		90 Office-17	Office	roof insulation R-value 11.00	Attic Ceiling Increase insulation by R-11	2,315	3,213	0	3,213	898	1.39	11.3
Roof		104 Office-35	Office	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof		94 Office-20	Office	roof insulation R-value 19.00	none	0	0	0	0	0	NA	NA

Table 3.6a
All Building ERCs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Roof	96	Office-22	Office	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof	84	Office-10	Office	roof insulation R-value 5.00	Suspended Ceiling Increase insulation by R-19	8,877	33,227	0	33,227	24,350	3.74	4.2
Roof	110	Office-09	Office	roof insulation R-value 11.00	none	0	0	0	0	0	NA	NA
Roof	105	Office-37	Office	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof	91	Office-18	Office	roof insulation R-value 11.00	none	0	0	0	0	0	NA	NA
Roof	97	Office-26	Office	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof	101	Office-30	Office	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof	82	Office-01	Office	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	30,081	103,063	0	103,063	72,984	3.43	4.6
Roof	103	Office-34	Office	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof	85	Office-13	Office	roof insulation R-value 11.00	none	0	0	0	0	0	NA	NA
Roof	86	Office-14	Office	roof insulation R-value 8.90	none	0	0	0	0	0	NA	NA
Roof	107	Office-04	Office	roof insulation R-value 8.00	none	0	0	0	0	0	NA	NA
Roof	106	Office-38	Office	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof	98	Office-28	Office	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof	109	Office-08	Office	roof insulation R-value 11.00	none	0	0	0	0	0	NA	NA
Roof	108	Office-07	Office	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof	120	Other-02	Other	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-11	19,990	41,037	0	41,037	21,047	2.05	7.6
Roof	139	Other-09	Other	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof	138	Other-08	Other	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof	118	Other-18	Other	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-11	449	477	0	477	28	1.06	14.7
Roof	128	Other-30	Other	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof	140	Other-09g	Other	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof	122	Other-23	Other	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof	125	Other-27	Other	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof	126	Other-29	Other	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof	113	Other-10	Other	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof	129	Other-31	Other	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof	133	Other-38	Other	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof	137	Other-07	Other	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof	131	Other-36	Other	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof	123	Other-24	Other	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof	135	Other-42	Other	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof	116	Other-17	Other	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof	121	Other-20	Other	roof insulation R-value 5.00	Attic Ceiling Increase insulation by R-8	15,187	26,296	0	26,296	11,109	1.73	9.0
Roof	111	Other-01	Other	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof	127	Other-03	Other	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-11	1,210	2,876	0	2,876	1,666	2.38	6.6
Roof	119	Other-19	Other	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-11	14,597	15,958	0	15,958	1,361	1.09	14.3
Roof	130	Other-32	Other	roof insulation R-value 8.69	none	0	0	0	0	0	NA	NA
Roof	112	Other-01g	Other	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-8	13,175	15,214	0	15,214	2,039	1.15	13.5
Roof	117	Other-17ng	Other	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof	132	Other-37	Other	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof	114	Other-15	Other	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof	136	Other-05	Other	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-11	2,838	6,010	0	6,010	3,172	2.12	7.4
Roof	134	Other-41	Other	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof	115	Other-16	Other	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof	124	Other-26	Other	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof	144	Public Order-04	Public Order Safety	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof	141	Public Order-01	Public Order Safety	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	3,599	15,811	0	15,811	12,212	4.39	3.6
Roof	142	Public Order-02	Public Order Safety	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-19	2,383	7,573	0	7,573	5,190	3.18	4.9
Roof	143	Public Order-03	Public Order Safety	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	1,123	3,233	0	3,233	2,110	2.88	5.4
Roof	145	Public Order-[illegible]	Public Order Safety	roof insulation R-value 20.05	none	0	0	0	0	0	NA	NA
Roof	51	FH-attached-05	Single Family Attached	roof insulation R-value 19.00	none	0	0	0	0	0	NA	NA
Roof	49	FH-attached-03	Single Family Attached	roof insulation R-value 11.00	none	0	0	0	0	0	NA	NA
Roof	50	FH-attached-04	Single Family Attached	roof insulation R-value 11.00	none	0	0	0	0	0	NA	NA
Roof	48	FH-attached-01	Single Family Attached	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	225,778	2,692,487	0	2,692,487	2,466,709	11.93	1.3
Roof	46	FH-Detached-05	Single Family Detached	roof insulation R-value 11.00	none	0	0	0	0	0	NA	NA
Roof	44	FH-Detached-03	Single Family Detached	roof insulation R-value 11.00	Attic Ceiling Increase insulation by R-8	549	787	0	787	238	1.43	10.9
Roof	43	FH-Detached-01	Single Family Detached	roof insulation R-value 11.00	none	0	0	0	0	0	NA	NA
Roof	47	FH-Detached-07	Single Family Detached	roof insulation R-value 19.00	none	0	0	0	0	0	NA	NA
Roof	45	FH-Detached-04	Single Family Detached	roof insulation R-value 5.00	Attic Ceiling Increase insulation by R-8	7,638	16,915	0	16,915	9,277	2.21	7.1
Roof	163	Warehouse-23	Warehouse & Storage	roof insulation R-value 8.90	none	0	0	0	0	0	NA	NA
Roof	161	Warehouse-02	Warehouse & Storage	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof	169	Warehouse-30	Warehouse & Storage	roof insulation R-value 20.00	none	0	0	0	0	0	NA	NA
Roof	174	Warehouse-09	Warehouse & Storage	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof	167	Warehouse-29	Warehouse & Storage	roof insulation R-value 8.69	none	0	0	0	0	0	NA	NA
Roof	173	Warehouse-08	Warehouse & Storage	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof	158	Warehouse-16	Warehouse & Storage	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof	159	Warehouse-18	Warehouse & Storage	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Roof	170	Warehouse-04	Warehouse & Storage	roof insulation R-value 0.00	none	0	0	0	0	0	NA	NA

Table 3.6a
All Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Roof	163	Warehouse-23	Warehouse & Storage	roof insulation R-value 8 69	none	0	0	0	0	0	NA	NA
Roof	160	Warehouse-19	Warehouse & Storage	roof insulation R-value 20 05	none	0	0	0	0	0	NA	NA
Roof	162	Warehouse-21	Warehouse & Storage	roof insulation R-value 20 05	none	0	0	0	0	0	NA	NA
Roof	172	Warehouse-07	Warehouse & Storage	roof insulation R-value 0 00	Attic Ceiling Increase Insulation by R-8	4,888	5,156	0	5,156	268	1 05	14 8
Roof	137	Warehouse-15	Warehouse & Storage	roof insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Roof	171	Warehouse-05	Warehouse & Storage	roof insulation R-value 0 00	Attic Ceiling Increase Insulation by R-8	2,416	3,059	0	3,059	643	1 27	12 3
Roof	168	Warehouse-03	Warehouse & Storage	roof insulation R-value 0 00	Attic Ceiling Increase Insulation by R-8	83,394	90,831	0	90,831	7,437	1 09	14 3
Roof	134	Warehouse-01	Warehouse & Storage	roof insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Roof	155	Warehouse-11	Warehouse & Storage	roof insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Roof	164	Warehouse-24	Warehouse & Storage	roof insulation R-value 20 05	none	0	0	0	0	0	NA	NA
Roof	166	Warehouse-26	Warehouse & Storage	roof insulation R-value 8 69	none	0	0	0	0	0	NA	NA
Roof	156	Warehouse-12	Warehouse & Storage	roof insulation R-value 0 00	Attic Ceiling Increase Insulation by R-8	3,706	3,990	0	3,990	284	1 08	14 5
Wall	35	FH-2 to 4-01	2 to 4 Unit Buildings	wall insulation R-value 7 00	none	0	0	0	0	0	NA	NA
Wall	40	FH-2 to 4-07	2 to 4 Unit Buildings	wall insulation R-value 5 00	none	0	0	0	0	0	NA	NA
Wall	37	FH-2 to 4-12	2 to 4 Unit Buildings	wall insulation R-value 11 00	none	0	0	0	0	0	NA	NA
Wall	38	FH-2 to 4-03	2 to 4 Unit Buildings	wall insulation R-value 5 00	none	0	0	0	0	0	NA	NA
Wall	41	FH-2 to 4-09	2 to 4 Unit Buildings	wall insulation R-value 5 00	none	0	0	0	0	0	NA	NA
Wall	36	FH-2 to 4-10	2 to 4 Unit Buildings	wall insulation R-value 11 00	none	0	0	0	0	0	NA	NA
Wall	39	FH-2 to 4-06	2 to 4 Unit Buildings	wall insulation R-value 5 00	none	0	0	0	0	0	NA	NA
Wall	42	FH-5 or More-01	5 or More Unit Buildings	wall insulation R-value 5 00	none	0	0	0	0	0	NA	NA
Wall	17	Assembly-09	Assembly	wall insulation R-value 7 00	none	0	0	0	0	0	NA	NA
Wall	14	Assembly-05	Assembly	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	1	Assembly-10	Assembly	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	16	Assembly-08	Assembly	wall insulation R-value 7 00	none	0	0	0	0	0	NA	NA
Wall	8	Assembly-20	Assembly	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	9	Assembly-22	Assembly	wall insulation R-value 13 00	none	0	0	0	0	0	NA	NA
Wall	11	Assembly-24	Assembly	wall insulation R-value 19 00	none	0	0	0	0	0	NA	NA
Wall	13	Assembly-04	Assembly	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	10	Assembly-23	Assembly	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	12	Assembly-03	Assembly	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	5	Assembly-18	Assembly	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	3	Assembly-15	Assembly	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	6	Assembly-19	Assembly	wall insulation R-value 11 00	none	0	0	0	0	0	NA	NA
Wall	0	Assembly-01	Assembly	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	15	Assembly-07	Assembly	wall insulation R-value 0 00	Blow-in Insulation Increase Insulation by R-13	4,044	4,314	0	4,314	270	1 07	14 6
Wall	4	Assembly-16	Assembly	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	2	Assembly-13	Assembly	wall insulation R-value 7 00	none	0	0	0	0	0	NA	NA
Wall	7	Assembly-02	Assembly	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	30	Education-24	Education	wall insulation R-value 19 00	none	0	0	0	0	0	NA	NA
Wall	23	Education-16	Education	wall insulation R-value 11 00	none	0	0	0	0	0	NA	NA
Wall	24	Education-17	Education	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	29	Education-23	Education	wall insulation R-value 19 00	none	0	0	0	0	0	NA	NA
Wall	22	Education-15	Education	wall insulation R-value 11 00	none	0	0	0	0	0	NA	NA
Wall	25	Education-18	Education	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	21	Education-14	Education	wall insulation R-value 8 79	none	0	0	0	0	0	NA	NA
Wall	27	Education-02	Education	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	18	Education-01	Education	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	28	Education-22	Education	wall insulation R-value 8 79	none	0	0	0	0	0	NA	NA
Wall	34	Education-09	Education	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	33	Education-08	Education	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	19	Education-11	Education	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	32	Education-07	Education	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	31	Education-04	Education	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	20	Education-12	Education	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	26	Education-19	Education	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	52	Food Sales-01	Food Sales	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	59	Food Service-02	Food Service	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	60	Food Service-04	Food Service	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	53	Food Service-01	Food Service	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	54	Food Service-11	Food Service	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	55	Food Service-12	Food Service	wall insulation R-value 19 00	none	0	0	0	0	0	NA	NA
Wall	56	Food Service-13	Food Service	wall insulation R-value 19 00	none	0	0	0	0	0	NA	NA
Wall	63	Food Service-09	Food Service	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	58	Food Service-17	Food Service	wall insulation R-value 19 00	none	0	0	0	0	0	NA	NA
Wall	57	Food Service-15	Food Service	wall insulation R-value 19 00	none	0	0	0	0	0	NA	NA
Wall	61	Food Service-07	Food Service	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	62	Food Service-08	Food Service	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	69	Health Care-07	Health Care	wall insulation R-value 19 00	none	0	0	0	0	0	NA	NA
Wall	64	Health Care-01	Health Care	wall insulation R-value 0 00	Blow-in Insulation Increase Insulation by R-13	1,427	3,993	0	3,993	2,566	2 80	5 0

Table 3.6a
All Building ERCs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Wall	67	Health Care-04	Health Care	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	66	Health Care-03	Health Care	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	65	Health Care-02	Health Care	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	68	Health Care-06	Health Care	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	75	Lodging-15	Lodging	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	74	Lodging-13	Lodging	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	76	Lodging-16	Lodging	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	72	Lodging-11	Lodging	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	81	Lodging-08	Lodging	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	79	Lodging-05	Lodging	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	73	Lodging-12	Lodging	wall insulation R-value 5 00	none	0	0	0	0	0	NA	NA
Wall	78	Lodging-02	Lodging	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	71	Lodging-10	Lodging	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	80	Lodging-07	Lodging	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	77	Lodging-19	Lodging	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	70	Lodging-01	Lodging	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	150	Service-06	Mercantile & Service	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	146	Service-01	Mercantile & Service	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	152	Service-08	Mercantile & Service	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	148	Service-04	Mercantile & Service	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	149	Service-05	Mercantile & Service	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	153	Service-09	Mercantile & Service	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	147	Service-03	Mercantile & Service	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	151	Service-07	Mercantile & Service	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	105	Office-37	Office	wall insulation R-value 19 00	none	0	0	0	0	0	NA	NA
Wall	91	Office-18	Office	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	90	Office-17	Office	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	99	Office-29	Office	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	98	Office-28	Office	wall insulation R-value 19 00	none	0	0	0	0	0	NA	NA
Wall	101	Office-30	Office	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	92	Office-02	Office	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	87	Office-15	Office	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	88	Office-15ng	Office	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	94	Office-20	Office	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	109	Office-08	Office	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	85	Office-13	Office	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	108	Office-07	Office	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	95	Office-21	Office	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	100	Office-03	Office	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	96	Office-22	Office	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	97	Office-26	Office	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	93	Office-02g	Office	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	107	Office-04	Office	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	102	Office-31	Office	wall insulation R-value 8 79	none	0	0	0	0	0	NA	NA
Wall	106	Office-38	Office	wall insulation R-value 19 00	none	0	0	0	0	0	NA	NA
Wall	104	Office-35	Office	wall insulation R-value 5 32	none	0	0	0	0	0	NA	NA
Wall	82	Office-01	Office	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	84	Office-10	Office	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	83	Office-01g	Office	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	110	Office-09	Office	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	103	Office-34	Office	wall insulation R-value 19 00	none	0	0	0	0	0	NA	NA
Wall	86	Office-14	Office	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	89	Office-16	Office	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	124	Other-26	Other	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	127	Other-03	Other	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	113	Other-10	Other	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	112	Other-01g	Other	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	115	Other-16	Other	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	123	Other-24	Other	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	120	Other-02	Other	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	111	Other-01	Other	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	126	Other-29	Other	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	119	Other-19	Other	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	132	Other-37	Other	wall insulation R-value 19 00	none	0	0	0	0	0	NA	NA
Wall	116	Other-17	Other	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	117	Other-17ng	Other	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	118	Other-18	Other	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	122	Other-23	Other	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA
Wall	121	Other-20	Other	wall insulation R-value 0 00	none	0	0	0	0	0	NA	NA

Table 3.6a
All Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Invest Ratio	Discounted Payback
Wall		135 Other-42	Other	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		140 Other-09g	Other	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		136 Other-03	Other	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		114 Other-15	Other	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		134 Other-41	Other	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		133 Other-38	Other	wall insulation R-value 19.00	none	0	0	0	0	0	NA	NA
Wall		128 Other-30	Other	wall insulation R-value 19.00	none	0	0	0	0	0	NA	NA
Wall		139 Other-09	Other	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		129 Other-31	Other	wall insulation R-value 19.00	none	0	0	0	0	0	NA	NA
Wall		125 Other-27	Other	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		138 Other-08	Other	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		131 Other-36	Other	wall insulation R-value 19.00	none	0	0	0	0	0	NA	NA
Wall		130 Other-32	Other	wall insulation R-value 8.79	none	0	0	0	0	0	NA	NA
Wall		137 Other-07	Other	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		143 Public Order-03	Public Order Safety	wall insulation R-value 0.00	Blow-in Insulation: Increase Insulation by R-13	3,839	3,899	0	3,899	60	1.02	15.4
Wall		141 Public Order-01	Public Order Safety	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		142 Public Order-02	Public Order Safety	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		144 Public Order-04	Public Order Safety	wall insulation R-value 5.32	none	0	0	0	0	0	NA	NA
Wall		145 Public Order-05	Public Order Safety	wall insulation R-value 5.32	none	0	0	0	0	0	NA	NA
Wall		49 FH-attached-03	Single Family Attached	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		48 FH-attached-01	Single Family Attached	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		51 FH-attached-05	Single Family Attached	wall insulation R-value 5.00	none	0	0	0	0	0	NA	NA
Wall		50 FH-attached-04	Single Family Attached	wall insulation R-value 5.00	none	0	0	0	0	0	NA	NA
Wall		46 FH-Detached-05	Single Family Detached	wall insulation R-value 5.00	none	0	0	0	0	0	NA	NA
Wall		43 FH-Detached-01	Single Family Detached	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		45 FH-Detached-04	Single Family Detached	wall insulation R-value 0.00	Blow-in Insulation: Increase Insulation by R-6.5	22,880	41,085	0	41,085	18,205	1.80	8.7
Wall		47 FH-Detached-07	Single Family Detached	wall insulation R-value 11.00	none	0	0	0	0	0	NA	NA
Wall		44 FH-Detached-03	Single Family Detached	wall insulation R-value 5.00	none	0	0	0	0	0	NA	NA
Wall		171 Warehouse-03	Warehouse & Storage	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		162 Warehouse-21	Warehouse & Storage	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		160 Warehouse-19	Warehouse & Storage	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		161 Warehouse-02	Warehouse & Storage	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		169 Warehouse-30	Warehouse & Storage	wall insulation R-value 11.00	none	0	0	0	0	0	NA	NA
Wall		153 Warehouse-11	Warehouse & Storage	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		170 Warehouse-04	Warehouse & Storage	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		165 Warehouse-25	Warehouse & Storage	wall insulation R-value 8.79	none	0	0	0	0	0	NA	NA
Wall		154 Warehouse-01	Warehouse & Storage	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		166 Warehouse-26	Warehouse & Storage	wall insulation R-value 8.79	none	0	0	0	0	0	NA	NA
Wall		168 Warehouse-03	Warehouse & Storage	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		157 Warehouse-13	Warehouse & Storage	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		167 Warehouse-29	Warehouse & Storage	wall insulation R-value 5.32	none	0	0	0	0	0	NA	NA
Wall		164 Warehouse-24	Warehouse & Storage	wall insulation R-value 5.32	none	0	0	0	0	0	NA	NA
Wall		156 Warehouse-12	Warehouse & Storage	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		159 Warehouse-18	Warehouse & Storage	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		172 Warehouse-07	Warehouse & Storage	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		173 Warehouse-08	Warehouse & Storage	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		158 Warehouse-16	Warehouse & Storage	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA
Wall		163 Warehouse-23	Warehouse & Storage	wall insulation R-value 5.32	none	0	0	0	0	0	NA	NA
Wall		174 Warehouse-09	Warehouse & Storage	wall insulation R-value 0.00	none	0	0	0	0	0	NA	NA

Table 3.6b
All Non-Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of O&M Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Cooling		Hsg-fam - 1	Hsg-fam - 1	AC and Heat Source	Reflect Win Film - RI	4,575	28,321	0	-4,236	24,084	19,510	5.26	3.0
Cooling		Hsg-fam - 1	Hsg-fam - 1	AC and Heat Source	Shade Screen - RI	5,791	43,162	0	-5,363	37,800	32,009	6.53	2.4
Cooling		Hsg-fam - 2	Hsg-fam - 2	AC and Heat Source	Reflect Win Film - RI	7,331	45,061	0	-6,789	38,272	30,941	5.22	3.0
Cooling		Hsg-fam - 2	Hsg-fam - 2	AC and Heat Source	Shade Screen - RI	9,280	68,012	0	-8,594	59,419	50,139	6.40	2.4
Cool, Heat		Hsg-fam	Hsg-fam	AC and Elec Heat	Radiant Barriers	465,731	248,261	0	-188,652	59,608	-406,122	0.13	122.1
Cool, Heat		Hsg-fam	Hsg-fam	AC and Gas Heat	Radiant Barriers	1,196,079	534,874	0	-484,492	50,382	-1,145,697	0.04	370.9
Dryer		On-Post Housing	On-Post Housing	Clothes Drying	DRE-1	583,710	176,906	-380,710	-136,612	-340,416	-924,126	-0.58	-26.8
Dryer		On-Post Housing	On-Post Housing	Clothes Drying	Switch to Nat Gas	764,470	489,237	-254,640	-178,917	55,681	-708,789	0.07	214.5
Dshwshr		On-Post Housing	On-Post Housing	Dishwasher	DWE-1	662,425	265,094	0	304,827	569,922	-92,504	0.86	18.2
Lights		8 Ball Fields	8 Ball Fields	Lighting Controls	Lighting Controls - RI	40,000	933,740	0	-16,203	917,537	877,537	22.94	0.7
Lights		BRK/ADM - 2	BRK/ADM - 2	60W INC	CFL 2-13 CEIL	159,608	71,585	18,253	0	89,838	-69,769	0.56	27.8
Motors		1	Assembly	AHU	EEM - RI	1,212	433	0	1,107	2,752	328	1.27	6.9
Motors		1	Assembly	AHU	EEM - ROF	1,165	401	0	1,165	2,732	401	1.34	6.7
Motors		10A	Assembly	AHU	EEM - RI	1,410	2,206	0	1,288	4,904	2,084	2.48	4.5
Motors		10A	Assembly	AHU	EEM - ROF	1,356	2,024	0	1,356	4,736	2,024	2.49	4.5
Motors		10B	Assembly	AHU	EEM - RI	1,410	2,206	0	1,288	4,904	2,084	2.48	4.5
Motors		10B	Assembly	AHU	EEM - ROF	1,356	2,024	0	1,356	4,736	2,024	2.49	4.5
Motors		10B	Assembly	AHU	VSD to Existing - RI	53,080	23,528	312	-19,603	56,693	-49,468	0.07	14.6
Motors		10B	Assembly	AHU	VSD & EEM - RI	53,350	23,122	-312	-19,751	56,409	-50,291	0.06	14.8
Motors		11	Assembly	AHU	EEM - RI	1,908	2,695	0	1,743	6,346	2,530	2.33	4.7
Motors		11	Assembly	AHU	EEM - ROF	1,835	2,463	0	1,835	6,132	2,463	2.34	4.7
Motors		11	Assembly	AHU	VSD to Existing - RI	78,739	34,235	-312	-29,329	83,333	-74,145	0.06	14.8
Motors		11	Assembly	AHU	VSD & EEM - RI	79,172	33,630	312	-29,554	82,936	-75,408	0.05	14.9
Motors		12	Assembly	AHU	EEM - RI	3,348	5,886	0	3,058	12,292	5,596	2.67	4.3
Motors		12	Assembly	AHU	EEM - ROF	3,219	5,392	0	3,219	11,831	5,392	2.68	4.3
Motors		12	Assembly	AHU	VSD to Existing - RI	155,333	68,558	-469	-58,413	165,010	-145,656	0.06	14.7
Motors		12	Assembly	AHU	VSD & EEM - RI	155,929	67,360	-469	-58,747	164,073	-147,785	0.05	14.8
Motors		13	Assembly	AHU	EEM - RI	1,546	2,464	0	1,412	5,422	2,330	2.51	4.5
Motors		13	Assembly	AHU	EEM - ROF	1,487	2,248	0	1,487	5,221	2,248	2.51	4.4
Motors		13	Assembly	AHU	VSD to Existing - RI	77,449	33,637	-156	-29,292	81,638	-73,259	0.05	14.8
Motors		13	Assembly	AHU	VSD & EEM - RI	77,763	33,038	-156	-29,461	81,184	-74,342	0.04	15.0
Motors		14	Assembly	AHU	EEM - RI	1,918	3,294	0	1,752	6,964	3,128	2.63	4.3
Motors		14	Assembly	AHU	EEM - ROF	1,844	3,007	0	1,844	6,696	3,007	2.63	4.3
Motors		14	Assembly	AHU	VSD to Existing - RI	103,141	44,465	-156	-39,198	108,251	-98,030	0.05	14.9
Motors		14	Assembly	AHU	VSD & EEM - RI	103,528	43,673	-156	-39,407	107,638	-99,418	0.04	15.0
Motors		15	Assembly	Air Comp.	EEM - RI	705	1,103	0	644	2,452	1,042	2.48	4.5
Motors		15	Assembly	Air Comp.	EEM - ROF	678	1,012	0	678	2,368	1,012	2.49	4.5
Motors		16	Assembly	CTwr Fan	EEM - RI	1,214	2,013	0	1,008	4,235	1,807	2.49	4.5
Motors		16	Assembly	CTwr Fan	EEM - ROF	1,122	1,706	0	1,122	3,951	1,706	2.52	4.4
Motors		16	Assembly	CTwr Fan	VSD to Existing - RI	4,434	14,161	-312	-236	18,047	9,179	3.07	3.8
Motors		16	Assembly	CTwr Fan	VSD & EEM - RI	4,766	14,041	-312	-431	18,064	8,532	2.79	4.1
Motors		17	Assembly	CTwr Fan	EEM - RI	1,410	2,206	0	1,288	4,904	2,084	2.48	4.5
Motors		17	Assembly	CTwr Fan	EEM - ROF	1,356	2,024	0	1,356	4,736	2,024	2.49	4.5
Motors		17	Assembly	CTwr Fan	VSD to Existing - RI	5,280	18,566	-312	-241	23,292	12,732	3.41	3.5
Motors		17	Assembly	CTwr Fan	VSD & EEM - RI	5,550	18,295	312	-389	23,144	12,044	3.17	3.7
Motors		18	Assembly	CWtr Pump	EEM - RI	607	988	0	555	2,150	936	2.54	4.4
Motors		18	Assembly	CWtr Pump	EEM - ROF	584	910	0	584	2,077	910	2.56	4.4
Motors		18	Assembly	CWtr Pump	VSD to Existing - RI	6,559	8,956	-156	-1,841	13,518	401	1.06	7.6
Motors		18	Assembly	CWtr Pump	VSD & EEM - RI	6,707	8,806	-156	-1,916	13,440	26	1.00	7.8
Motors		19	Assembly	CWtr Pump	EEM - RI	1,410	2,255	0	1,171	4,836	2,016	2.43	4.6
Motors		19	Assembly	CWtr Pump	EEM - ROF	1,304	1,898	0	1,304	4,505	1,898	2.46	4.5
Motors		19	Assembly	CWtr Pump	VSD to Existing - RI	17,037	23,515	312	-5,084	35,156	1,083	1.06	7.6
Motors		19	Assembly	CWtr Pump	VSD & EEM - RI	17,350	23,171	312	-5,286	34,922	222	1.01	7.8
Motors		2	Assembly	AHU	EEM - RI	416	165	0	380	961	129	1.31	6.8

Table 3.6b
All Non-Building EROs: Present Values of Costs and Savings

End Use	Bldg. Set No.	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of O&M Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		2	Assembly	AHU	EEM - ROF	400	152	0	400	952	152	1.38	6.6
Motors		20	Assembly	CWtr Pump	EEM - RI	954	1,347	0	871	3,173	1,265	2.33	4.7
Motors		20	Assembly	CWtr Pump	EEM - ROF	917	1,232	0	917	3,066	1,232	2.34	4.7
Motors		20	Assembly	CWtr Pump	VSD to Existing - RI	12,232	17,118	-156	-3,672	25,522	1,057	1.09	7.5
Motors		20	Assembly	CWtr Pump	VSD & EEM - RI	12,449	16,815	-156	-3,785	25,323	425	1.03	7.7
Motors		21	Assembly	Cond. Fan	EEM - RI	1,010	366	0	839	2,215	195	1.19	7.1
Motors		21	Assembly	Cond. Fan	EEM - ROF	934	313	0	934	2,181	313	1.34	6.7
Motors		22	Assembly	Cond. Fan	EEM - RI	208	82	0	190	480	64	1.31	6.8
Motors		22	Assembly	Cond. Fan	EEM - ROF	200	76	0	200	476	76	1.38	6.6
Motors		23	Assembly	Cond. Fan	EEM - RI	2,270	610	0	2,074	4,954	414	1.18	7.2
Motors		23	Assembly	Cond. Fan	EEM - ROF	2,183	558	0	2,183	4,923	558	1.26	6.9
Motors		24	Assembly	Cond. Fan	EEM - RI	1,428	766	0	1,305	3,498	642	1.45	6.4
Motors		24	Assembly	Cond. Fan	EEM - ROF	1,373	705	0	1,373	3,451	705	1.51	6.2
Motors		25	Assembly	Cond. Fan	EEM - RI	275	193	0	251	719	169	1.61	6.0
Motors		25	Assembly	Cond. Fan	EEM - ROF	264	178	0	264	707	178	1.67	5.8
Motors		26	Assembly	Cond. Fan	EEM - RI	954	847	0	871	2,673	765	1.80	5.6
Motors		26	Assembly	Cond. Fan	EEM - ROF	917	779	0	917	2,614	779	1.85	5.5
Motors		27	Assembly	Cond. Fan	EEM - RI	1,736	2,461	0	1,586	5,783	2,311	2.33	4.7
Motors		27	Assembly	Cond. Fan	EEM - ROF	1,669	2,261	0	1,669	5,600	2,261	2.35	4.7
Motors		28	Assembly	Cond. Fan	EEM - RI	1,214	1,976	0	1,109	4,299	1,871	2.54	4.4
Motors		28	Assembly	Cond. Fan	EEM - ROF	1,167	1,819	0	1,167	4,154	1,819	2.56	4.4
Motors		29	Assembly	Cond. Fan	EEM - RI	705	1,103	0	644	2,452	1,042	2.48	4.5
Motors		29	Assembly	Cond. Fan	EEM - ROF	678	1,012	0	678	2,368	1,012	2.49	4.5
Motors		3	Assembly	AHU	EEM - RI	2,951	813	0	2,450	6,215	313	1.11	7.4
Motors		3	Assembly	AHU	EEM - ROF	2,728	680	0	2,728	6,136	680	1.25	6.9
Motors		30	Assembly	Cond. Pump	EEM - RI	1,214	2,013	0	1,008	4,235	1,807	2.49	4.5
Motors		30	Assembly	Cond. Pump	EEM - ROF	1,122	1,706	0	1,122	3,951	1,706	2.52	4.4
Motors		30	Assembly	Cond. Pump	VSD to Existing - RI	4,434	14,161	-312	-236	18,047	9,179	3.07	3.8
Motors		30	Assembly	Cond. Pump	VSD & EEM - RI	4,766	14,041	-312	-431	18,064	8,532	2.79	4.1
Motors		31	Assembly	Cond. Pump	EEM - RI	1,410	2,206	0	1,288	4,904	2,084	2.48	4.5
Motors		31	Assembly	Cond. Pump	EEM - ROF	1,356	2,024	0	1,356	4,736	2,024	2.49	4.5
Motors		31	Assembly	Cond. Pump	VSD to Existing - RI	5,280	18,566	-312	-241	23,292	12,732	3.41	3.5
Motors		31	Assembly	Cond. Pump	VSD & EEM - RI	5,550	18,295	-312	-389	23,144	12,044	3.17	3.7
Motors		4	Assembly	AHU	EEM - RI	714	383	0	652	1,749	321	1.45	6.4
Motors		4	Assembly	AHU	EEM - ROF	687	352	0	687	1,726	352	1.51	6.2
Motors		5A	Assembly	AHU	EEM - RI	1,100	783	0	913	2,796	596	1.54	6.1
Motors		5A	Assembly	AHU	EEM - ROF	1,017	668	0	1,017	2,702	668	1.66	5.9
Motors		5B	Assembly	AHU	EEM - RI	1,375	978	0	1,142	3,495	745	1.54	6.1
Motors		5B	Assembly	AHU	EEM - ROF	1,271	835	0	1,271	3,377	835	1.66	5.9
Motors		5B	Assembly	AHU	VSD to Existing - RI	18,465	6,634	-781	-5,701	18,617	-18,313	0.01	15.5
Motors		5B	Assembly	AHU	VSD & EEM - RI	18,680	6,554	-781	-5,868	18,585	-18,775	-0.01	15.7
Motors		6A	Assembly	AHU	EEM - RI	1,590	1,467	0	1,193	4,250	1,070	1.67	5.8
Motors		6A	Assembly	AHU	EEM - ROF	1,414	1,139	0	1,414	3,966	1,139	1.81	5.6
Motors		6B	Assembly	AHU	EEM - RI	2,226	2,054	0	1,670	5,951	1,499	1.67	5.8
Motors		6B	Assembly	AHU	EEM - ROF	1,979	1,595	0	1,979	5,553	1,595	1.81	5.6
Motors		6B	Assembly	AHU	VSD to Existing - RI	43,721	17,805	1,094	-14,948	45,485	-41,957	0.04	15.0
Motors		6B	Assembly	AHU	VSD & EEM - RI	44,142	17,611	1,094	-15,308	45,352	-42,932	0.03	15.2
Motors		7A	Assembly	AHU	EEM - RI	760	933	0	512	2,205	685	1.90	5.4
Motors		7A	Assembly	AHU	EEM - ROF	650	672	0	650	1,971	672	2.03	5.1
Motors		7B	Assembly	AHU	EEM - RI	760	933	0	512	2,205	685	1.90	5.4
Motors		7B	Assembly	AHU	EEM - ROF	650	672	0	650	1,971	672	2.03	5.1
Motors		7B	Assembly	AHU	VSD to Existing - RI	17,745	7,367	312	-6,281	18,518	-16,971	0.04	15.0
Motors		7B	Assembly	AHU	VSD & EEM - RI	17,896	7,312	312	-6,429	18,466	-17,326	0.03	15.1
Motors		8A	Assembly	AHU	EEM - RI	868	1,304	0	585	2,757	1,021	2.18	4.9

Table 3.6b
All Non-Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of O&M Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		8A	Assembly	AHU	EEM - ROF	742	928	0	742	2,412	928	2.25	4.8
Motors		8B	Assembly	AHU	EEM - RI	868	1,304	0	585	2,757	1,021	2.18	4.9
Motors		8B	Assembly	AHU	EEM - ROF	742	928	0	742	2,412	928	2.25	4.8
Motors		8B	Assembly	AHU	VSD to Existing - RI	27,510	12,069	-312	-10,116	29,151	-25,870	0.06	14.7
Motors		8B	Assembly	AHU	VSD & EEM - RI	27,739	11,959	-312	-10,300	29,086	-26,392	0.05	14.9
Motors		9	Assembly	AHU	EEM - RI	607	988	0	555	2,150	936	2.54	4.4
Motors		9	Assembly	AHU	EEM - ROF	584	910	0	584	2,077	910	2.56	4.4
Motors		9	Assembly	AHU	VSD to Existing - RI	20,059	8,956	-156	-7,309	21,549	-18,568	0.07	14.5
Motors		9	Assembly	AHU	VSD & EEM - RI	20,207	8,806	-156	-7,385	21,472	-18,942	0.06	14.7
Motors		1	Education	AHU	EEM - RI	404	176	0	369	949	141	1.35	6.7
Motors		1	Education	AHU	EEM - ROF	388	163	0	388	940	163	1.42	6.5
Motors		10	Education	AHU	EEM - RI	2,232	4,779	0	2,039	9,049	4,585	3.05	3.9
Motors		10	Education	AHU	EEM - ROF	2,146	4,379	0	2,146	8,671	4,379	3.04	3.9
Motors		10	Education	AHU	VSD to Existing - RI	103,866	55,393	-312	-39,068	119,878	-87,853	0.15	13.5
Motors		10	Education	AHU	VSD & EEM - RI	104,263	54,619	-312	-39,290	119,279	-89,247	0.14	13.7
Motors		11	Education	AHU	EEM - RI	3,092	6,002	0	2,825	11,919	5,735	2.85	4.1
Motors		11	Education	AHU	EEM - ROF	2,973	5,478	0	2,973	11,424	5,478	2.84	4.1
Motors		11	Education	AHU	VSD to Existing - RI	155,325	81,532	-312	-58,757	177,788	-132,863	0.14	13.6
Motors		11	Education	AHU	VSD & EEM - RI	155,954	80,365	-312	-59,095	176,912	-134,996	0.13	13.8
Motors		12	Education	Air Comp.	EEM - RI	868	1,498	0	793	3,159	1,423	2.64	4.3
Motors		12	Education	Air Comp.	EEM - ROF	835	1,377	0	835	3,046	1,377	2.65	4.3
Motors		13	Education	Air Comp.	EEM - RI	1,116	2,389	0	1,019	4,525	2,293	3.05	3.9
Motors		13	Education	Air Comp.	EEM - ROF	1,073	2,189	0	1,073	4,336	2,189	3.04	3.9
Motors		14	Education	Air Comp.	EEM - RI	1,546	3,001	0	1,412	5,959	2,667	2.85	4.1
Motors		14	Education	Air Comp	EEM - ROF	1,487	2,739	0	1,487	5,712	2,739	2.84	4.1
Motors		15	Education	CTwr Fan	EEM - RI	1,214	2,406	0	1,109	4,729	2,301	2.90	4.0
Motors		15	Education	CTwr Fan	EEM - ROF	1,167	2,216	0	1,167	4,550	2,216	2.90	4.0
Motors		15	Education	CTwr Fan	VSD to Existing - RI	4,469	17,211	-312	-179	21,189	12,251	3.74	3.3
Motors		15	Education	CTwr Fan	VSD & EEM - RI	4,766	17,033	-312	-330	21,157	11,625	3.44	3.5
Motors		16	Education	CTwr Fan	EEM - RI	1,410	2,687	0	1,288	5,385	2,565	2.82	4.1
Motors		16	Education	CTwr Fan	EEM - ROF	1,356	2,466	0	1,356	5,177	2,466	2.82	4.1
Motors		16	Education	CTwr Fan	VSD to Existing - RI	5,280	22,504	-312	-241	27,230	16,670	4.16	3.0
Motors		16	Education	CTwr Fan	VSD & EEM - RI	5,550	22,253	-312	-389	27,102	16,002	3.88	3.2
Motors		17A	Education	CWtr Pump	EEM - RI	1,410	2,687	0	1,288	5,385	2,565	2.82	4.1
Motors		17A	Education	CWtr Pump	EEM - ROF	1,356	2,466	0	1,356	5,177	2,466	2.82	4.1
Motors		17B	Education	CWtr Pump	EEM - RI	1,410	2,687	0	1,288	5,385	2,565	2.82	4.1
Motors		17B	Education	CWtr Pump	EEM - ROF	1,356	2,466	0	1,356	5,177	2,466	2.82	4.1
Motors		17B	Education	CWtr Pump	VSD to Existing - RI	17,080	28,515	-312	-5,021	40,262	6,101	1.36	6.6
Motors		17B	Education	CWtr Pump	VSD & EEM - RI	17,350	28,123	-312	-5,169	39,992	5,292	1.31	6.8
Motors		18	Education	Cond. Fan	EEM - RI	624	314	0	420	1,358	110	1.18	7.2
Motors		18	Education	Cond. Fan	EEM - ROF	533	228	0	533	1,295	228	1.43	6.4
Motors		19	Education	Cond. Fan	EEM - RI	4,313	1,447	0	3,581	9,342	716	1.17	7.2
Motors		19	Education	Cond. Fan	EEM - ROF	3,988	1,210	0	3,988	9,185	1,210	1.30	6.8
Motors		2	Education	AHU	EEM - RI	624	300	0	570	1,494	246	1.40	6.5
Motors		2	Education	AHU	EEM - ROF	600	278	0	600	1,478	278	1.46	6.3
Motors		20	Education	Cond. Fan	EEM - RI	1,190	777	0	1,087	3,054	674	1.57	6.1
Motors		20	Education	Cond. Fan	EEM - ROF	1,144	715	0	1,144	3,004	715	1.63	6.0
Motors		21	Education	Cond. Fan	EEM - RI	2,475	2,111	0	2,261	6,847	1,897	1.77	5.6
Motors		21	Education	Cond. Fan	EEM - ROF	2,380	1,951	0	2,380	6,710	1,951	1.82	5.5
Motors		22	Education	Cond. Fan	EEM - RI	954	1,032	0	871	2,857	949	1.99	5.2
Motors		22	Education	Cond. Fan	EEM - ROF	917	949	0	917	2,783	949	2.03	5.1
Motors		23	Education	Cond. Fan	EEM - RI	868	1,498	0	793	3,159	1,423	2.64	4.3
Motors		23	Education	Cond. Fan	EEM - ROF	835	1,377	0	835	3,046	1,377	2.65	4.3
Motors		24	Education	Cond. Fan	EEM - RI	607	1,203	0	555	2,364	1,596	2.90	4.0

Table 3.6b
All Non-Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of O&M Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		24	Education	Cond. Fan	EEM - ROF	584	1,108	0	584	2,275	1,108	2.90	4.0
Motors		25	Education	Cond. Pump	EEM - RI	1,214	2,406	0	1,109	4,729	2,301	2.90	4.0
Motors		25	Education	Cond. Pump	EEM - ROF	1,167	2,216	0	1,167	4,550	2,216	2.90	4.0
Motors		25	Education	Cond. Pump	VSD to Existing - RI	4,469	17,211	312	-179	21,189	12,251	3.74	3.3
Motors		25	Education	Cond. Pump	VSD & EEM - RI	4,766	17,033	-312	-330	21,157	11,625	3.44	3.5
Motors		26	Education	Cond. Pump	EEM - RI	1,410	2,687	0	1,288	5,385	2,565	2.82	4.1
Motors		26	Education	Cond. Pump	EEM - ROF	1,356	2,466	0	1,356	5,177	2,466	2.82	4.1
Motors		26	Education	Cond. Pump	VSD to Existing - RI	5,280	22,504	-312	-241	27,230	16,670	4.16	3.0
Motors		26	Education	Cond. Pump	VSD & EEM - RI	5,550	22,251	-312	-389	27,102	16,002	3.88	3.2
Motors		27	Education	Refrig.	EEM - RI	705	2,228	0	644	3,577	2,167	4.07	3.1
Motors		27	Education	Refrig.	EEM - ROF	678	2,045	0	678	3,401	2,045	4.02	3.1
Motors		3	Education	AHU	EEM - RI	2,724	936	0	2,044	5,704	256	1.09	7.5
Motors		3	Education	AHU	EEM - ROF	2,422	715	0	2,422	5,559	715	1.30	6.8
Motors		4	Education	AHU	EEM - RI	952	665	0	571	2,188	284	1.30	6.8
Motors		4	Education	AHU	EEM - ROF	782	438	0	782	2,003	438	1.56	6.1
Motors		5A	Education	AHU	EEM - RI	2,200	1,933	0	1,651	5,784	1,384	1.63	5.9
Motors		5A	Education	AHU	EEM - ROF	1,956	1,522	0	1,956	5,434	1,522	1.78	5.6
Motors		5B	Education	AHU	EEM - RI	3,575	3,142	0	2,683	9,399	2,249	1.63	5.9
Motors		5B	Education	AHU	EEM - ROF	3,178	2,473	0	3,178	8,830	2,473	1.78	5.6
Motors		5B	Education	AHU	VSD to Existing - RI	48,191	20,877	-2,031	-15,084	51,953	-44,429	0.08	14.5
Motors		5B	Education	AHU	VSD & EEM - RI	48,865	20,771	2,031	-15,663	51,942	-45,788	0.06	14.7
Motors		6A	Education	AHU	EEM - RI	1,908	2,063	0	1,743	5,714	1,898	1.99	5.2
Motors		6A	Education	AHU	EEM - ROF	1,835	1,897	0	1,835	5,567	1,897	2.03	5.1
Motors		6B	Education	AHU	EEM - RI	4,452	4,814	0	4,067	13,333	4,429	1.99	5.2
Motors		6B	Education	AHU	EEM - ROF	4,281	4,427	0	4,281	12,989	4,427	2.03	5.1
Motors		6B	Education	AHU	VSD to Existing - RI	87,906	43,227	2,187	-29,606	99,340	-76,472	0.13	13.8
Motors		6B	Education	AHU	VSD & EEM - RI	88,454	42,653	-2,187	-29,959	98,960	-77,948	0.12	14.0
Motors		7A	Education	AHU	EEM - RI	2,290	3,300	0	1,893	7,473	2,913	2.28	4.8
Motors		7A	Education	AHU	EEM - ROF	2,108	2,804	0	2,108	7,020	2,804	2.33	4.7
Motors		7B	Education	AHU	EEM - RI	3,800	5,500	0	3,155	12,455	4,855	2.28	4.8
Motors		7B	Education	AHU	EEM - ROF	3,513	4,673	0	3,513	11,699	4,673	2.33	4.7
Motors		7B	Education	AHU	VSD to Existing - RI	88,961	44,731	-1,562	-31,114	101,016	-76,907	0.14	13.8
Motors		7B	Education	AHU	VSD & EEM - RI	89,470	44,289	-1,562	-31,547	100,650	-78,290	0.12	13.9
Motors		8	Education	AHU	EEM - RI	705	1,343	0	644	2,692	1,282	2.82	4.1
Motors		8	Education	AHU	EEM - ROF	678	1,233	0	678	2,589	1,233	2.82	4.1
Motors		8	Education	AHU	VSD to Existing - RI	26,738	14,258	-156	-9,882	30,958	-22,519	0.16	13.5
Motors		8	Education	AHU	VSD & EEM - RI	26,873	14,061	-156	-9,956	30,822	-22,924	0.15	13.6
Motors		9	Education	AHU	EEM - RI	2,862	5,049	0	2,376	10,288	4,564	2.59	4.3
Motors		9	Education	AHU	EEM - ROF	2,646	4,220	0	2,646	9,512	4,220	2.59	4.3
Motors		9	Education	AHU	VSD to Existing - RI	117,886	62,220	-469	-44,070	135,568	-100,205	0.15	13.6
Motors		9	Education	AHU	VSD & EEM - RI	118,621	61,481	-469	-44,514	135,119	-102,123	0.14	13.7
Motors		1	FH-2 to 4	AHU	EEM - RI	208	97	0	190	495	79	1.38	6.6
Motors		1	FH-2 to 4	AHU	EEM - ROF	200	90	0	200	490	90	1.45	6.4
Motors		2	FH-2 to 4	AHU	EEM - RI	24,743	8,266	0	18,567	51,577	2,091	1.08	7.5
Motors		2	FH-2 to 4	AHU	EEM - ROF	21,996	6,319	0	21,996	50,312	6,319	1.29	6.8
Motors		3	FH-2 to 4	AHU	EEM - RI	210,392	136,064	0	174,702	521,158	100,374	1.48	6.3
Motors		3	FH-2 to 4	AHU	EEM - ROF	194,519	115,335	0	194,519	504,373	115,335	1.59	6.0
Motors		4	FH-2 to 4	AHU	EEM - RI	183,190	154,284	0	152,081	489,515	123,215	1.67	5.8
Motors		4	FH-2 to 4	AHU	EEM - ROF	169,332	131,644	0	169,332	470,309	131,644	1.78	5.6
Motors		5	FH-2 to 4	AHU	EEM - RI	8,904	9,363	0	8,134	26,401	8,593	1.97	5.3
Motors		5	FH-2 to 4	AHU	EEM - ROF	8,562	8,612	0	8,562	25,735	8,612	2.01	5.2
Motors		6	FH-2 to 4	Cond. Fan	EEM - RI	22,220	9,636	0	16,674	48,550	4,110	1.18	7.1
Motors		6	FH-2 to 4	Cond. Fan	EEM - ROF	19,753	7,638	0	19,753	47,145	7,638	1.39	6.5
Motors		7	FH-2 to 4	Cond. Fan	EEM - RI	78,416	36,724	0	71,634	186,774	29,942	1.38	6.6

Table 3.6b
All Non-Building EROs: Present Values of Costs and Savings

End Use	Bldg. Set No.	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of O&M Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		7	FH-2 to 4	Cond. Fan	EEM - ROF	75,400	33,947	0	75,400	184,747	33,947	1.45	6.4
Motors		8	FH-2 to 4	Cond. Fan	EEM - RI	261,277	85,263	0	216,955	563,495	40,941	1.16	7.2
Motors		8	FH-2 to 4	Cond. Fan	EEM - ROF	241,565	71,287	0	241,565	554,417	71,287	1.30	6.8
Motors		9	FH-2 to 4	Cond. Fan	EEM - RI	3,808	2,418	0	3,479	9,704	2,088	1.55	6.1
Motors		9	FH-2 to 4	Cond. Fan	EEM - ROF	3,662	2,226	0	3,662	9,549	2,226	1.61	6.0
Motors		10	FH-5 or More	AHU	EEM - RI	6,583	2,340	0	3,479	12,402	-764	0.88	8.3
Motors		10	FH-5 or More	AHU	EEM - ROF	5,203	1,366	0	5,203	11,771	1,366	1.26	6.9
Motors		11	FH-5 or More	AHU	EEM - RI	9,996	6,792	0	5,994	22,781	2,789	1.28	6.9
Motors		11	FH-5 or More	AHU	EEM - ROF	8,216	4,477	0	8,216	20,909	4,477	1.54	6.1
Motors		12	FH-5 or More	AHU	EEM - RI	9,350	8,309	0	4,942	22,601	3,901	1.42	6.5
Motors		12	FH-5 or More	AHU	EEM - ROF	7,389	5,113	0	7,389	19,892	5,113	1.69	5.8
Motors		13	FH-5 or More	Cond. Fan	EEM - RI	5,858	2,636	0	3,096	11,590	-126	0.98	7.9
Motors		13	FH-5 or More	Cond. Fan	EEM - ROF	4,630	1,637	0	4,630	10,896	1,637	1.35	6.6
Motors		14	FH-5 or More	Cond. Fan	EEM - RI	8,736	4,323	0	5,238	18,297	825	1.09	7.5
Motors		14	FH-5 or More	Cond. Fan	EEM - ROF	7,180	2,898	0	7,180	17,258	2,898	1.40	6.5
Motors		15	FH-5 or More	Cond. Fan	EEM - RI	7,718	2,743	0	4,079	14,540	-855	0.88	8.3
Motors		15	FH-5 or More	Cond. Fan	EEM - ROF	6,100	1,602	0	6,100	13,801	1,602	1.26	6.9
Motors		16	FH-Attached	AHU	EEM - RI	2,043	753	0	806	3,601	-485	0.76	8.9
Motors		16	FH-Attached	AHU	EEM - ROF	1,493	364	0	1,493	3,350	364	1.24	7.0
Motors		17	FH-Attached	AHU	EEM - RI	89,488	58,894	0	67,152	215,534	36,558	1.41	6.5
Motors		17	FH-Attached	AHU	EEM - ROF	79,555	45,921	0	79,555	205,030	45,921	1.58	6.1
Motors		18	FH-Attached	AHU	EEM - RI	26,400	22,565	0	19,811	68,776	15,976	1.61	6.0
Motors		18	FH-Attached	AHU	EEM - ROF	23,470	17,764	0	23,470	64,703	17,764	1.76	5.7
Motors		19	FH-Attached	AHU	EEM - RI	6,996	7,503	0	5,809	20,308	6,316	1.90	5.4
Motors		19	FH-Attached	AHU	EEM - ROF	6,468	6,345	0	6,468	19,281	6,345	1.98	5.2
Motors		20	FH-Attached	Cond. Fan	EEM - RI	1,818	835	0	717	3,370	-266	0.85	8.4
Motors		20	FH-Attached	Cond. Fan	EEM - ROF	1,328	437	0	1,328	3,093	437	1.33	6.7
Motors		21	FH-Attached	Cond. Fan	EEM - RI	11,648	5,537	0	9,672	26,857	3,561	1.31	6.8
Motors		21	FH-Attached	Cond. Fan	EEM - ROF	10,769	4,728	0	10,769	26,267	4,728	1.44	6.4
Motors		22	FH-Attached	Cond. Fan	EEM - RI	94,432	31,549	0	70,862	196,843	7,979	1.08	7.5
Motors		22	FH-Attached	Cond. Fan	EEM - ROF	83,950	24,117	0	83,950	192,016	24,117	1.29	6.8
Motors		23	FH-Attached	Cond. Fan	EEM - RI	4,760	3,022	0	4,348	12,130	2,610	1.55	6.1
Motors		23	FH-Attached	Cond. Fan	EEM - ROF	4,577	2,783	0	4,577	11,937	2,783	1.61	6.0
Motors		24	FH-Detached	AHU	EEM - RI	454	155	0	306	915	7	1.02	7.8
Motors		24	FH-Detached	AHU	EEM - ROF	388	108	0	388	885	108	1.28	6.9
Motors		25	FH-Detached	AHU	EEM - RI	3,570	2,461	0	1,887	7,918	778	1.22	7.0
Motors		25	FH-Detached	AHU	EEM - ROF	2,821	1,489	0	2,821	7,132	1,489	1.53	6.2
Motors		26	FH-Detached	AHU	EEM - RI	4,400	3,650	0	4,019	12,069	3,269	1.74	5.7
Motors		26	FH-Detached	AHU	EEM - ROF	4,231	3,373	0	4,231	11,834	3,373	1.80	5.6
Motors		27	FH-Detached	AHU	EEM - RI	1,908	2,006	0	1,743	5,657	1,841	1.97	5.3
Motors		27	FH-Detached	AHU	EEM - ROF	1,835	1,845	0	1,835	5,515	1,845	2.01	5.2
Motors		28	FH-Detached	AHU	EEM - RI	380	526	0	347	1,253	493	2.30	4.7
Motors		28	FH-Detached	AHU	EEM - ROF	365	485	0	365	1,215	485	2.33	4.7
Motors		29	FH-Detached	Cond. Fan	EEM - RI	1,456	721	0	873	3,050	138	1.09	7.5
Motors		29	FH-Detached	Cond. Fan	EEM - ROF	1,197	483	0	1,197	2,876	483	1.40	6.5
Motors		30	FH-Detached	Cond. Fan	EEM - RI	5,448	1,820	0	4,088	11,356	460	1.08	7.5
Motors		30	FH-Detached	Cond. Fan	EEM - ROF	4,843	1,391	0	4,843	11,078	1,391	1.29	6.8
Motors		31	FH-Detached	Cond. Fan	EEM - RI	1,428	907	0	1,305	3,639	783	1.55	6.1
Motors		31	FH-Detached	Cond. Fan	EEM - ROF	1,373	835	0	1,373	3,581	835	1.61	6.0
Motors		32	FH-Detached	Cond. Fan	EEM - RI	318	334	0	290	943	307	1.97	5.3
Motors		32	FH-Detached	Cond. Fan	EEM - ROF	306	308	0	306	919	308	2.01	5.2
Motors		1	Food Sales	AHU	EEM - RI	607	1,326	0	555	2,487	1,273	3.10	3.8
Motors		1	Food Sales	AHU	EEM - ROF	584	1,221	0	584	2,388	1,221	3.09	3.8
Motors		1	Food Sales	AHU	VSD to Existing - RI	20,039	11,941	136	7,369	24,534	15,583	0.22	12.8

Table 3.6b
All Non-Building EROs: Present Values of Costs and Savings

End Use	Bldg. Set No	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of O&M Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		1	Food Sales	AHU	VSD & EEM - RI	20,207	11,800	-156	-7,385	24,466	-15,948	0.21	12.9
Motors		2	Food Sales	AHU	EEM - RI	2,232	5,267	0	2,039	9,538	5,074	3.27	3.7
Motors		2	Food Sales	AHU	EEM - ROF	2,146	4,827	0	2,146	9,120	4,827	3.25	3.7
Motors		2	Food Sales	AHU	VSD to Existing - RI	103,866	60,935	312	-39,068	125,420	-82,311	0.21	12.9
Motors		2	Food Sales	AHU	VSD & EEM - RI	104,263	60,175	312	-39,290	124,835	-83,691	0.20	13.0
Motors		3	Food Sales	Cond. Fan	EEM - RI	434	826	0	396	1,656	788	2.82	4.1
Motors		3	Food Sales	Cond. Fan	EEM - ROF	417	759	0	417	1,594	759	2.82	4.1
Motors		4	Food Sales	Cond. Fan	EEM - RI	2,246	5,166	0	2,052	9,463	4,971	3.21	3.7
Motors		4	Food Sales	Cond. Fan	EEM - ROF	2,160	4,709	0	2,160	9,029	4,709	3.18	3.7
Motors		5	Food Sales	Refrig.	EEM - RI	1,116	4,162	0	1,019	6,297	4,065	4.64	2.8
Motors		5	Food Sales	Refrig.	EEM - ROF	1,073	3,816	0	1,073	5,962	3,816	4.56	2.8
Motors		6	Food Sales	Refrig.	EEM - RI	1,546	5,230	0	1,412	8,188	5,096	4.30	2.9
Motors		6	Food Sales	Refrig.	EEM - ROF	1,487	4,776	0	1,487	7,749	4,776	4.21	3.0
Motors		1	Food Service	AHU	EEM - RI	404	202	0	369	975	167	1.41	6.5
Motors		1	Food Service	AHU	EEM - ROF	388	187	0	388	964	187	1.48	6.3
Motors		10	Food Service	AHU	EEM - RI	954	1,891	0	871	3,717	1,809	2.90	4.0
Motors		10	Food Service	AHU	EEM - ROF	917	1,729	0	917	3,564	1,729	2.88	4.0
Motors		10	Food Service	AHU	VSD to Existing - RI	39,232	23,833	156	-14,609	48,301	-30,164	0.23	12.7
Motors		10	Food Service	AHU	VSD & EEM - RI	39,449	23,547	156	-14,722	48,118	-30,780	0.22	12.8
Motors		11	Food Service	AHU	EEM - RI	2,246	5,551	0	1,865	9,662	5,170	3.30	3.6
Motors		11	Food Service	AHU	EEM - ROF	2,077	4,617	0	2,077	8,770	4,617	3.22	3.7
Motors		11	Food Service	AHU	VSD to Existing - RI	128,712	77,002	156	-49,243	156,315	-101,109	0.21	12.9
Motors		11	Food Service	AHU	VSD & EEM - RI	129,231	76,218	-156	-49,572	155,720	-102,742	0.20	13.0
Motors		12	Food Service	Air Comp	EEM - RI	434	863	0	396	1,694	826	2.90	4.0
Motors		12	Food Service	Air Comp	EEM - ROF	417	793	0	417	1,628	793	2.90	4.0
Motors		13	Food Service	Air Comp	EEM - RI	607	1,386	0	555	2,547	1,333	3.20	3.7
Motors		13	Food Service	Air Comp	EEM - ROF	584	1,276	0	584	2,444	1,276	3.19	3.7
Motors		14	Food Service	Air Comp	EEM - RI	1,546	3,458	0	1,412	6,417	3,325	3.15	3.8
Motors		14	Food Service	Air Comp	EEM - ROF	1,487	3,157	0	1,487	6,130	3,157	3.12	3.8
Motors		15	Food Service	CTwr Fan	EEM - RI	954	1,939	0	792	3,685	1,777	2.86	4.0
Motors		15	Food Service	CTwr Fan	EEM - ROF	882	1,621	0	882	3,385	1,621	2.84	4.1
Motors		15	Food Service	CTwr Fan	VSD to Existing - RI	3,304	18,703	156	-111	21,740	15,131	5.58	2.4
Motors		15	Food Service	CTwr Fan	VSD & EEM - RI	3,549	18,598	156	-259	21,731	14,633	5.12	2.6
Motors		16	Food Service	CWtr Pump	EEM - RI	1,116	2,817	0	927	4,860	2,628	3.35	3.6
Motors		16	Food Service	CWtr Pump	EEM - ROF	1,032	2,366	0	1,032	4,430	2,366	3.29	3.6
Motors		16	Food Service	CWtr Pump	VSD to Existing - RI	15,432	31,806	156	-4,812	42,270	11,406	1.74	5.7
Motors		16	Food Service	CWtr Pump	VSD & EEM - RI	15,666	31,506	156	-4,967	42,049	10,717	1.68	5.8
Motors		17	Food Service	Cond. Fan	EEM - RI	1,272	1,585	0	1,162	4,019	1,475	2.16	4.9
Motors		17	Food Service	Cond. Fan	EEM - ROF	1,223	1,458	0	1,223	3,904	1,458	2.19	4.9
Motors		18	Food Service	Cond. Fan	EEM - RI	760	1,245	0	694	2,700	1,180	2.55	4.4
Motors		18	Food Service	Cond. Fan	EEM - ROF	731	1,148	0	731	2,610	1,148	2.57	4.4
Motors		19	Food Service	Cond. Fan	EEM - RI	434	863	0	396	1,694	826	2.90	4.0
Motors		19	Food Service	Cond. Fan	EEM - ROF	417	793	0	417	1,628	793	2.90	4.0
Motors		2	Food Service	AHU	EEM - RI	416	247	0	220	883	51	1.12	7.4
Motors		2	Food Service	AHU	EEM - ROF	329	152	0	329	810	152	1.46	6.3
Motors		20	Food Service	Cond. Fan	EEM - RI	607	1,386	0	555	2,547	1,333	3.20	3.7
Motors		20	Food Service	Cond. Fan	EEM - ROF	584	1,276	0	584	2,444	1,276	3.19	3.7
Motors		21	Food Service	Cond. Pump	EEM - RI	954	1,939	0	792	3,685	1,777	2.86	4.0
Motors		21	Food Service	Cond. Pump	EEM - ROF	882	1,621	0	882	3,385	1,621	2.84	4.1
Motors		21	Food Service	Cond. Pump	VSD to Existing - RI	3,304	18,703	156	-111	21,740	15,131	5.58	2.4
Motors		21	Food Service	Cond. Pump	VSD & EEM - RI	3,549	18,598	156	-259	21,731	14,633	5.12	2.6
Motors		22	Food Service	HW Circ	EEM - RI	434	863	0	396	1,694	826	2.90	4.0
Motors		22	Food Service	HW Circ	EEM - ROF	417	793	0	417	1,628	793	2.90	4.0
Motors		23	Food Service	Refrig	EEM - RI	227	123	0	207	558	104	1.46	6.4

Table 3.6b
All Non-Building ERCs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of O&M Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		23	Food Service	Refrig	EEM - ROF	218	113	0	218	549	113	1.52	6.2
Motors		24	Food Service	Refrig	EEM - RI	1,272	2,281	0	1,162	4,715	2,171	2.71	4.2
Motors		24	Food Service	Refrig	EEM - ROF	1,223	2,098	0	1,223	4,545	2,098	2.72	4.2
Motors		25	Food Service	Refrig	EEM - RI	760	1,792	0	694	3,246	1,726	3.27	3.7
Motors		25	Food Service	Refrig	EEM - ROF	731	1,653	0	731	3,114	1,653	3.26	3.7
Motors		3	Food Service	AHU	EEM - RI	3,632	1,370	0	3,318	8,319	1,055	1.29	6.8
Motors		3	Food Service	AHU	EEM - ROF	3,492	1,252	0	3,492	8,237	1,252	1.36	6.6
Motors		4	Food Service	AHU	EEM - RI	13,328	10,022	0	12,175	35,526	8,870	1.67	5.9
Motors		4	Food Service	AHU	EEM - ROF	12,815	9,231	0	12,815	34,862	9,231	1.72	5.7
Motors		5	Food Service	AHU	EEM - RI	550	519	0	457	1,555	455	1.83	5.5
Motors		5	Food Service	AHU	EEM - ROF	509	468	0	509	1,485	468	1.92	5.3
Motors		6	Food Service	AHU	EEM - RI	636	851	0	381	1,868	596	1.94	5.3
Motors		6	Food Service	AHU	EEM - ROF	523	558	0	523	1,604	558	2.07	5.1
Motors		7A	Food Service	AHU	EEM - RI	1,140	1,668	0	1,041	4,049	1,769	2.55	4.4
Motors		7A	Food Service	AHU	EEM - ROF	1,096	1,722	0	1,096	3,915	1,722	2.57	4.4
Motors		7B	Food Service	AHU	EEM - RI	1,900	3,113	0	1,736	6,749	2,949	2.55	4.4
Motors		7B	Food Service	AHU	EEM - ROF	1,827	2,871	0	1,827	6,525	2,871	2.57	4.4
Motors		7B	Food Service	AHU	VSD to Existing - RI	44,552	25,722	781	15,483	54,009	-35,044	0.21	12.9
Motors		7B	Food Service	AHU	VSD & EEM - RI	44,740	25,441	781	15,617	53,783	-35,697	0.20	13.0
Motors		8A	Food Service	AHU	EEM - RI	434	863	0	396	1,694	826	2.90	4.0
Motors		8A	Food Service	AHU	EEM - ROF	417	793	0	417	1,628	793	2.90	4.0
Motors		8B	Food Service	AHU	EEM - RI	868	1,726	0	793	3,387	1,651	2.90	4.0
Motors		8B	Food Service	AHU	EEM - ROF	835	1,587	0	835	3,256	1,587	2.90	4.0
Motors		8B	Food Service	AHU	VSD to Existing - RI	27,590	16,837	312	10,007	34,107	21,073	0.24	12.6
Motors		8B	Food Service	AHU	VSD & EEM - RI	27,739	16,645	312	10,092	33,980	-21,498	0.22	12.8
Motors		9	Food Service	AHU	EEM - RI	705	1,548	0	644	2,897	1,487	3.11	3.8
Motors		9	Food Service	AHU	EEM - ROF	678	1,421	0	678	2,776	1,421	3.10	3.8
Motors		9	Food Service	AHU	VSD to Existing - RI	26,738	16,380	156	9,852	33,080	-20,396	0.24	12.6
Motors		9	Food Service	AHU	VSD & EEM - RI	26,873	16,190	156	9,956	32,951	-20,795	0.23	12.7
Motors		1	Health Care	AHU	EEM - RI	238	255	0	217	713	237	2.00	5.2
Motors		1	Health Care	AHU	EEM - ROF	229	237	0	229	695	237	2.04	5.1
Motors		10	Health Care	Cond Fan	EEM - RI	275	389	0	251	915	365	2.33	4.7
Motors		10	Health Care	Cond Fan	EEM - ROF	264	359	0	264	888	359	2.36	4.7
Motors		11	Health Care	Cond Fan	EEM - RI	380	896	0	347	1,623	863	3.27	3.7
Motors		11	Health Care	Cond Fan	EEM - ROF	365	826	0	365	1,557	826	3.26	3.7
Motors		12	Health Care	Cond Pump	EEM - RI	607	2,031	0	504	3,142	1,928	4.18	3.0
Motors		12	Health Care	Cond Pump	EEM - ROF	561	1,723	0	561	2,846	1,723	4.07	3.1
Motors		12	Health Care	Cond Pump	VSD to Existing - RI	2,141	14,115	156	87	16,013	11,731	6.48	2.1
Motors		12	Health Care	Cond Pump	VSD & EEM - RI	2,307	14,133	156	185	16,099	11,485	5.98	2.2
Motors		13	Health Care	Vac Sys	EEM - RI	607	2,379	0	30	3,016	1,802	3.97	3.1
Motors		13	Health Care	Vac Sys	EEM - ROF	351	648	0	351	1,349	648	2.85	4.1
Motors		2	Health Care	AHU	EEM - RI	636	1,140	0	581	2,357	1,085	2.71	4.2
Motors		2	Health Care	AHU	EEM - ROF	612	1,049	0	612	2,272	1,049	2.72	4.2
Motors		2	Health Care	AHU	VSD to Existing - RI	12,534	10,154	312	4,220	18,156	-6,912	0.45	10.8
Motors		2	Health Care	AHU	VSD & EEM - RI	12,612	10,055	312	4,270	18,114	-7,110	0.44	10.9
Motors		3	Health Care	AHU	EEM - RI	760	1,792	0	694	3,246	1,726	3.27	3.7
Motors		3	Health Care	AHU	EEM - ROF	731	1,653	0	731	3,114	1,653	3.26	3.7
Motors		3	Health Care	AHU	VSD to Existing - RI	17,821	14,726	312	6,193	26,041	9,680	0.46	10.7
Motors		3	Health Care	AHU	VSD & EEM - RI	17,896	14,625	312	6,247	25,965	9,827	0.45	10.8
Motors		4	Health Care	AHU	EEM - RI	607	1,944	0	555	3,156	1,942	4.20	3.0
Motors		4	Health Care	AHU	EEM - ROF	584	1,857	0	584	3,005	1,857	4.15	3.0
Motors		4	Health Care	AHU	VSD to Existing - RI	20,059	17,829	56	7,469	30,442	9,675	0.52	10.3
Motors		4	Health Care	AHU	VSD & EEM - RI	20,207	17,776	56	7,355	30,392	10,022	0.50	10.4
Motors		5	Health Care	AHU	EEM - RI	[illegible]	[illegible]	0	545	2,074	4,254	4.02	3.1

Table 3.6b
All Non-Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of O&M Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		5	Health Care	AHU	EEM - ROF	1,159	3,137	0	1,159	5,455	3,137	3.71	3.3
Motors		5	Health Care	AHU	VSD to Existing - RI	52,915	46,788	-312	-19,839	79,551	-26,279	0.50	10.4
Motors		5	Health Care	AHU	VSD & EEM - RI	53,350	46,907	-312	-20,194	79,751	-26,949	0.49	10.5
Motors		6	Health Care	AHU	EEM - RI	1,116	4,055	0	927	6,097	3,865	4.46	2.9
Motors		6	Health Care	AHU	EEM - ROF	1,032	3,408	0	1,032	5,471	3,408	4.30	2.9
Motors		6	Health Care	AHU	VSD to Existing - RI	51,432	45,519	-156	-19,394	77,401	-25,463	0.50	10.4
Motors		6	Health Care	AHU	VSD & EEM - RI	51,666	45,289	-156	-19,549	77,249	-26,083	0.50	10.4
Motors		7	Health Care	CTwr Fan	EEM - RI	607	2,031	0	504	3,142	1,928	4.18	3.0
Motors		7	Health Care	CTwr Fan	EEM - ROF	561	1,723	0	561	2,846	1,723	4.07	3.1
Motors		7	Health Care	CTwr Fan	VSD to Existing - RI	2,141	14,115	-156	87	16,013	11,731	6.48	2.1
Motors		7	Health Care	CTwr Fan	VSD & EEM - RI	2,307	14,133	-156	-185	16,099	11,485	5.98	2.2
Motors		8	Health Care	CWtr Pump	EEM - RI	705	2,276	0	585	3,567	2,157	4.06	3.1
Motors		8	Health Care	CWtr Pump	EEM - ROF	652	1,918	0	652	3,222	1,918	3.94	3.2
Motors		8	Health Care	CWtr Pump	VSD to Existing - RI	8,716	23,430	-156	-2,622	29,368	11,935	2.37	4.6
Motors		8	Health Care	CWtr Pump	VSD & EEM - RI	8,873	23,320	-156	-2,723	29,314	11,568	2.30	4.7
Motors		9	Health Care	Cond. Fan	EEM - RI	476	515	0	435	1,426	474	2.00	5.2
Motors		9	Health Care	Cond. Fan	EEM - ROF	458	475	0	458	1,390	475	2.03	5.1
Motors		1	Lodging	AHU	EEM - RI	208	108	0	190	506	90	1.43	6.4
Motors		1	Lodging	AHU	EEM - ROF	200	100	0	200	500	100	1.50	6.3
Motors		10	Lodging	CWtr Pump	EEM - RI	607	1,295	0	555	2,456	1,242	3.05	3.9
Motors		10	Lodging	CWtr Pump	EEM - ROF	584	1,193	0	584	2,360	1,193	3.04	3.9
Motors		10	Lodging	CWtr Pump	VSD to Existing - RI	6,559	11,667	-156	1,841	16,229	3,112	1.47	6.3
Motors		10	Lodging	CWtr Pump	VSD & EEM - RI	6,707	11,525	-156	1,916	16,160	2,746	1.41	6.5
Motors		11	Lodging	Cond. Fan	EEM - RI	404	189	0	369	962	154	1.38	6.6
Motors		11	Lodging	Cond. Fan	EEM - ROF	388	175	0	388	952	175	1.45	6.4
Motors		12	Lodging	Cond. Fan	EEM - RI	416	216	0	380	1,012	180	1.43	6.4
Motors		12	Lodging	Cond. Fan	EEM - ROF	400	199	0	400	999	199	1.50	6.3
Motors		13	Lodging	Cond. Fan	EEM - RI	1,589	560	0	1,452	3,600	422	1.27	6.9
Motors		13	Lodging	Cond. Fan	EEM - ROF	1,528	512	0	1,528	3,568	512	1.34	6.7
Motors		14	Lodging	Cond. Fan	EEM - RI	275	252	0	251	779	229	1.83	5.5
Motors		14	Lodging	Cond. Fan	EEM - ROF	264	233	0	264	762	233	1.88	5.4
Motors		15	Lodging	Cond. Fan	EEM - RI	3,816	4,442	0	3,486	11,744	4,112	2.08	5.1
Motors		15	Lodging	Cond. Fan	EEM - ROF	3,669	4,085	0	3,669	11,424	4,085	2.11	5.0
Motors		16	Lodging	Cond. Fan	EEM - RI	760	1,164	0	694	2,618	1,098	2.44	4.5
Motors		16	Lodging	Cond. Fan	EEM - ROF	731	1,073	0	731	2,534	1,073	2.47	4.5
Motors		2	Lodging	AHU	EEM - RI	48,124	16,954	0	43,962	109,040	12,792	1.27	6.9
Motors		2	Lodging	AHU	EEM - ROF	46,273	15,503	0	46,273	108,049	15,503	1.34	6.7
Motors		3	Lodging	AHU	EEM - RI	1,904	1,338	0	1,739	4,981	1,173	1.62	6.0
Motors		3	Lodging	AHU	EEM - ROF	1,831	1,232	0	1,831	4,894	1,232	1.67	5.8
Motors		4A	Lodging	AHU	EEM - RI	1,100	1,010	0	1,005	3,115	915	1.83	5.5
Motors		4A	Lodging	AHU	EEM - ROF	1,058	933	0	1,058	3,049	933	1.88	5.4
Motors		4B	Lodging	AHU	EEM - RI	1,375	1,262	0	1,256	3,893	1,143	1.83	5.5
Motors		4B	Lodging	AHU	EEM - ROF	1,322	1,167	0	1,322	3,811	1,167	1.88	5.4
Motors		4B	Lodging	AHU	VSD to Existing - RI	18,512	8,656	-781	-5,645	20,741	-16,282	0.12	13.9
Motors		4B	Lodging	AHU	VSD & EEM - RI	18,680	8,558	-781	5,754	20,704	-16,656	0.11	14.1
Motors		5	Lodging	AHU	EEM - RI	318	370	0	290	979	343	2.08	5.1
Motors		5	Lodging	AHU	EEM - ROF	306	340	0	306	952	340	2.11	5.0
Motors		5	Lodging	AHU	VSD to Existing - RI	6,267	3,319	-156	-2,110	7,320	5,214	0.17	13.4
Motors		5	Lodging	AHU	VSD & EEM - RI	6,306	3,278	-156	2,135	7,293	-5,319	0.16	13.5
Motors		6A	Lodging	AHU	EEM - RI	1,900	2,960	0	1,578	6,438	2,638	2.39	4.6
Motors		6A	Lodging	AHU	EEM - ROF	1,757	2,515	0	1,757	6,029	2,515	2.43	4.6
Motors		6B	Lodging	AHU	EEM - RI	3,040	4,736	0	2,524	10,300	4,220	2.39	4.6
Motors		6B	Lodging	AHU	EEM - ROF	2,811	4,024	0	2,811	9,646	4,024	2.43	4.6
Motors		6B	Lodging	AHU	VSD to Existing - RI	[illegible]	38,463	1,250	24,995	83,496	38,859	0.17	13.3

Table 3.6b
All Non-Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of O&M Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		6B	Lodging	AHU	VSD & EEM - RI	[illegible]	38,127	-256	25,241	83,221	-59,947	0.16	13.4
Motors		7	Lodging	AHU	EEM - RI	[illegible]	1,613	0	793	3,274	1,538	2.77	4.1
Motors		7	Lodging	AHU	EEM - ROF	[illegible]	1,492	0	835	3,152	1,482	2.78	4.1
Motors		7	Lodging	AHU	VSD to Existing - RI	[illegible]	15,752	312	10,007	33,022	-22,158	0.20	13.1
Motors		7	Lodging	AHU	VSD & EEM - RI	[illegible]	15,557	312	10,092	32,892	-22,586	0.19	13.2
Motors		8	Lodging	AHU	EEM - RI	[illegible]	1,299	0	555	2,456	1,242	3.05	3.9
Motors		8	Lodging	AHU	EEM - ROF	[illegible]	1,193	0	584	2,360	1,193	3.04	3.9
Motors		8	Lodging	AHU	VSD to Existing - RI	[illegible]	-1,667	156	7,309	24,261	-15,857	0.21	12.9
Motors		8	Lodging	AHU	VSD & EEM - RI	[illegible]	-1,525	156	-7,385	24,191	-16,223	0.20	13.0
Motors		9	Lodging	Air Comp	EEM - RI	[illegible]	5,645	0	2,775	11,458	5,382	2.77	4.1
Motors		9	Lodging	Air Comp	EEM - ROF	2,92[illegible]	5,158	0	2,921	11,030	5,188	2.78	4.1
Motors		1	Office	AHU	EEM - RI	[illegible]	8,312	0	14,578	38,848	6,932	1.43	6.4
Motors		1	Office	AHU	EEM - ROF	[illegible]	7,695	0	15,344	38,383	7,695	1.50	6.2
Motors		10A	Office	AHU	EEM - RI	[illegible]	4,827	0	1,932	8,874	4,644	3.20	3.7
Motors		10A	Office	AHU	EEM - ROF	[illegible]	4,431	0	2,034	8,498	4,431	3.18	3.7
Motors		10B	Office	AHU	EEM - RI	[illegible]	6,436	0	2,576	11,833	6,193	3.20	3.7
Motors		10B	Office	AHU	EEM - ROF	[illegible]	5,908	0	2,712	11,331	5,908	3.18	3.7
Motors		10B	Office	AHU	VSD to Existing - RI	[illegible]	68,071	625	39,367	134,636	-78,478	0.26	12.4
Motors		10B	Office	AHU	VSD & EEM - RI	[illegible]	67,317	625	39,663	134,126	-80,066	0.25	12.5
Motors		11	Office	AHU	EEM - RI	[illegible]	3,932	0	1,743	7,583	3,767	2.97	3.9
Motors		11	Office	AHU	EEM - ROF	[illegible]	3,596	0	1,835	7,265	3,596	2.96	3.9
Motors		11	Office	AHU	VSD to Existing - RI	[illegible]	49,523	312	29,329	98,621	58,557	0.25	12.5
Motors		11	Office	AHU	VSD & EEM - RI	[illegible]	49,955	312	29,554	98,260	-60,084	0.24	12.6
Motors		12	Office	AHU	EEM - RI	[illegible]	3,596	0	1,412	6,554	3,462	3.24	3.7
Motors		12	Office	AHU	EEM - ROF	[illegible]	3,253	0	1,487	6,256	3,253	3.21	3.7
Motors		12	Office	AHU	VSD to Existing - RI	[illegible]	48,657	156	29,292	96,658	-58,239	0.25	12.5
Motors		12	Office	AHU	VSD & EEM - RI	[illegible]	48,092	156	29,461	96,238	-59,288	0.24	12.6
Motors		13	Office	Air Comp	EEM - RI	2,920	6,436	0	2,576	11,833	6,193	3.20	3.7
Motors		13	Office	Air Comp	EEM - ROF	2,712	5,908	0	2,712	11,331	5,908	3.18	3.7
Motors		14	Office	CTwr Fan	EEM - RI	[illegible]	1,686	0	644	2,958	1,548	3.20	3.7
Motors		14	Office	CTwr Fan	EEM - ROF	[illegible]	1,477	0	678	2,833	1,477	3.18	3.7
Motors		14	Office	CTwr Fan	VSD to Existing - RI	2,939	13,431	156	201	15,913	10,236	4.61	2.8
Motors		14	Office	CTwr Fan	VSD & EEM - RI	2,973	13,317	156	275	15,859	9,913	4.33	2.9
Motors		15	Office	CWtr Pump	EEM - RI	[illegible]	1,686	0	644	2,958	1,548	3.20	3.7
Motors		15	Office	CWtr Pump	EEM - ROF	[illegible]	1,477	0	678	2,833	1,477	3.18	3.7
Motors		15	Office	CWtr Pump	VSD to Existing - RI	[illegible]	17,018	56	2,591	23,009	5,533	1.63	5.9
Motors		15	Office	CWtr Pump	VSD & EEM - RI	[illegible]	16,829	56	2,665	22,881	5,135	1.58	6.1
Motors		16	Office	Cond Fan	EEM - RI	[illegible]	[illegible]	0	3,137	8,360	1,492	1.43	6.4
Motors		16	Office	Cond Fan	EEM - ROF	[illegible]	636	0	3,302	8,260	1,656	1.50	6.2
Motors		17	Office	Cond Fan	EEM - RI	[illegible]	[illegible]	0	760	2,072	408	1.49	6.3
Motors		17	Office	Cond Fan	EEM - ROF	[illegible]	[illegible]	0	800	2,044	444	1.55	6.1
Motors		18	Office	Cond Fan	EEM - RI	[illegible]	730	0	1,505	4,054	422	1.23	7.0
Motors		18	Office	Cond Fan	EEM - ROF	[illegible]	611	0	1,679	3,969	611	1.36	6.6
Motors		19	Office	Cond Fan	EEM - RI	[illegible]	3,276	0	3,036	10,361	2,269	1.50	6.1
Motors		19	Office	Cond Fan	EEM - ROF	[illegible]	2,555	0	3,597	9,752	2,558	1.71	5.8
Motors		2	Office	AHU	EEM - RI	[illegible]	[illegible]	0	190	518	102	1.49	6.3
Motors		2	Office	AHU	EEM - ROF	[illegible]	[illegible]	0	200	511	111	1.55	6.1
Motors		20	Office	Cond Fan	EEM - RI	[illegible]	[illegible]	0	3,015	9,665	3,085	1.93	5.3
Motors		20	Office	Cond Fan	EEM - ROF	[illegible]	[illegible]	0	3,173	9,461	3,115	1.95	5.2
Motors		21	Office	Cond Fan	EEM - RI	[illegible]	[illegible]	0	3,433	3,027	4,756	2.15	5.0
Motors		21	Office	Cond Fan	EEM - ROF	[illegible]	[illegible]	0	3,822	12,263	4,819	2.21	4.9
Motors		22	Office	Cond Fan	EEM - RI	[illegible]	[illegible]	0	[illegible]	3,542	5,942	2.56	4.4
Motors		22	Office	Cond Fan	EEM - ROF	[illegible]	[illegible]	0	[illegible]	2,624	[illegible]	2.59	4.3
Motors		23	Office	Cond Fan	EEM - RI	[illegible]	[illegible]	0	[illegible]	23,942	[illegible]	2.44	4.0

Table 3.6b
All Non-Building EROs: Present Values of Costs and Savings

End Use	Bldg. Set No.	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of O&M Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		23	Office	Cond. Fan	EEM - ROF	5,618	10,828	0	5,618	22,064	10,828	2.93	4.0
Motors		24	Office	Cond. Fan	EEM - RI	1,214	2,581	0	1,109	5,204	2,776	3.29	3.6
Motors		24	Office	Cond. Fan	EEM - ROF	1,167	2,654	0	1,167	4,989	2,654	3.27	3.7
Motors		25	Office	Cond. Pump	EEM - RI	705	1,609	0	644	2,958	1,548	3.20	3.7
Motors		25	Office	Cond. Pump	EEM - ROF	678	1,477	0	678	2,833	1,477	3.18	3.7
Motors		25	Office	Cond. Pump	VSD to Existing - RI	2,838	13,431	156	201	15,913	10,236	4.61	2.5
Motors		25	Office	Cond. Pump	VSD & EEM - RI	2,973	13,317	156	275	15,859	9,913	4.33	2.9
Motors		3	Office	AHU	EEM - RI	10,896	4,380	0	9,048	24,323	2,531	1.23	7.0
Motors		3	Office	AHU	EEM - ROF	10,074	3,664	0	10,074	23,811	3,664	1.36	6.6
Motors		4	Office	AHU	EEM - RI	952	771	0	714	2,438	534	1.56	6.1
Motors		4	Office	AHU	EEM - ROF	846	602	0	846	2,295	602	1.71	5.8
Motors		5A	Office	AHU	EEM - RI	1,100	1,141	0	913	3,154	954	1.87	5.4
Motors		5A	Office	AHU	EEM - ROF	1,017	974	0	1,017	3,008	974	1.96	5.3
Motors		5B	Office	AHU	EEM - RI	1,375	1,426	0	1,142	3,943	1,193	1.87	5.4
Motors		5B	Office	AHU	EEM - ROF	1,271	1,217	0	1,271	3,760	1,217	1.96	5.3
Motors		5B	Office	AHU	VSD to Existing - RI	18,465	9,598	781	5,701	21,581	-15,349	0.17	13.4
Motors		5B	Office	AHU	VSD & EEM - RI	18,680	9,541	781	5,868	21,572	-15,788	0.15	13.5
Motors		6A	Office	AHU	EEM - RI	4,452	5,880	0	3,697	14,029	5,125	2.15	5.0
Motors		6A	Office	AHU	EEM - ROF	4,116	4,974	0	4,116	13,206	4,974	2.21	4.9
Motors		6B	Office	AHU	EEM - RI	6,996	9,240	0	5,809	22,045	8,053	2.15	5.0
Motors		6B	Office	AHU	EEM - ROF	6,468	7,816	0	6,468	20,753	7,816	2.21	4.9
Motors		6B	Office	AHU	VSD to Existing - RI	137,805	81,015	3,437	-46,771	168,611	-106,998	0.22	12.8
Motors		6B	Office	AHU	VSD & EEM - RI	138,902	80,399	3,437	-47,622	168,242	-109,562	0.21	12.9
Motors		7A	Office	AHU	EEM - RI	3,800	6,587	0	3,155	13,542	5,942	2.56	4.4
Motors		7A	Office	AHU	EEM - ROF	3,513	5,598	0	3,513	12,624	5,598	2.59	4.3
Motors		7B	Office	AHU	EEM - RI	6,080	10,538	0	5,039	21,667	9,507	2.56	4.4
Motors		7B	Office	AHU	EEM - ROF	5,621	8,956	0	5,621	20,199	8,956	2.59	4.3
Motors		7B	Office	AHU	VSD to Existing - RI	142,344	85,427	2,500	-49,785	175,486	-109,202	0.23	12.7
Motors		7B	Office	AHU	VSD & EEM - RI	143,158	84,810	2,500	50,477	174,991	-111,325	0.22	12.8
Motors		8A	Office	AHU	EEM - RI	4,774	10,073	0	3,964	18,812	9,264	2.94	4.0
Motors		8A	Office	AHU	EEM - ROF	4,414	8,508	0	4,414	17,336	8,508	2.93	4.0
Motors		8B	Office	AHU	EEM - RI	6,944	14,652	0	5,766	27,362	13,474	2.94	4.0
Motors		8B	Office	AHU	EEM - ROF	6,420	12,375	0	6,420	25,215	12,375	2.93	4.0
Motors		8B	Office	AHU	VSD to Existing - RI	219,961	139,843	2,500	80,139	277,165	-162,756	0.26	12.4
Motors		8B	Office	AHU	VSD & EEM - RI	221,372	138,713	2,500	81,092	276,494	-166,250	0.25	12.5
Motors		9A	Office	AHU	EEM - RI	2,428	5,973	0	1,822	10,223	5,367	3.21	3.7
Motors		9A	Office	AHU	EEM - ROF	2,158	4,660	0	2,158	8,977	4,660	3.16	3.8
Motors		9B	Office	AHU	EEM - RI	3,035	7,467	0	2,277	12,779	6,709	3.21	3.7
Motors		9B	Office	AHU	EEM - ROF	2,698	5,825	0	2,698	11,221	5,825	3.16	3.8
Motors		9B	Office	AHU	VSD to Existing - RI	100,272	64,670	781	-36,887	127,275	-73,270	0.27	12.3
Motors		9B	Office	AHU	VSD & EEM - RI	101,187	64,356	781	37,481	127,281	-75,093	0.26	12.4
Motors		1	Other	AHU	EEM - RI	624	318	0	374	1,316	68	1.11	7.4
Motors		1	Other	AHU	EEM - ROF	513	213	0	513	1,239	213	1.42	6.5
Motors		10	Other	AHU	EEM - RI	1,546	3,166	0	1,160	5,872	2,780	2.80	4.1
Motors		10	Other	AHU	EEM - ROF	1,374	2,408	0	1,374	5,157	2,408	2.75	4.2
Motors		10	Other	AHU	VSD to Existing - RI	77,356	40,819	156	29,428	88,590	-66,121	0.15	13.6
Motors		10	Other	AHU	VSD & EEM - RI	77,763	40,408	156	29,713	88,302	-67,224	0.14	13.8
Motors		11	Other	Air Comp	EEM - RI	275	235	0	251	761	211	1.77	5.6
Motors		11	Other	Air Comp	EEM - ROF	264	217	0	264	746	217	1.82	5.5
Motors		12	Other	Air Comp	EEM - RI	383	763	0	228	1,371	611	2.61	4.3
Motors		12	Other	Air Comp	EEM - ROF	312	506	0	312	1,131	506	2.62	4.3
Motors		13	Other	Air Comp	EEM - RI	1,410	2,691	0	1,288	5,389	2,569	2.82	4.1
Motors		13	Other	Air Comp	EEM - ROF	1,356	2,470	0	1,356	5,181	2,470	2.82	4.1
Motors		14	Other	Air Comp	EEM - RI	3,092	6,012	0	2,825	11,929	5,745	2.86	4.0

Table 3.6b
All Non-Building ERCs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of O&M Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		14	Other	Air Comp	EEM - ROF	2,973	5,487	0	2,973	11,434	5,487	2.85	4.1
Motors		15	Other	Air Comp	EEM - RI	2,246	4,693	0	2,052	8,991	4,499	3.00	3.9
Motors		15	Other	Air Comp	EEM - ROF	2,160	4,278	0	2,160	8,598	4,278	2.98	3.9
Motors		16	Other	Air Comp	EEM - RI	2,246	6,215	0	2,052	10,513	6,021	3.68	3.3
Motors		16	Other	Air Comp	EEM - ROF	2,160	5,668	0	2,160	9,987	5,668	3.62	3.4
Motors		17	Other	Air Comp	EEM - RI	7,286	11,955	0	4,907	24,148	9,576	2.31	4.7
Motors		17	Other	Air Comp	EEM - ROF	6,228	8,070	0	6,228	20,527	8,070	2.30	4.7
Motors		18	Other	CTwr Fan	EEM - RI	705	1,403	0	529	2,637	1,227	2.74	4.2
Motors		18	Other	CTwr Fan	EEM - ROF	627	1,084	0	627	2,337	1,084	2.73	4.2
Motors		18	Other	CTwr Fan	VSD to Existing - RI	2,795	11,224	156	-262	13,600	8,010	3.87	3.2
Motors		18	Other	CTwr Fan	VSD & EEM - RI	2,973	11,203	156	-390	13,630	7,684	3.58	3.4
Motors		19	Other	CTwr Fan	EEM - RI	1,410	3,562	0	1,288	6,260	3,440	3.44	3.5
Motors		19	Other	CTwr Fan	EEM - ROF	1,356	3,270	0	1,356	5,982	3,270	3.41	3.5
Motors		19	Other	CTwr Fan	VSD to Existing - RI	5,280	29,684	312	-241	34,410	23,850	5.52	2.4
Motors		19	Other	CTwr Fan	VSD & EEM - RI	5,550	29,469	312	-389	34,317	23,217	5.18	2.5
Motors		2	Other	AHU	EEM - RI	4,994	1,637	0	4,562	11,193	1,205	1.24	7.0
Motors		2	Other	AHU	EEM - ROF	4,802	1,497	0	4,802	11,101	1,497	1.31	6.8
Motors		20CEP	Other	CTwr Fan	EEM - RI	6,738	23,329	0	6,155	36,222	22,746	4.38	2.9
Motors		20CEP	Other	CTwr Fan	EEM - ROF	6,479	21,277	0	6,479	34,235	21,277	4.28	3.0
Motors		20CEP	Other	CTwr Fan	VSD to Existing - RI	26,643	259,251	469	1,726	283,700	230,413	9.65	1.5
Motors		20CEP	Other	CTwr Fan	VSD & EEM - RI	27,993	257,711	469	2,454	282,781	226,795	9.10	1.5
Motors		21CEP	Other	CTwr Fan	EEM - RI	2,246	9,332	0	2,052	13,629	9,137	5.07	2.6
Motors		21CEP	Other	CTwr Fan	EEM - ROF	2,160	8,511	0	2,160	12,830	8,511	4.94	2.6
Motors		21CEP	Other	CTwr Fan	VSD to Existing - RI	8,881	103,700	156	-575	111,850	94,088	11.59	1.2
Motors		21CEP	Other	CTwr Fan	VSD & EEM - RI	9,331	103,085	156	-818	111,441	92,779	10.94	1.3
Motors		22	Other	CWtr Pump	EEM - RI	705	1,403	0	529	2,637	1,227	2.74	4.2
Motors		22	Other	CWtr Pump	EEM - ROF	627	1,084	0	627	2,337	1,084	2.73	4.2
Motors		22	Other	CWtr Pump	VSD to Existing - RI	8,695	14,265	156	-2,652	20,152	2,762	1.32	6.7
Motors		22	Other	CWtr Pump	VSD & EEM - RI	8,873	14,142	156	-2,780	20,080	2,334	1.26	6.9
Motors		23	Other	CWtr Pump	EEM - RI	1,918	6,581	0	1,150	9,649	5,813	4.03	3.1
Motors		23	Other	CWtr Pump	EEM - ROF	1,576	4,195	0	1,576	7,348	4,195	3.66	3.4
Motors		23	Other	CWtr Pump	VSD to Existing - RI	30,919	79,773	156	-10,358	100,177	38,340	2.24	4.8
Motors		23	Other	CWtr Pump	VSD & EEM - RI	31,528	79,715	156	-10,844	100,243	37,187	2.18	4.9
Motors		24CEP	Other	CWtr Pump	EEM - RI	2,246	10,826	0	1,347	14,419	9,927	5.42	2.4
Motors		24CEP	Other	CWtr Pump	EEM - ROF	1,846	6,854	0	1,846	10,546	6,854	4.71	2.7
Motors		24CEP	Other	CWtr Pump	VSD to Existing - RI	44,520	138,737	-156	15,497	167,604	78,564	2.76	4.1
Motors		24CEP	Other	CWtr Pump	VSD & EEM - RI	45,231	138,793	156	-16,065	167,803	77,341	2.71	4.2
Motors		25CEP	Other	CWtr Pump	EEM - RI	10,250	36,612	0	9,364	56,226	35,726	4.49	2.8
Motors		25CEP	Other	CWtr Pump	EEM - ROF	9,856	33,093	0	9,856	52,805	33,093	4.36	2.9
Motors		25CEP	Other	CWtr Pump	VSD to Existing - RI	185,427	684,631	312	-61,305	808,440	437,587	3.36	3.6
Motors		25CEP	Other	CWtr Pump	VSD & EEM - RI	187,090	680,409	312	-62,268	804,919	430,739	3.30	3.6
Motors		26CEP	Other	CWtr Pump	EEM - RI	14,105	34,210	0	12,885	61,200	32,990	3.34	3.6
Motors		26CEP	Other	CWtr Pump	EEM - ROF	13,563	30,619	0	13,563	57,744	30,619	3.26	3.7
Motors		26CEP	Other	CWtr Pump	VSD to Existing - RI	219,938	807,142	156	70,167	956,757	516,880	3.35	3.6
Motors		26CEP	Other	CWtr Pump	VSD & EEM - RI	224,451	801,948	156	72,319	953,924	505,022	3.25	3.7
Motors		27CEP	Other	CWtr Pump	EEM - RI	16,398	44,476	0	14,980	75,854	43,058	3.63	3.4
Motors		27CEP	Other	CWtr Pump	EEM - ROF	15,767	39,999	0	15,767	71,534	39,999	3.54	3.4
Motors		27CEP	Other	CWtr Pump	VSD to Existing - RI	260,086	946,154	156	83,222	1,122,862	602,690	3.32	3.6
Motors		27CEP	Other	CWtr Pump	VSD & EEM - RI	261,412	940,170	156	84,267	1,117,159	594,335	3.27	3.7
Motors		28	Other	Circ Pump	EEM - RI	380	560	0	285	1,225	465	2.22	4.8
Motors		28	Other	Circ Pump	EEM - ROF	338	438	0	338	1,114	438	2.30	4.7
Motors		29	Other	Circ Pump	EEM - RI	954	3,906	0	572	5,332	3,424	4.59	2.8
Motors		29	Other	Circ Pump	EEM - ROF	784	2,439	0	784	4,008	2,439	4.11	3.1
Motors		3	Other	AHU	EEM - RI	3,808	2,536	0	3,162	9,506	1,990	1.50	6.3

Table 3.6b
All Non-Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of O&M Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		3	Other	AHU	EEM - ROF	3,521	2,150	0	3,521	9,191	2,150	1.61	6.0
Motors		30	Other	Cond. Fan	EEM - RI	2,020	880	0	1,845	4,745	705	1.35	6.6
Motors		30	Other	Cond. Fan	EEM - ROF	1,942	815	0	1,942	4,699	815	1.42	6.5
Motors		31	Other	Cond. Fan	EEM - RI	1,872	917	0	1,554	4,343	599	1.32	6.7
Motors		31	Other	Cond. Fan	EEM - ROF	1,731	783	0	1,731	4,244	783	1.45	6.4
Motors		32	Other	Cond. Fan	EEM - RI	1,362	458	0	1,131	2,951	227	1.17	7.2
Motors		32	Other	Cond. Fan	EEM - ROF	1,259	383	0	1,259	2,901	383	1.30	6.8
Motors		33	Other	Cond. Fan	EEM - RI	2,380	1,613	0	1,786	5,779	1,019	1.43	6.4
Motors		33	Other	Cond. Fan	EEM - ROF	2,116	1,258	0	2,116	5,490	1,258	1.59	6.0
Motors		34	Other	Cond. Fan	EEM - RI	825	705	0	754	2,283	633	1.77	5.6
Motors		34	Other	Cond. Fan	EEM - ROF	793	651	0	793	2,238	651	1.82	5.5
Motors		35	Other	Cond. Fan	EEM - RI	3,498	3,936	0	2,625	10,059	3,063	1.88	5.4
Motors		35	Other	Cond. Fan	EEM - ROF	3,110	3,059	0	3,110	9,278	3,059	1.98	5.2
Motors		36	Other	Cond. Fan	EEM - RI	3,800	5,688	0	2,559	12,047	4,447	2.17	4.9
Motors		36	Other	Cond. Fan	EEM - ROF	3,248	4,098	0	3,248	10,595	4,098	2.26	4.8
Motors		37	Other	Cond. Fan	EEM - RI	434	809	0	260	1,503	635	2.46	4.5
Motors		37	Other	Cond. Fan	EEM - ROF	357	528	0	357	1,242	528	2.48	4.5
Motors		38	Other	Cond. Pump	EEM - RI	705	1,403	0	529	2,637	1,227	2.74	4.2
Motors		38	Other	Cond. Pump	EEM - ROF	627	1,084	0	627	2,337	1,084	2.73	4.2
Motors		38	Other	Cond. Pump	VSD to Existing - RI	2,795	11,224	156	262	13,600	8,010	3.87	3.2
Motors		38	Other	Cond. Pump	VSD & EEM - RI	2,973	11,203	156	-390	13,630	7,684	3.58	3.4
Motors		39	Other	Cond. Pump	EEM - RI	954	1,644	0	871	3,469	1,561	2.64	4.3
Motors		39	Other	Cond. Pump	EEM - ROF	917	1,503	0	917	3,337	1,503	2.64	4.3
Motors		39	Other	Cond. Pump	VSD to Existing - RI	3,332	16,331	-156	-67	19,440	12,775	4.83	2.7
Motors		39	Other	Cond. Pump	VSD & EEM - RI	3,549	16,137	-156	-180	19,351	12,253	4.45	2.9
Motors		40	Other	Cond. Pump	EEM - RI	1,546	3,981	0	1,412	6,939	3,847	3.49	3.5
Motors		40	Other	Cond. Pump	EEM - ROF	1,487	3,634	0	1,487	6,607	3,634	3.44	3.5
Motors		40	Other	Cond. Pump	VSD to Existing - RI	5,549	42,195	156	-168	47,420	36,323	7.55	1.8
Motors		40	Other	Cond. Pump	VSD & EEM - RI	5,863	41,849	-156	-336	47,219	35,493	7.05	1.9
Motors		41CEP	Other	Cond. Pump	EEM - RI	10,250	30,102	0	9,364	49,716	29,216	3.85	3.2
Motors		41CEP	Other	Cond. Pump	EEM - ROF	9,856	27,204	0	9,856	46,916	27,204	3.76	3.3
Motors		41CEP	Other	Cond. Pump	VSD to Existing - RI	35,627	440,425	-312	-626	475,113	403,860	12.34	1.2
Motors		41CEP	Other	Cond. Pump	VSD & EEM - RI	37,290	437,680	-312	1,589	473,068	398,488	11.69	1.2
Motors		42CEP	Other	Cond. Pump	EEM - RI	9,174	22,716	0	8,381	40,270	21,922	3.39	3.6
Motors		42CEP	Other	Cond. Pump	EEM - ROF	8,821	20,550	0	8,821	38,192	20,550	3.33	3.6
Motors		42CEP	Other	Cond. Pump	VSD to Existing - RI	28,041	326,464	-156	972	355,321	299,239	11.67	1.2
Motors		42CEP	Other	Cond. Pump	VSD & EEM - RI	30,284	324,221	-156	-170	354,178	293,610	10.70	1.3
Motors		43	Other	HTW Pump	EEM - RI	954	3,806	0	572	5,332	3,424	4.59	2.8
Motors		43	Other	HTW Pump	EEM - ROF	784	2,439	0	784	4,008	2,439	4.11	3.1
Motors		44CEP	Other	HTW Pump	EEM - RI	4,252	15,156	0	3,884	23,292	14,788	4.48	2.9
Motors		44CEP	Other	HTW Pump	EEM - ROF	4,088	13,714	0	4,088	21,891	13,714	4.35	2.9
Motors		45CEP	Other	HTW Pump	EEM - RI	5,125	18,306	0	4,682	28,113	17,863	4.49	2.8
Motors		45CEP	Other	HTW Pump	EEM - ROF	4,928	16,547	0	4,928	26,402	16,547	4.36	2.9
Motors		46	Other	Makeup Pmp	EEM - RI	380	577	0	228	1,185	425	2.12	5.0
Motors		46	Other	Makeup Pmp	EEM - ROF	312	382	0	312	1,007	382	2.22	4.8
Motors		47	Other	Oil Pump	EEM - RI	2,246	5,435	0	2,052	9,733	5,241	3.33	3.6
Motors		47	Other	Oil Pump	EEM - ROF	2,160	4,955	0	2,160	9,274	4,955	3.29	3.6
Motors		48	Other	Pumps	EEM - RI	1,546	6,359	0	1,412	9,318	6,226	5.03	2.6
Motors		48	Other	Pumps	EEM - ROF	1,487	5,808	0	1,487	8,781	5,808	4.91	2.6
Motors		48	Other	Pumps	VSD to Existing - RI	5,549	66,975	156	168	72,203	61,105	12.01	1.2
Motors		48	Other	Pumps	VSD & EEM - RI	5,863	66,734	156	336	72,105	60,379	11.30	1.3
Motors		49	Other	Pumps	EEM - RI	1,918	8,501	0	1,752	12,171	8,335	5.35	2.5
Motors		49	Other	Pumps	EEM - ROF	1,844	7,769	0	1,844	11,457	7,769	5.21	2.5
Motors		49	Other	Pumps	VSD to Existing - RI	7,241	88,555	156	332	95,291	80,909	12.16	1.2

Table 3.6b
All Non-Building ERCs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of O&M Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		49	Other	Pumps	VSD & EEM - RI	7,628	88,238	-156	-561	95,149	79,893	11.47	1.3
Motors		4A	Other	AHU	EEM - RI	550	484	0	413	1,447	347	1.63	5.9
Motors		4A	Other	AHU	EEM - ROF	489	381	0	489	1,359	381	1.78	5.6
Motors		4B	Other	AHU	EEM - RI	825	726	0	619	2,170	520	1.63	5.9
Motors		4B	Other	AHU	EEM - ROF	733	572	0	733	2,039	572	1.78	5.6
Motors		4B	Other	AHU	VSD to Existing - RI	11,052	4,826	-469	-3,453	11,956	-10,149	0.08	14.4
Motors		4B	Other	AHU	VSD & EEM - RI	11,208	4,801	-469	-3,587	11,954	-10,462	0.07	14.6
Motors		50	Other	Pumps	EEM - RI	2,246	9,930	0	2,052	14,228	9,736	5.33	2.5
Motors		50	Other	Pumps	EEM - ROF	2,160	9,059	0	2,160	13,378	9,059	5.19	2.5
Motors		50	Other	Pumps	VSD to Existing - RI	8,881	110,021	-156	-575	118,170	100,408	12.31	1.2
Motors		50	Other	Pumps	VSD & EEM - RI	9,331	109,602	-156	-818	117,958	99,296	11.64	1.2
Motors		51CEP	Other	HTW Pump	EEM - RI	2,246	11,426	0	1,034	14,705	10,213	5.55	2.4
Motors		51CEP	Other	HTW Pump	EEM - ROF	1,707	6,015	0	1,707	9,428	6,015	4.52	2.8
Motors		52CEP	Other	Makeup Pmp	EEM - RI	1,116	3,736	0	514	5,365	3,133	3.81	3.2
Motors		52CEP	Other	Makeup Pmp	EEM - ROF	848	2,018	0	848	3,714	2,018	3.38	3.6
Motors		53CEP	Other	CWtr Pump	EEM - RI	14,105	28,120	0	12,885	55,110	26,900	2.91	4.0
Motors		53CEP	Other	CWtr Pump	EEM - ROF	13,563	25,163	0	13,563	52,288	25,163	2.86	4.1
Motors		53CEP	Other	CWtr Pump	VSD to Existing - RI	223,908	602,692	-147	13,563	840,016	392,199	2.75	4.2
Motors		53CEP	Other	CWtr Pump	VSD & EEM - RI	224,451	1,000,205	-156	12,885	1,237,385	788,483	4.51	2.8
Motors		54CEP	Other	Cond. Pump	EEM - RI	3,327	9,901	0	3,039	16,267	9,613	3.89	3.2
Motors		54CEP	Other	Cond. Pump	EEM - ROF	3,199	8,975	0	3,199	15,373	8,975	3.81	3.3
Motors		54CEP	Other	Cond. Pump	VSD to Existing - RI	13,529	116,904	-147	3,199	133,486	106,427	8.87	1.6
Motors		54CEP	Other	Cond. Pump	VSD & EEM - RI	13,657	254,960	-156	3,039	271,500	244,186	18.88	0.8
Motors		55CEP	Other	CWtr Pump	EEM - RI	1,546	5,256	0	1,041	7,844	4,752	4.07	3.1
Motors		55CEP	Other	CWtr Pump	EEM - ROF	1,271	3,417	0	1,271	5,958	3,417	3.69	3.3
Motors		56CEP	Other	CWtr Pump	EEM - RI	2,246	9,830	0	1,187	13,263	8,771	4.91	2.6
Motors		56CEP	Other	CWtr Pump	EEM - ROF	1,707	5,275	0	1,707	8,689	5,275	4.09	3.1
Motors		57CEP	Other	FD Fan #4	EEM - RI	2,246	13,711	16	1,034	17,006	12,514	6.57	2.1
Motors		57CEP	Other	FD Fan #4	EEM - ROF	1,707	7,218	19	1,707	10,650	7,237	5.24	2.5
Motors		58CEP	Other	Under Air #4	EEM - RI	4,252	18,055	78	1,957	24,342	15,838	4.72	2.7
Motors		58CEP	Other	Under Air #4	EEM - ROF	3,231	9,104	58	3,231	15,624	9,161	3.84	3.2
Motors		5A	Other	AHU	EEM - RI	1,590	1,756	0	1,320	4,667	1,487	1.93	5.3
Motors		5A	Other	AHU	EEM - ROF	1,470	1,485	0	1,470	4,425	1,485	2.01	5.2
Motors		5B	Other	AHU	EEM - RI	2,544	2,810	0	2,112	7,466	2,378	1.93	5.3
Motors		5B	Other	AHU	EEM - ROF	2,352	2,376	0	2,352	7,080	2,376	2.01	5.2
Motors		5B	Other	AHU	VSD to Existing - RI	50,049	24,721	-1,250	-16,983	56,538	-43,560	0.13	13.8
Motors		5B	Other	AHU	VSD & EEM - RI	50,448	24,468	-1,250	-17,292	56,374	-44,522	0.12	14.0
Motors		6A	Other	AHU	EEM - RI	1,520	2,240	0	1,141	4,901	1,861	2.22	4.8
Motors		6A	Other	AHU	EEM - ROF	1,351	1,753	0	1,351	4,455	1,753	2.30	4.7
Motors		6B	Other	AHU	EEM - RI	2,280	3,360	0	1,711	7,351	2,791	2.22	4.8
Motors		6B	Other	AHU	EEM - ROF	2,027	2,629	0	2,027	6,683	2,629	2.30	4.7
Motors		6B	Other	AHU	VSD to Existing - RI	53,307	26,855	-937	-18,758	60,466	-46,148	0.13	13.8
Motors		6B	Other	AHU	VSD & EEM - RI	53,688	26,672	-937	-19,113	60,310	-47,066	0.12	13.9
Motors		7A	Other	AHU	EEM - RI	3,038	5,465	0	2,280	10,783	4,707	2.55	4.4
Motors		7A	Other	AHU	EEM - ROF	2,701	4,237	0	2,701	9,639	4,237	2.57	4.4
Motors		7B	Other	AHU	EEM - RI	4,774	8,588	0	3,582	16,944	7,396	2.55	4.4
Motors		7B	Other	AHU	EEM - ROF	4,244	6,658	0	4,244	15,146	6,658	2.57	4.4
Motors		7B	Other	AHU	VSD to Existing - RI	151,110	80,626	-1,718	55,308	174,709	127,511	0.16	13.5
Motors		7B	Other	AHU	VSD & EEM - RI	152,227	79,977	-1,718	56,146	174,340	130,114	0.15	13.6
Motors		8A	Other	AHU	EEM - RI	607	1,289	0	364	2,260	1,046	2.72	4.2
Motors		8A	Other	AHU	EEM - ROF	499	880	0	499	1,848	880	2.70	4.2
Motors		8B	Other	AHU	EEM - RI	1,214	2,579	0	728	4,521	2,093	2.72	4.2
Motors		8B	Other	AHU	EEM - ROF	998	1,700	0	998	3,696	1,700	2.70	4.2
Motors		8B	Other	AHU	VSD to Existing - RI	40,136	21,673	112	14,895	46,802	33,670	0.16	13.5

Table 3.6b
All Non-Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of O&M Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		8B	Other	AHU	VSD & EEM - RI	40,566	21,625	312	-15,212	46,667	-34,465	0.15	13.6
Motors		9	Other	AHU	EEM - RI	1,908	3,603	0	1,144	6,655	2,839	2.49	4.5
Motors		9	Other	AHU	EEM - ROF	1,568	2,302	0	1,568	5,439	2,302	2.47	4.5
Motors		9	Other	AHU	VSD to Existing - RI	78,525	41,517	312	-29,661	90,069	-66,980	0.15	13.6
Motors		9	Other	AHU	VSD & EEM - RI	79,172	41,286	312	-30,153	89,993	-68,351	0.14	13.7
Motors		1	Public Order	AHU	EEM - RI	636	851	0	581	2,068	796	2.25	4.8
Motors		1	Public Order	AHU	EEM - ROF	612	783	0	612	2,006	783	2.28	4.8
Motors		1	Public Order	AHU	VSD to Existing - RI	12,534	7,612	312	-4,220	15,614	-9,454	0.25	12.5
Motors		1	Public Order	AHU	VSD & EEM - RI	12,612	7,535	312	-4,270	15,564	-9,660	0.23	12.7
Motors		2	Public Order	AHU	EEM - RI	380	713	0	228	1,321	561	2.48	4.5
Motors		2	Public Order	AHU	EEM - ROF	312	473	0	312	1,097	473	2.51	4.4
Motors		2	Public Order	AHU	VSD to Existing - RI	8,861	5,498	-156	-3,154	11,048	-6,673	0.25	12.5
Motors		2	Public Order	AHU	VSD & EEM - RI	8,948	5,509	156	3,243	11,058	-6,838	0.24	12.6
Motors		3	Public Order	AHU	EEM - RI	434	1,074	0	117	1,625	757	2.75	4.2
Motors		3	Public Order	AHU	EEM - ROF	293	443	0	293	1,030	443	2.51	4.4
Motors		3	Public Order	AHU	VSD to Existing - RI	13,621	8,985	-156	-5,122	17,327	-9,914	0.27	12.3
Motors		3	Public Order	AHU	VSD & EEM - RI	13,802	9,085	156	5,298	17,433	-10,171	0.26	12.4
Motors		4	Public Order	AHU	EEM - RI	607	1,702	0	164	2,473	1,259	3.07	3.8
Motors		4	Public Order	AHU	EEM - ROF	410	713	0	410	1,533	713	2.74	4.2
Motors		4	Public Order	AHU	VSD to Existing - RI	19,922	13,289	156	-7,529	25,526	-14,319	0.28	12.2
Motors		4	Public Order	AHU	VSD & EEM - RI	20,207	13,457	156	-7,775	25,733	-14,681	0.27	12.3
Motors		5	Public Order	Cond. Fan	EEM - RI	476	385	0	435	1,295	343	1.72	5.7
Motors		5	Public Order	Cond. Fan	EEM - ROF	458	354	0	458	1,270	354	1.77	5.6
Motors		6	Public Order	Cond. Fan	EEM - RI	318	457	0	191	966	330	2.04	5.1
Motors		6	Public Order	Cond. Fan	EEM - ROF	261	300	0	261	823	300	2.15	5.0
Motors		7	Public Order	Cond. Fan	EEM - RI	380	759	0	103	1,242	482	2.27	4.8
Motors		7	Public Order	Cond. Fan	EEM - ROF	257	321	0	257	834	321	2.25	4.8
Motors		8	Public Order	Cond. Fan	EEM - RI	434	1,074	0	117	1,625	757	2.75	4.2
Motors		8	Public Order	Cond. Fan	EEM - ROF	293	443	0	293	1,030	443	2.51	4.4
Motors		1	Service	AHU	EEM - RI	227	70	0	207	505	51	1.22	7.0
Motors		1	Service	AHU	EEM - ROF	218	64	0	218	501	64	1.29	6.8
Motors		10	Service	CWtr Pump	EEM - RI	1,214	2,278	0	1,109	4,601	2,173	2.79	4.1
Motors		10	Service	CWtr Pump	EEM - ROF	1,167	2,098	0	1,167	4,432	2,098	2.80	4.1
Motors		10	Service	CWtr Pump	VSD to Existing - RI	13,269	20,579	312	-3,743	29,793	3,254	1.25	7.0
Motors		10	Service	CWtr Pump	VSD & EEM - RI	13,566	20,287	-312	-3,894	29,646	2,514	1.19	7.1
Motors		11	Service	Cond. Fan	EEM - RI	227	70	0	207	505	51	1.22	7.0
Motors		11	Service	Cond. Fan	EEM - ROF	218	64	0	218	501	64	1.29	6.8
Motors		12	Service	Cond. Fan	EEM - RI	714	441	0	652	1,808	380	1.53	6.2
Motors		12	Service	Cond. Fan	EEM - ROF	687	406	0	687	1,779	406	1.59	6.0
Motors		13	Service	Cond. Fan	EEM - RI	954	977	0	871	2,802	894	1.94	5.3
Motors		13	Service	Cond. Fan	EEM - ROF	917	898	0	917	2,733	898	1.98	5.2
Motors		14	Service	Cond. Fan	EEM - RI	380	512	0	347	1,239	479	2.26	4.8
Motors		14	Service	Cond. Fan	EEM - ROF	365	472	0	365	1,203	472	2.29	4.7
Motors		15	Service	Cond. Pump	EEM - RI	1,116	2,262	0	1,019	4,398	2,166	2.94	4.0
Motors		15	Service	Cond. Pump	EEM - ROF	1,073	2,073	0	1,073	4,219	2,073	2.93	4.0
Motors		15	Service	Cond. Pump	VSD to Existing - RI	3,567	20,674	156	57	24,143	17,008	5.77	2.3
Motors		15	Service	Cond. Pump	VSD & EEM - RI	3,766	20,417	156	-54	23,973	16,441	5.37	2.5
Motors		16	Service	HTW Pump	EEM - RI	760	1,024	0	694	2,478	958	2.26	4.8
Motors		16	Service	HTW Pump	EEM - ROF	731	944	0	731	2,405	944	2.29	4.7
Motors		2	Service	AHU	EEM - RI	476	300	0	395	1,171	219	1.46	6.4
Motors		2	Service	AHU	EEM - ROF	440	254	0	440	1,134	254	1.58	6.1
Motors		3A	Service	AHU	EEM - RI	275	226	0	228	729	179	1.65	5.9
Motors		3A	Service	AHU	EEM - ROF	254	192	0	254	701	192	1.76	5.7
Motors		3B	Service	AHU	EEM - RI	580	451	0	457	1,458	358	1.65	5.9

Table 3.6b
All Non-Building EROs: Present Values of Costs and Savings

End Use	Bldg Set No.	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of O&M Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		3B	Service	AHU	EEM - ROF	509	385	0	509	1,402	385	1.76	5.7
Motors		3B	Service	AHU	VSD to Existing - RI	7,386	3,049	312	-2,280	7,842	-6,930	0.06	14.7
Motors		3B	Service	AHU	VSD & EEM - RI	7,472	3,020	312	-2,347	7,832	-7,112	0.05	14.9
Motors		4A	Service	AHU	EEM - RI	636	651	0	581	1,868	596	1.94	5.3
Motors		4A	Service	AHU	EEM - ROF	612	599	0	612	1,822	599	1.98	5.2
Motors		4B	Service	AHU	EEM - RI	636	651	0	581	1,868	596	1.94	5.3
Motors		4B	Service	AHU	EEM - ROF	612	599	0	612	1,822	599	1.98	5.2
Motors		4B	Service	AHU	VSD to Existing - RI	12,534	5,854	-312	-4,220	13,855	-11,212	0.11	14.1
Motors		4B	Service	AHU	VSD & EEM - RI	12,612	5,771	-312	-4,270	13,800	-11,424	0.09	14.3
Motors		5A	Service	AHU	EEM - RI	380	512	0	347	1,239	479	2.26	4.8
Motors		5A	Service	AHU	EEM - ROF	365	472	0	365	1,203	472	2.29	4.7
Motors		5B	Service	AHU	EEM - RI	760	1,024	0	694	2,478	958	2.26	4.8
Motors		5B	Service	AHU	EEM - ROF	731	944	0	731	2,405	944	2.29	4.7
Motors		5B	Service	AHU	VSD to Existing - RI	17,821	8,489	-312	-6,193	19,804	-15,837	0.11	14.1
Motors		5B	Service	AHU	VSD & EEM - RI	17,896	8,371	-312	-6,247	19,708	-16,084	0.10	14.2
Motors		6	Service	AHU	EEM - RI	434	709	0	396	1,540	672	2.55	4.4
Motors		6	Service	AHU	EEM - ROF	417	652	0	417	1,486	652	2.56	4.4
Motors		6	Service	AHU	VSD to Existing - RI	13,728	6,946	-156	4,976	15,541	-11,914	0.13	13.8
Motors		6	Service	AHU	VSD & EEM - RI	13,802	6,846	-156	-5,018	15,473	-12,131	0.12	13.9
Motors		7	Service	AHU	EEM - RI	2,246	4,436	0	2,052	8,734	4,242	2.89	4.0
Motors		7	Service	AHU	EEM - ROF	2,160	4,043	0	2,160	8,363	4,043	2.87	4.0
Motors		7	Service	AHU	VSD to Existing - RI	128,781	63,545	-156	-49,143	143,027	-114,535	0.11	14.1
Motors		7	Service	AHU	VSD & EEM - RI	129,231	62,571	-156	-49,386	142,260	-116,202	0.10	14.2
Motors		8	Service	Air Comp.	EEM - RI	9,174	13,211	0	8,381	30,766	12,418	2.35	4.7
Motors		8	Service	Air Comp.	EEM - ROF	8,821	11,943	0	8,821	29,585	11,943	2.35	4.7
Motors		9	Service	CTwr Fan	EEM - RI	1,116	2,262	0	1,019	4,398	2,166	2.94	4.0
Motors		9	Service	CTwr Fan	EEM - ROF	1,073	2,073	0	1,073	4,219	2,073	2.93	4.0
Motors		9	Service	CTwr Fan	VSD to Existing - RI	3,567	20,674	-156	57	24,143	17,008	5.77	2.3
Motors		9	Service	CTwr Fan	VSD & EEM - RI	3,766	20,417	-156	-54	23,973	16,441	5.37	2.5
Motors		1	Warehouse	AHU	EEM - RI	808	368	0	738	1,914	298	1.37	6.6
Motors		1	Warehouse	AHU	EEM - ROF	777	341	0	777	1,895	341	1.44	6.4
Motors		10	Warehouse	Cond. Fan	EEM - RI	2,424	1,119	0	2,013	5,556	708	1.29	6.8
Motors		10	Warehouse	Cond. Fan	EEM - ROF	2,241	959	0	2,241	5,441	959	1.43	6.4
Motors		11	Warehouse	Cond. Fan	EEM - RI	416	210	0	380	1,006	174	1.42	6.5
Motors		11	Warehouse	Cond. Fan	EEM - ROF	400	194	0	400	994	194	1.48	6.3
Motors		12	Warehouse	Cond. Fan	EEM - RI	2,043	700	0	1,866	4,610	524	1.26	6.9
Motors		12	Warehouse	Cond. Fan	EEM - ROF	1,964	640	0	1,964	4,569	640	1.33	6.7
Motors		13	Warehouse	Cond. Fan	EEM - RI	1,666	1,139	0	1,522	4,327	995	1.60	6.0
Motors		13	Warehouse	Cond. Fan	EEM - ROF	1,602	1,049	0	1,602	4,253	1,049	1.65	5.9
Motors		14	Warehouse	Cond. Fan	EEM - RI	825	737	0	754	2,316	666	1.81	5.6
Motors		14	Warehouse	Cond. Fan	EEM - ROF	793	681	0	793	2,268	681	1.86	5.5
Motors		15	Warehouse	Cond. Fan	EEM - RI	954	1,080	0	871	2,906	998	2.05	5.1
Motors		15	Warehouse	Cond. Fan	EEM - ROF	917	994	0	917	2,828	994	2.08	5.1
Motors		16	Warehouse	Cond. Fan	EEM - RI	434	785	0	396	1,615	747	2.72	4.2
Motors		16	Warehouse	Cond. Fan	EEM - ROF	417	721	0	417	1,556	721	2.73	4.2
Motors		17	Warehouse	Refrig.	EEM - RI	434	1,491	0	396	2,322	1,454	4.35	2.9
Motors		17	Warehouse	Refrig.	EEM - ROF	417	1,371	0	417	2,206	1,371	4.29	3.0
Motors		18	Warehouse	Refrig.	EEM - RI	2,246	9,337	0	2,052	13,635	9,143	5.07	2.6
Motors		18	Warehouse	Refrig.	EEM - ROF	2,160	8,517	0	2,160	12,837	8,517	4.94	2.6
Motors		2	Warehouse	AHU	EEM - RI	2,704	1,384	0	2,245	6,333	925	1.34	6.7
Motors		2	Warehouse	AHU	EEM - ROF	2,500	1,182	0	2,500	6,182	1,182	1.47	6.3
Motors		3	Warehouse	AHU	EEM - RI	7,264	2,671	0	4,892	14,828	300	1.04	7.7
Motors		3	Warehouse	AHU	EEM - ROF	6,209	1,869	0	6,209	14,288	1,869	1.30	6.8
Motors		4	Warehouse	AHU	EEM - RI	1,904	1,372	0	1,252	4,558	750	1.39	6.5

Table 3.6b
All Non-Building EROs: Present Values of Costs and Savings

End Use	Bldg. Set No.	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of O&M Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		4	Warehouse	AHU	EEM - ROF	1,628	984	0	1,628	4,239	984	1.60	6.0
Motors		5A	Warehouse	AHU	EEM - RI	1,375	1,247	0	1,142	3,764	1,014	1.74	5.7
Motors		5A	Warehouse	AHU	EEM - ROF	1,271	1,064	0	1,271	3,607	1,064	1.84	5.5
Motors		5B	Warehouse	AHU	EEM - RI	1,925	1,746	0	1,598	5,270	1,420	1.74	5.7
Motors		5B	Warehouse	AHU	EEM - ROF	1,780	1,490	0	1,780	5,050	1,490	1.84	5.5
Motors		5B	Warehouse	AHU	VSD to Existing - RI	25,851	11,779	-1,094	-7,982	28,556	-23,147	0.10	14.1
Motors		5B	Warehouse	AHU	VSD & EEM - RI	26,152	11,686	-1,094	8,215	28,529	-23,775	0.09	14.3
Motors		6A	Warehouse	AHU	EEM - RI	4,452	5,142	0	3,697	13,290	4,386	1.99	5.2
Motors		6A	Warehouse	AHU	EEM - ROF	4,116	4,349	0	4,116	12,581	4,349	2.06	5.1
Motors		6B	Warehouse	AHU	EEM - RI	6,360	7,345	0	5,281	18,986	6,266	1.99	5.2
Motors		6B	Warehouse	AHU	EEM - ROF	5,880	6,212	0	5,880	17,973	6,212	2.06	5.1
Motors		6B	Warehouse	AHU	VSD to Existing - RI	125,292	64,564	-3,124	-42,525	144,207	-106,378	0.15	13.6
Motors		6B	Warehouse	AHU	VSD & EEM - RI	126,290	63,948	-3,124	-43,299	143,815	-108,765	0.14	13.7
Motors		7A	Warehouse	AHU	EEM - RI	760	1,132	0	694	2,586	1,066	2.40	4.6
Motors		7A	Warehouse	AHU	EEM - ROF	721	1,044	0	731	2,505	1,044	2.43	4.6
Motors		7B	Warehouse	AHU	EEM - RI	1,140	1,698	0	1,041	3,880	1,600	2.40	4.6
Motors		7B	Warehouse	AHU	EEM - ROF	1,096	1,566	0	1,096	3,758	1,566	2.43	4.6
Motors		7B	Warehouse	AHU	VSD to Existing - RI	26,731	14,056	-469	9,290	31,029	-22,433	0.16	13.5
Motors		7B	Warehouse	AHU	VSD & EEM - RI	26,844	13,883	-469	9,370	30,888	-22,800	0.15	13.6
Motors		8	Warehouse	AHU	EEM - RI	705	1,407	0	644	2,756	1,346	2.91	4.0
Motors		8	Warehouse	AHU	EEM - ROF	678	1,291	0	678	2,647	1,291	2.90	4.0
Motors		8	Warehouse	AHU	VSD to Existing - RI	26,738	14,919	-156	9,882	31,619	-21,858	0.18	13.2
Motors		8	Warehouse	AHU	VSD & EEM - RI	26,873	14,724	156	9,956	31,485	-22,261	0.17	13.3
Motors		9	Warehouse	AHU	EEM - RI	954	1,884	0	572	3,410	1,502	2.57	4.4
Motors		9	Warehouse	AHU	EEM - ROF	784	1,204	0	784	2,772	1,204	2.54	4.4
Motors		9	Warehouse	AHU	VSD to Existing - RI	39,125	21,686	-156	14,775	45,880	-32,371	0.17	13.3
Motors		9	Warehouse	AHU	VSD & EEM - RI	39,449	21,580	-156	15,021	45,852	-33,046	0.16	13.4
Motors		1WELL	Water Well	P-933	EEM - RI	9,174	26,790	0	3,619	39,583	21,235	3.31	3.6
Motors		1WELL	Water Well	P-933	EEM - ROF	6,703	12,197	0	6,703	25,603	12,197	2.82	4.1
Motors		2WELL	Water Well	P-456	EEM - RI	5,125	16,969	0	2,022	24,115	13,865	3.71	3.3
Motors		2WELL	Water Well	P-456	EEM - ROF	3,745	7,678	0	3,745	15,167	7,678	3.05	3.9
Motors		3WELL	Water Well	P-1345	EEM - RI	5,125	16,005	0	2,022	23,151	12,901	3.52	3.5
Motors		3WELL	Water Well	P-1345	EEM - ROF	3,745	7,238	0	3,745	14,728	7,238	2.93	4.0
Motors		4WELL	Water Well	T-9961	EEM - RI	5,125	16,647	0	2,022	23,794	13,544	3.64	3.4
Motors		4WELL	Water Well	T-9961	EEM - ROF	3,745	7,531	0	3,745	15,021	7,531	3.01	3.9
Motors		5WELL	Water Well	P-4524	EEM - RI	4,252	16,890	0	1,677	22,819	14,315	4.37	2.9
Motors		5WELL	Water Well	P-4524	EEM - ROF	3,107	7,700	0	3,107	13,914	7,700	3.48	3.5
Motors		6WELL	Water Well	T-7732	EEM - RI	1,918	3,515	0	757	6,189	2,353	2.23	4.8
Motors		6WELL	Water Well	T-15003	EEM - RI	1,546	2,743	0	610	4,899	1,807	2.17	4.9
Motors		6WELL	Water Well	T-7732	EEM - ROF	1,401	1,684	0	1,401	4,487	1,684	2.20	4.9
Motors		6WELL	Water Well	T-15003	EEM - ROF	1,130	1,310	0	1,130	3,569	1,310	2.16	4.9
Motors		7WELL	Water Well	S-19222	EEM - RI	705	1,527	0	278	2,510	1,100	2.56	4.4
Motors		7WELL	Water Well	S-19222	EEM - ROF	515	756	0	515	1,787	756	2.47	4.5
Refrig.		Barracks	Barracks	Refrigerator	RFE-3	289,568	6,332	0	116,750	123,081	-166,486	0.43	36.8
Refrig.		Breakrooms	Breakrooms	Refrigerator	RFE-2	73,894	35,211	0	29,793	65,003	-8,890	0.88	17.8
Refrig.		On-Post Housing	On-Post Housing	Refrigerator	RFE-1	1,000,437	476,712	0	403,362	880,074	-120,363	0.88	17.8
Transportation		Ambulance	Vehicles	Modular, 4x2	CNG Vehicle - ROF	30,822	51,852	82,515	9,718	124,649	93,827	3.04	3.9
Transportation		Bus	Vehicles	Bus, School, 28-29 psgr	CNG Vehicle - ROF	12,159	6,818	8,458	2,413	12,863	705	0.06	14.8
Transportation		Bus	Vehicles	Bus, School, 42-45 psgr	CNG Vehicle - ROF	21,278	18,009	60,303	4,222	74,090	52,812	2.48	4.5
Transportation		Bus	Vehicles	Bus, Intercity, 41-51 psgr, 4x2	CNG Vehicle - ROF	72,709	144,907	159,537	29,044	275,401	202,692	2.79	4.1
Transportation		Pickup	Vehicles	Compact, 4x2, 4,599 GVW & under	CNG Vehicle - ROF	74,368	70,055	74,372	80,594	63,833	-10,534	-0.14	18.2
Transportation		Sedan	Vehicles	Sedan	CNG Vehicle - ROF	110,236	206,912	199,983	155,178	251,717	141,482	1.28	6.8
Transportation		Truck	Vehicles	Panel Truck, 4x2, 6,999 GVW & under	CNG Vehicle - ROF	28,209	43,769	40,543	30,570	53,742	25,533	0.91	8.2
Transportation		Truck	Vehicles	Tractor, 4x2, 24,000-44,500 GVW	CNG Vehicle - ROF	9,863	14,527	12,806	5,438	22,245	12,382	1.26	6.9

Table 3.6b
All Non-Building EROs: Present Values of Costs and Savings

End Use	Bldg. Set No.	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of O&M Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Transportation		Truck	Vehicles	Stake, 4x2, 7,000 GVW	CNG Vehicle - ROF	228,233	464,105	271,345	-202,402	533,048	304,815	1.34	6.7
Transportation		Truck	Vehicles	Carryall, 4x2, Conv, 15 psgr, 7,700 GVW	CNG Vehicle - ROF	35,902	92,775	53,361	-38,907	107,228	71,327	1.99	5.2
Transportation		Truck	Vehicles	Carryall, 4x4, 7,500 GVW	CNG Vehicle - ROF	28,209	56,744	59,988	-30,570	86,162	57,953	2.05	5.1
Transportation		Truck	Vehicles	Carryall, 4x2, 6,999 GVW & under	CNG Vehicle - ROF	69,239	134,761	70,414	-75,036	130,140	60,901	0.88	8.3
Transportation		Truck	Vehicles	Tractor, 6x4, 24,000-44,500 GVW	CNG Vehicle - ROF	4,742	10,087	66,648	-1,894	74,841	70,099	14.78	1.0
Transportation		Truck	Vehicles	Stake, 4x2, 10,000 GVW	CNG Vehicle - ROF	39,453	33,577	56,750	-26,653	63,675	24,223	0.61	9.7
Transportation		Truck	Vehicles	Multistop, 4x2, 12,500-16,999 GVW	CNG Vehicle - ROF	88,011	24,325	44,647	-123,892	-54,920	-142,930	-1.62	-25.0
Transportation		Truck	Vehicles	Multistop, 4x2, 1-ton	CNG Vehicle - ROF	2,564	924	3,857	-2,779	2,002	-562	-0.22	20.0
Transportation		Truck	Vehicles	Multistop, 4x2, 8,499 GVW & under	CNG Vehicle - ROF	26,670	17,532	33,642	-37,543	13,631	-13,039	-0.49	30.6
Transportation		Truck	Vehicles	Cargo, 4x4, 12,499 GVW & under	CNG Vehicle - ROF	74,368	32,573	34,673	-80,594	-13,349	-87,717	-1.18	-87.0
T&D		Substation	Substation	Sub. Transformers	Conservation Voltage Reduction - RI	400	827,205	0	0	827,205	826,805	2068.01	0.0
T&D		Substation	Substation	Capacitor Bank	Power Factor Correction to Unity - RI	49,140	123,864	154	0	123,711	74,571	2.52	6.2
T&D		Substation	Substation	Capacitor Bank	Power Factor Correction to .95 - RI	14,040	110,596	-44	0	110,552	96,512	7.87	2.0

Table 3.7a

Building ERCs Constituting the Minimum Life-Cycle Cost Efficiency Resources: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement Energy Savings (MBtu)	Full Implement Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Hot Water	14	Assembly-05	Assembly	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	216.0	NA	216.0	NA	17,029	70.51	0.2
Hot Water	23	Education-18	Education	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	107.0	NA	107.0	NA	10,072	70.46	0.2
Hot Water	57	Food Service-15	Food Service	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	329.0	NA	329.0	NA	31,009	68.56	0.2
Hot Water	152	Service-08	Mercantile & Service	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	228.0	NA	228.0	NA	20,823	67.53	0.2
Hot Water	96	Office-22	Office	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	48.0	NA	48.0	NA	4,482	65.96	0.2
Hot Water	93	Office-21	Office	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	67.0	NA	67.0	NA	6,291	65.19	0.2
Hot Water	4	Assembly-16	Assembly	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	345.0	NA	345.0	NA	31,426	62.62	0.2
Hot Water	98	Office-28	Office	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	32.0	NA	32.0	NA	3,052	59.69	0.3
Hot Water	21	Education-14	Education	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	43.0	NA	43.0	NA	4,010	58.29	0.3
Hot Water	100	Office-03	Office	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	173.0	NA	173.0	NA	13,608	57.00	0.3
Hot Water	20	Education-12	Education	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	108.0	NA	108.0	NA	6,641	56.34	0.3
Hot Water	134	Other-41	Other	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	99.0	NA	99.0	NA	9,316	55.80	0.3
Hot Water	1	Assembly-10	Assembly	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	67.0	NA	67.0	NA	4,111	48.80	0.3
Hot Water	32	Education-07	Education	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	259.0	NA	259.0	NA	15,911	48.50	0.3
Hot Water	58	Food Service-17	Food Service	gas central boiler	Gas Wrap Tank w Insulation, LFSHs, Aerators	1,826.0	NA	1,826.0	NA	121,994	47.37	0.3
Hot Water	124	Other-26	Other	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	17.0	NA	17.0	NA	1,447	41.19	0.4
Hot Water	90	Office-17	Office	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	39.0	NA	39.0	NA	2,355	40.92	0.4
Hot Water	171	Warehouse-05	Warehouse & Storage	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	5.0	NA	5.0	NA	379	38.90	0.4
Hot Water	12	Assembly-03	Assembly	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	238.0	NA	238.0	NA	18,551	38.40	0.4
Hot Water	109	Office-08	Office	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	144.0	NA	144.0	NA	11,262	37.10	0.4
Hot Water	131	Other-36	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	39.0	NA	39.0	NA	8,653	23.48	0.7
Hot Water	78	Lodging-02	Lodging	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	340.0	NA	340.0	NA	37,529	23.33	0.7
Hot Water	137	Other-07	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	38.0	NA	38.0	NA	5,996	22.04	0.7
Hot Water	125	Other-27	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	32.0	NA	32.0	NA	6,712	20.86	0.7
Hot Water	130	Other-32	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	91.0	NA	91.0	NA	19,999	20.23	0.8
Hot Water	73	Lodging-12	Lodging	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	637.0	NA	637.0	NA	78,869	20.23	0.8
Hot Water	38	FH-2 to 4-03	2 to 4 Unit Buildings	electric shw heater	0.85 Gas WH (RES), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	22.0	NA	22.0	NA	5,323	19.94	0.8
Heating	109	Office-08	Office	oil conv boiler	Add Automatic Electric Damper	33.0	NA	33.0	NA	2,314	18.22	0.9
Hot Water	103	Office-37	Office	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	64.0	NA	64.0	NA	9,934	17.42	0.9
Hot Water	107	Office-04	Office	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	46.0	NA	46.0	NA	5,636	15.68	1.0
Hot Water	33	Education-08	Education	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	118.0	NA	118.0	NA	6,406	14.69	1.1
Hot Water	43	FH-Detached-01	Single Family Detached	electric shw heater	0.85 Gas WH (RES), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	31.0	NA	31.0	NA	1,577	14.36	1.1
Hot Water	168	Warehouse-03	Warehouse & Storage	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	20.0	NA	20.0	NA	3,323	14.14	1.1
Heating	30	Education-24	Education	gas conv boiler	Add Automatic Electric Damper	35.0	NA	35.0	NA	2,219	13.90	1.1
Heating	25	Education-18	Education	oil conv boiler	Add Automatic Electric Damper	16.0	NA	16.0	NA	1,393	13.24	1.2
Hot Water	82	Office-01	Office	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	275.0	NA	275.0	NA	33,382	13.08	1.2
Hot Water	36	FH-2 to 4-10	2 to 4 Unit Buildings	electric shw heater	0.85 Gas WH (RES), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	312.0	NA	312.0	NA	15,194	12.33	1.3
Hot Water	131	Other-36	Other	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	21.0	NA	21.0	NA	8,499	12.01	1.3
Roof	48	FH-attached-01	Single Family Attached	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	NA	NA	NA	NA	2,466,709	11.93	1.3
Heating	96	Office-22	Office	oil conv boiler	Add Automatic Electric Damper	13.0	NA	13.0	NA	1,103	11.52	1.4
Hot Water	76	Lodging-16	Lodging	gas central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	460.0	NA	460.0	NA	28,635	11.47	1.4
Hot Water	35	FH-2 to 4-01	2 to 4 Unit Buildings	electric shw heater	0.85 Gas WH (RES), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	652.0	NA	652.0	NA	28,534	11.44	1.4
Hot Water	147	Service-03	Mercantile & Service	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	296.0	NA	296.0	NA	22,711	11.28	1.4
Heating	8	Assembly-20	Assembly	gas conv boiler	Add Automatic Electric Damper	32.0	NA	32.0	NA	1,774	11.14	1.4
Heating	28	Education-22	Education	other conv furn	Conventional Gas Furnace	12.0	NA	12.0	NA	5,469	11.13	1.4
Heating	12	Assembly-03	Assembly	oil conv boiler	Add Automatic Electric Damper	36.0	NA	36.0	NA	2,617	10.95	1.4
Hot Water	5	Assembly-18	Assembly	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	325.0	NA	325.0	NA	35,171	10.90	1.4
Hot Water	77	Lodging-19	Lodging	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	1,089.0	NA	1,089.0	NA	135,118	10.87	1.4
Hot Water	127	Other-03	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	16.0	NA	16.0	NA	2,520	10.81	1.4
Hot Water	97	Office-26	Office	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	167.0	NA	167.0	NA	25,337	10.79	1.4
Heating	4	Assembly-16	Assembly	oil conv boiler	Add Automatic Electric Damper	38.0	NA	38.0	NA	3,191	10.53	1.5
Heating	90	Office-17	Office	oil conv boiler	Add Automatic Electric Damper	19.0	NA	19.0	NA	1,070	10.39	1.5
Hot Water	105	Office-37	Office	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	73.0	NA	73.0	NA	11,355	10.38	1.5
Heating	76	Lodging-16	Lodging	gas conv boiler	Add Automatic Electric Damper	89.0	NA	89.0	NA	2,391	10.23	1.5
Heating	33	Education-08	Education	other conv furn	Conventional Gas Furnace	143.0	NA	143.0	NA	33,231	10.22	1.5
Heating	20	Education-12	Education	oil conv boiler	Add Automatic Electric Damper	19.0	NA	19.0	NA	1,072	10.16	5
Hot Water	69	Health Care-07	Health Care	hot water central haer	Conventional Gas Boiler, Wrap Tank w Insulation, LFSHs, Aerators	10,622.0	NA	10,622.0	NA	942,779	10.03	1.6
Hot Water	54	Food Service-11	Food Service	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	2,246.0	NA	2,246.0	NA	199,977	9.93	1.6
Heating	14	Assembly-05	Assembly	oil conv boiler	Add Automatic Electric Damper	14.0	NA	14.0	NA	1,032	9.82	1.6
Hot Water	136	Other-32	Other	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	43.0	NA	43.0	NA	21,397	9.81	1.6
Heating	93	Office-21	Office	oil conv boiler	Add Automatic Electric Damper	20.0	NA	20.0	NA	1,703	9.31	1.7
Lights	133	Other-38	Other	INE INC 75 CEIL	FLUS CFL 27 INTEGRAL UNIT	3,831.0	NA	3,831.0	NA	1,851,235	9.27	1.7
Hot Water	24	Education-17	Education	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	121.0	NA	121.0	NA	13,841	8.79	1.8
Heating	84	Office-10	Office	other conv furn	Conventional Gas Furnace	20.0	NA	20.0	NA	7,162	8.15	1.9
Hot Water	67	Health Care-04	Health Care	hot water central haer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	107.0	NA	107.0	NA	12,224	8.10	1.9
Hot Water	82	Office-01	Office	other shw heater	Wrap Old LPG Tank Ins Pipe LFSHs, Aer Lower Tank Temp	19.0	NA	19.0	NA	325	8.09	1.9
Hot Water	37	FH-2 to 4-12	2 to 4 Unit Buildings	electric shw heater	Better Elec WH (RES) Ins Pipe LFSHs, Aer Lower Tank Temp	3,485.0	NA	3,485.0	NA	87,973	8.07	1.9
Hot Water	32	Education-07	Education	other shw heater	Wrap Old LPG Tank Ins Pipe LFSHs, Aer Lower Tank Temp	20.0	NA	20.0	NA	333	8.03	1.9
Heating	5	Assembly-18	Assembly	other conv furn	Conventional Gas Furnace	67.0	NA	67.0	NA	12,603	7.89	2.0
Hot Water	139	Other-39	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	21.0	NA	21.0	NA	337	7.87	2.0

Table 3.7a

Building ERCs Constituting the Minimum Life-Cycle Cost Efficiency Resources Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW mo)	Full Implement Energy Savings (MBtu)	Full Implement Demand Savings (kW mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Heating	134	Other-41	Other	oil conv boiler	Add Automatic Electric Damper	15.0	NA	15.0	NA	1,264	7.58	2.1
Lights	46	FH-Detached-03	Single Family Detached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	1.0	NA	1.0	NA	1,034	7.54	2.1
Hot Water	68	Health Care-06	Health Care	hot water central heat	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	328.0	NA	328.0	NA	31,253	7.41	2.1
Heating	31	Education-04	Education	gas conv boiler	Add Automatic Electric Damper	29.0	NA	29.0	NA	1,423	7.32	2.1
Lights	45	FH-Detached-04	Single Family Detached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	3.0	NA	3.0	NA	2,073	7.19	2.2
Lights	37	FH-2 to 4-12	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	20.0	NA	20.0	NA	13,722	7.09	2.2
Hot Water	102	Office-31	Office	hot water central heat	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	25.0	NA	25.0	NA	4,386	7.08	2.2
Heating	1	Assembly-10	Assembly	oil conv boiler	Add Automatic Electric Damper	11.0	NA	11.0	NA	611	6.99	2.2
Lights	47	FH-Detached-07	Single Family Detached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	0.0	NA	0.0	NA	241	6.88	2.3
Hot Water	84	Office-10	Office	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	10.0	NA	10.0	NA	279	6.81	2.3
Hot Water	163	Warehouse-23	Warehouse & Storage	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	7.0	NA	7.0	NA	1,042	6.78	2.3
Lights	36	FH-2 to 4-10	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	13.0	NA	13.0	NA	8,699	6.75	2.3
Heating	75	Lodging-13	Lodging	gas conv boiler	Add Automatic Electric Damper	11.0	NA	11.0	NA	633	6.70	2.3
Hot Water	87	Office-13	Office	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	148.0	NA	148.0	NA	8,737	6.69	2.3
Roof	78	Lodging-02	Lodging	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	NA	NA	NA	NA	69,083	6.62	2.4
Heating	100	Office-03	Office	oil conv boiler	Add Automatic Electric Damper	44.0	NA	44.0	NA	2,991	6.59	2.4
Lights	30	FH-attached-04	Single Family Attached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	1.0	NA	1.0	NA	863	6.58	2.4
Lights	35	FH-2 to 4-01	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	25.0	NA	25.0	NA	15,946	6.58	2.4
Lights	69	Health Care-07	Health Care	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	7,862.0	NA	7,862.0	NA	3,359,582	6.57	2.4
Cooling	23	Education-18	Education	single conv chiller	Air-Cooled Reciprocating Chiller (20 to 75 tons cooling)	60.0	NA	60.0	NA	55,048	6.55	2.4
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	13.0	NA	13.0	NA	8,037	6.54	2.4
Heating	135	Other-42	Other	gas conv boiler	Add Automatic Electric Damper	16.0	NA	16.0	NA	986	6.52	2.4
Lights	8	Assembly-20	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	635.0	NA	635.0	NA	392,077	6.50	2.4
Roof	7	Assembly-02	Assembly	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-30	NA	NA	NA	NA	13,736	6.49	2.4
Lights	49	FH-attached-03	Single Family Attached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	9.0	NA	9.0	NA	5,537	6.47	2.4
Lights	43	FH-Detached-01	Single Family Detached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	1.0	NA	1.0	NA	463	6.47	2.4
Heating	107	Office-04	Office	other conv furn	Conventional Gas Furnace	32.0	NA	32.0	NA	11,147	6.46	2.4
Lights	36	FH-2 to 4-10	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	128.0	NA	128.0	NA	77,284	6.32	2.5
Lights	40	FH-2 to 4-07	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	231.0	NA	231.0	NA	138,198	6.27	2.5
Hot Water	39	FH-2 to 4-06	2 to 4 Unit Buildings	electric shw heater	Better Elec WH (RES), Ins Pipe, LFSHs, Aer , Lower Tank Temp	2,131.0	NA	2,131.0	NA	26,338	6.21	2.5
Hot Water	117	Other-17ag	Other	oil shw heater	0.80 Oil WH (COM), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	7,705.0	NA	7,705.0	NA	137,984	6.17	2.5
Hot Water	18	Education-01	Education	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	74.0	NA	74.0	NA	1,983	6.10	2.6
Lights	44	FH-Detached-03	Single Family Detached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	0.0	NA	0.0	NA	122	6.08	2.6
Hot Water	1	Assembly-10	Assembly	electric shw heater	Wrap Old Electric Tank w Ins , Ins Pipe, LFSHs, Aerators	12.0	NA	12.0	NA	801	6.04	2.6
Lights	40	FH-2 to 4-07	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	23.0	NA	23.0	NA	13,081	6.02	2.6
Roof	27	Education-02	Education	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	NA	NA	NA	NA	29,645	6.00	2.6
Lights	39	FH-2 to 4-06	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	39.0	NA	39.0	NA	20,945	5.81	2.7
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	21.0	NA	21.0	NA	11,119	5.78	2.7
Heating	78	Lodging-02	Lodging	other conv furn	Conventional Gas Furnace	7.0	NA	7.0	NA	2,358	5.63	2.8
Lights	6	Assembly-19	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	305.0	NA	305.0	NA	141,633	5.47	2.9
Lights	41	FH-2 to 4-09	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	9.0	NA	9.0	NA	4,423	5.38	2.9
Cooling	32	Education-07	Education	package unit	Single Zone Packaged AC Unit (5.4167 to 11.25 tons cooling)	7.0	NA	7.0	NA	17,726	5.33	2.9
Hot Water	51	FH-attached-03	Single Family Attached	electric shw heater	Wrap Old Electric Tank w Ins , Ins Pipe, LFSHs, Aerators	1,168.0	NA	1,168.0	NA	66,392	5.25	3.0
Lights	63	Health Care-02	Health Care	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	33.0	NA	33.0	NA	14,219	5.24	3.0
Hot Water	100	Office-03	Office	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	11.0	NA	11.0	NA	295	5.15	3.0
Hot Water	19	Education-11	Education	hot water central heat	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	30.0	NA	30.0	NA	1,406	5.12	3.1
Lights	14	Assembly-05	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	121.0	NA	121.0	NA	52,633	5.08	3.1
Lights	124	Other-26	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	43.0	NA	43.0	NA	15,461	5.00	3.1
Lights	76	Lodging-16	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	12.0	NA	12.0	NA	4,787	4.95	3.2
Lights	76	Lodging-16	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	12.0	NA	12.0	NA	4,434	4.88	3.2
Hot Water	48	FH-attached-01	Single Family Attached	electric shw heater	0.76 Gas WH (RES), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	97.0	NA	97.0	NA	36,679	4.88	3.2
Lights	121	Other-20	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	38.0	NA	38.0	NA	12,641	4.70	3.3
Lights	78	Lodging-02	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	5.0	NA	5.0	NA	1,648	4.68	3.3
Hot Water	107	Office-04	Office	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	16.0	NA	16.0	NA	405	4.68	3.3
Lights	134	Other-41	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	244.0	NA	244.0	NA	79,986	4.68	3.3
Lights	74	Lodging-13	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	27.0	NA	27.0	NA	9,623	4.67	3.3
Lights	78	Lodging-02	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	4.0	NA	4.0	NA	1,392	4.66	3.4
Lights	4	Assembly-16	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	364.0	NA	364.0	NA	174,338	4.64	3.4
Lights	74	Lodging-13	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	25.0	NA	25.0	NA	8,982	4.62	3.4
Lights	144	Public Order-04	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	5.0	NA	5.0	NA	1,887	4.56	3.4
Lights	67	Health Care-04	Health Care	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	289.0	NA	289.0	NA	121,446	4.53	3.5
Heating	137	Other-47	Other	oil conv boiler	Add Automatic Electric Damper	7.0	NA	7.0	NA	417	4.50	3.5
Lights	141	Public Order-01	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	11.0	NA	11.0	NA	4,136	4.49	3.5
Hot Water	89	Office-16	Office	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	17.0	NA	17.0	NA	436	4.47	3.5
Lights	145	Public Order-05	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	16.0	NA	16.0	NA	6,296	4.45	3.5
Hot Water	79	Lodging-05	Lodging	hot water central heat	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	73.0	NA	73.0	NA	12,643	4.42	3.5
Lights	66	Health Care-03	Health Care	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	50.0	NA	50.0	NA	22,376	4.42	3.5
Hot Water	110	Other-17	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	27.0	NA	27.0	NA	1,613	4.41	3.6
Roof	141	Public Order-01	Public Order Safety	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	NA	NA	NA	NA	12,217	4.36	3.6
Lights	139	Other-99	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	4.0	NA	4.0	NA	13,613	4.35	3.6

Table 3.7a

Building ERCs Constituting the Minimum Life-Cycle Cost Efficiency Measures: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW max)	Full Implement Energy Savings (MBtu)	Full Implement Demand Savings (kW max)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	73	Lodging-12	Lodging	IN23: INC 60 WALL	FL174: CFL 18 GLOBE UNIT	20.0	NA	20.0	NA	6,646	4.34	3.6
Lights	77	Lodging-19	Lodging	IN15: INC 60 TABLE LAMP	FL174: CFL 18 GLOBE UNIT	37.0	NA	37.0	NA	12,291	4.32	3.6
Lights	142	Public Order-02	Public Order Safety	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	6.0	NA	6.0	NA	2,189	4.32	3.6
Lights	116	Other-17	Other	IN5: INC 60 CEIL	FL174: CFL 18 GLOBE UNIT	4.0	NA	4.0	NA	1,229	4.31	3.6
Hot Water	62	Food Service-08	Food Service	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	1,337.0	NA	1,337.0	NA	37,842	4.29	3.6
Hot Water	63	Food Service-09	Food Service	other shw heater	Wrap Old [illegible] Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	132.0	NA	132.0	NA	3,744	4.28	3.6
Hot Water	88	Office-15ng	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	137.0	NA	137.0	NA	3,881	4.28	3.7
Lights	5	Assembly-18	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	449.0	NA	449.0	NA	193,424	4.27	3.7
Lights	77	Lodging-19	Lodging	IN23: INC 60 WALL	FL174: CFL 18 GLOBE UNIT	33.0	NA	33.0	NA	11,335	4.27	3.7
Lights	129	Other-31	Other	IN5: INC 60 CEIL	FL174: CFL 18 GLOBE UNIT	5.0	NA	5.0	NA	1,431	4.26	3.7
Lights	69	Health Care-07	Health Care	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	4,838.0	NA	4,838.0	NA	1,387,520	4.21	3.7
Lights	112	Other-01g	Other	IN5: INC 60 CEIL	FL174: CFL 18 GLOBE UNIT	43.0	NA	43.0	NA	13,293	4.20	3.7
Lights	123	Other-24	Other	IN5: INC 60 CEIL	FL174: CFL 18 GLOBE UNIT	70.0	NA	70.0	NA	19,897	4.19	3.7
Hot Water	59	Food Service-02	Food Service	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	248.0	NA	248.0	NA	6,369	4.18	3.7
Hot Water	53	Food Service-01	Food Service	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	118.0	NA	118.0	NA	2,891	4.18	3.7
Hot Water	60	Food Service-04	Food Service	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	1,825.0	NA	1,825.0	NA	44,571	4.18	3.7
Roof	147	Service-03	Mercantile & Service	roof insulation R-value 0.00	Attic Ceiling: Increase insulation by R-19	NA	NA	NA	NA	53,497	4.17	3.7
Lights	68	Health Care-06	Health Care	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	277.0	NA	277.0	NA	107,578	4.16	3.8
Lights	138	Other-08	Other	IN5: INC 60 CEIL	FL174: CFL 18 GLOBE UNIT	172.0	NA	172.0	NA	48,272	4.14	3.8
Lights	127	Other-03	Other	IN5: INC 60 CEIL	FL174: CFL 18 GLOBE UNIT	7.0	NA	7.0	NA	1,875	4.13	3.8
Hot Water	0	Assembly-01	Assembly	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	121.0	NA	121.0	NA	2,951	4.11	3.8
Lights	72	Lodging-11	Lodging	IN15: INC 60 TABLE LAMP	FL174: CFL 18 GLOBE UNIT	170.0	NA	170.0	NA	51,849	4.11	3.8
Lights	12	Assembly-03	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	234.0	NA	234.0	NA	107,562	4.11	3.8
Lights	11	Assembly-24	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	148.0	NA	148.0	NA	63,134	4.10	3.8
Hot Water	86	Office-14	Office	hot water central heat	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	180.0	NA	180.0	NA	2,736	4.00	3.9
Lights	117	Other-17ng	Other	IN5: INC 60 CEIL	FL174: CFL 18 GLOBE UNIT	12.0	NA	12.0	NA	3,641	3.98	4.0
Hot Water	22	Education-15	Education	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	8.0	NA	8.0	NA	191	3.98	4.0
Lights	79	Lodging-05	Lodging	IN23: INC 60 WALL	FL174: CFL 18 GLOBE UNIT	28.0	NA	28.0	NA	8,122	3.95	4.0
Lights	52	Food Sales-01	Food Sales	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	385.0	NA	385.0	NA	127,769	3.95	4.0
Hot Water	33	Education-08	Education	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	49.0	NA	49.0	NA	513	3.93	4.0
Lights	140	Other-09g	Other	IN5: INC 60 CEIL	FL174: CFL 18 GLOBE UNIT	6.0	NA	6.0	NA	1,831	3.92	4.0
Lights	1	Assembly-10	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	124.0	NA	124.0	NA	46,741	3.87	4.0
Roof	0	Assembly-01	Assembly	roof insulation R-value 0.00	Attic Ceiling: Increase insulation by R-19	NA	NA	NA	NA	73,367	3.86	4.0
Lights	143	Public Order-03	Public Order Safety	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	3.0	NA	3.0	NA	1,038	3.86	4.0
Hot Water	78	Lodging-02	Lodging	gas shw heater	Wrap Old Gas Tank w. Ins., Ins. Pipe, LFSHs, Aerators	146.0	NA	146.0	NA	1,523	3.86	4.0
Hot Water	129	Other-31	Other	hot water central heat	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	[illegible]	NA	[illegible]	NA	839	3.83	4.1
Lights	72	Lodging-11	Lodging	IN23: INC 60 WALL	FL174: CFL 18 GLOBE UNIT	196.0	NA	196.0	NA	44,696	3.82	4.1
Roof	70	Lodging-01	Lodging	roof insulation R-value 0.00	Attic Ceiling: Increase insulation by R-19	NA	NA	NA	NA	10,938	3.81	4.1
Lights	76	Lodging-05	Lodging	IN15: INC 60 TABLE LAMP	FL174: CFL 18 GLOBE UNIT	8.0	NA	8.0	NA	8,184	3.79	4.1
Hot Water	27	Education-02	Education	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	64.0	NA	64.0	NA	662	3.78	4.1
Lights	103	Office-34	Office	EX1: EXIT: INC (2x20)	EX6: EXIT: LED	12.0	NA	12.0	NA	3,089	3.75	4.2
Roof	84	Office-10	Office	roof insulation R-value 5.00	Suspended Ceiling: Increase insulation by R-19	NA	NA	NA	NA	24,350	3.74	4.2
Lights	55	Food Service-12	Food Service	EX1: EXIT: INC (2x20)	EX6: EXIT: LED	3.0	NA	3.0	NA	1,143	3.73	4.2
Hot Water	5	Assembly-18	Assembly	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	37.0	NA	37.0	NA	1,347	3.70	4.2
Heating	21	Education-14	Education	other conv. furn	Conventional Oil Furnace	13.0	NA	13.0	NA	1,418	3.70	4.2
Heating	139	Other-09	Other	other conv. furn	Conventional Gas Furnace	17.0	NA	17.0	NA	2,069	3.69	4.2
Lights	149	Service-05	Mercantile & Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	25.0	NA	25.0	NA	8,736	3.67	4.3
Hot Water	31	Education-04	Education	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	106.0	NA	106.0	NA	1,088	3.67	4.3
Lights	57	Food Service-15	Food Service	EX1: EXIT: INC (2x20)	EX6: EXIT: LED	12.0	NA	12.0	NA	4,906	3.66	4.3
Heating	148	Service-04	Mercantile & Service	other conv. furn	Conventional Gas Furnace	4.0	NA	4.0	NA	1,127	3.63	4.3
Heating	111	Other-01	Other	other conv. furn	Conventional Gas Furnace	19.0	NA	19.0	NA	5,347	3.63	4.3
Cooling	33	Education-08	Education	package unit	Single Zone Packaged AC Unit (5.416 to 11.25 tons cooling)	12.0	NA	12.0	NA	43,191	3.62	4.3
Lights	106	Office-38	Office	EX1: EXIT: INC (2x20)	EX6: EXIT: LED	46.0	NA	46.0	NA	14,447	3.61	4.3
Lights	153	Service-09	Mercantile & Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	20.0	NA	20.0	NA	7,963	3.60	4.3
Lights	153	Service-09	Mercantile & Service	EX1: EXIT: INC (2x20)	EX6: EXIT: LED	1.0	NA	1.0	NA	494	3.59	4.4
Lights	109	Office-08	Office	EX1: EXIT: INC (2x20)	EX6: EXIT: LED	42.0	NA	42.0	NA	16,685	3.58	4.4
Lights	36	FH 2 to 4-10	2 to 4 Unit Buildings	IN5: INC 60 CEIL	FL174: CFL 18 GLOBE UNIT	289.0	NA	289.0	NA	129,013	3.58	4.4
Roof	35	FH 2 to 4-01	2 to 4 Unit Buildings	roof insulation R-value 5.00	Attic Ceiling: Increase insulation by R-19	NA	NA	NA	NA	320,413	3.57	4.4
Heating	67	Health Care-04	Health Care	other conv. boiler	Gas Pulse Condensing Boiler	48.0	NA	48.0	NA	17,734	3.56	4.4
Hot Water	92	Office-02	Office	oil shw heater	Wrap Old Oil Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	19.0	NA	19.0	NA	366	3.55	4.4
Hot Water	82	Office-01	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	19.0	NA	19.0	NA	188	3.54	4.4
Hot Water	83	Office-01g	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	22.0	NA	22.0	NA	362	3.54	4.4
Heating	121	Other-20	Other	other conv. furn	Conventional Gas Furnace	14.0	NA	14.0	NA	4,267	3.52	4.4
Lights	61	Food Service-07	Food Service	EX1: EXIT: INC (2x20)	EX6: EXIT: LED	[illegible]	NA	[illegible]	NA	2,968	3.52	4.4
Lights	149	Service-05	Mercantile & Service	IN36: INC 150 FLD	HS31: HPS 70 FLD	[illegible]	NA	[illegible]	NA	73,455	3.51	4.4
Lights	40	FH 2 to 4-07	2 to 4 Unit Buildings	IN5: INC 60 CEIL	FL174: CFL 18 GLOBE UNIT	[illegible]	NA	[illegible]	NA	65,836	3.51	4.5
Lights	148	Service-04	Mercantile & Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	[illegible]	NA	[illegible]	NA	[illegible]	3.50	4.5
Lights	150	Service-06	Mercantile & Service	EX1: EXIT: INC (2x20)	EX6: EXIT: LED	4	NA	4	NA	1,934	3.49	4.5
Lights	144	Public Order-04	Public Order Safety	EX1: EXIT: INC (2x20)	EX6: EXIT: LED	4	NA	4	NA	1,439	3.49	4.5
Lights	34	Food Service-11	Food Service	EX1: EXIT: INC (2x20)	EX6: EXIT: LED	[illegible]	NA	[illegible]	NA	[illegible]	3.48	4.5

Table 3.7a

Building EEMs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MWh)	First Year Demand Savings (kW mo)	Full Implement Energy Savings (MWh)	Full Implement Demand Savings (kW mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	8	Assembly-20	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	96.0	NA	96.0	NA	23,224	3.48	4.5
Lights	152	Service-08	Mercantile & Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	21.0	NA	21.0	NA	7,996	3.47	4.5
Lights	108	Office-07	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	12.0	NA	12.0	NA	4,645	3.46	4.5
Lights	145	Public Order-05	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	15.0	NA	15.0	NA	4,912	3.46	4.5
Lights	9	Assembly-22	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	233.0	NA	233.0	NA	77,977	3.46	4.5
Hot Water	42	FH-5 or More-01	5 or More Unit Buildings	electric shw heater	Better Elec. WH (RES), Ins. Pipe, LFSHs, Aer., Lower Tank Temp	478.0	NA	478.0	NA	14,415	3.46	4.5
Lights	153	Service-09	Mercantile & Service	IN39 INC 150 FLD	HS31 HPS 70 FLD	92.0	NA	92.0	NA	64,076	3.45	4.5
Lights	110	Office-09	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	9.0	NA	9.0	NA	3,414	3.44	4.5
Lights	105	Office-37	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	58.0	NA	58.0	NA	21,799	3.43	4.5
Roof	82	Office-01	Office	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-19	NA	NA	NA	NA	72,984	3.43	4.6
Lights	141	Public Order-01	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	8.0	NA	8.0	NA	3,146	3.43	4.6
Lights	2	Assembly-13	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	102.0	NA	102.0	NA	36,613	3.42	4.6
Lights	69	Health Care-07	Health Care	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	158.0	NA	158.0	NA	99,125	3.42	4.6
Lights	148	Service-04	Mercantile & Service	IN39 INC 150 FLD	HS31 HPS 70 FLD	133.0	NA	133.0	NA	90,315	3.40	4.6
Heating	32	Education-07	Education	other conv furn	Conventional Oil Furnace	24.0	NA	24.0	NA	5,754	3.40	4.6
Hot Water	75	Lodging-15	Lodging	gas - central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	103.0	NA	103.0	NA	4,961	3.39	4.6
Lights	100	Office-03	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	35.0	NA	35.0	NA	12,936	3.39	4.6
Lights	149	Service-05	Mercantile & Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1.0	NA	1.0	NA	528	3.39	4.6
Lights	67	Health Care-04	Health Care	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	9.0	NA	9.0	NA	3,336	3.39	4.6
Hot Water	112	Other-01g	Other	oil shw heater	0.80 Oil WH (COM), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	2,578.0	NA	2,578.0	NA	35,788	3.38	4.6
Lights	84	Office-10	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	7.0	NA	7.0	NA	2,636	3.38	4.6
Lights	82	Office-01	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	29.0	NA	29.0	NA	10,595	3.37	4.6
Heating	110	Office-09	Office	other conv furn	Conventional Gas Furnace	4.0	NA	4.0	NA	1,076	3.37	4.6
Lights	95	Office-21	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	24.0	NA	24.0	NA	8,795	3.36	4.7
Lights	94	Office-20	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	20.0	NA	20.0	NA	7,392	3.35	4.7
Lights	124	Other-26	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	16.0	NA	16.0	NA	5,906	3.35	4.7
Lights	99	Office-29	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	6.0	NA	6.0	NA	2,073	3.35	4.7
Lights	52	Food Sales-01	Food Sales	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	10.0	NA	10.0	NA	3,814	3.35	4.7
Lights	152	Service-08	Mercantile & Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	343.0	NA	343.0	NA	112,570	3.34	4.7
Lights	148	Service-04	Mercantile & Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	2.0	NA	2.0	NA	638	3.33	4.7
Lights	146	Service-01	Mercantile & Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	87.0	NA	87.0	NA	28,316	3.33	4.7
Lights	146	Service-01	Mercantile & Service	IN39 INC 150 FLD	HS31 HPS 70 FLD	967.0	NA	967.0	NA	290,929	3.32	4.7
Lights	58	Food Service-17	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	36.0	NA	36.0	NA	10,876	3.32	4.7
Lights	152	Service-08	Mercantile & Service	IN39 INC 150 FLD	HS31 HPS 70 FLD	1,568.0	NA	1,568.0	NA	1,028,712	3.32	4.7
Hot Water	110	Office-09	Office	oil shw heater	Wrap Old Oil Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	11.0	NA	11.0	NA	175	3.30	4.7
Lights	90	Office-17	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	6.0	NA	6.0	NA	2,288	3.30	4.7
Heating	31	Education-04	Education	other conv boiler	Gas Pulse Condensing Boiler	132.0	NA	132.0	NA	34,670	3.30	4.7
Lights	4	Assembly-16	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	55.0	NA	55.0	NA	18,724	3.29	4.7
Lights	68	Health Care-06	Health Care	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	9.0	NA	9.0	NA	3,157	3.29	4.8
Lights	131	Other-36	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	60.0	NA	60.0	NA	21,188	3.28	4.8
Lights	14	Assembly-05	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	14.0	NA	14.0	NA	4,990	3.27	4.8
Lights	107	Office-04	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	17.0	NA	17.0	NA	6,042	3.27	4.8
Lights	128	Other-30	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	57.0	NA	57.0	NA	19,781	3.25	4.8
Lights	8	Assembly-20	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	70.0	NA	70.0	NA	23,791	3.24	4.8
Lights	136	Other-05	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	6.0	NA	6.0	NA	2,077	3.24	4.8
Lights	137	Other-07	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	32.0	NA	32.0	NA	11,072	3.24	4.8
Hot Water	38	FH-2 to 4-03	2 to 4 Unit Buildings	gas shw heater	Wrap Old Gas Tank w. Ins., Ins. Pipe, LFSHs, Aerators	2,478.0	NA	2,478.0	NA	28,965	3.24	4.8
Lights	78	Lodging-02	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	21.0	NA	21.0	NA	7,242	3.24	4.8
Lights	104	Office-35	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	102.0	NA	102.0	NA	35,447	3.24	4.8
Lights	83	Office-13	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	6.0	NA	6.0	NA	[illegible]	3.24	4.8
Lights	151	Service-07	Mercantile & Service	IN39 INC 150 FLD	HS31 HPS 70 FLD	237.0	NA	237.0	NA	[illegible]	3.24	4.8
Lights	11	Assembly-24	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	22.0	NA	22.0	NA	7,736	3.24	4.8
Lights	142	Public Order-02	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5.0	NA	5.0	NA	1,862	3.23	4.8
Lights	86	Office-14	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	57.0	NA	57.0	NA	19,548	3.22	4.9
Lights	96	Office-22	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	416.0	NA	416.0	NA	142,786	3.21	4.9
Lights	87	Office-15	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	15.0	NA	15.0	NA	5,293	3.21	4.9
Lights	147	Service-03	Mercantile & Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	10.0	NA	10.0	NA	3,583	3.21	4.9
Roof	92	Office-02	Office	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-19	NA	NA	NA	NA	98,729	3.21	4.9
Lights	17	Assembly-09	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	164.0	NA	164.0	NA	52,214	3.20	4.9
Lights	51	FH-attached-05	Single Family Attached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	122.0	NA	122.0	NA	39,268	3.19	4.9
Lights	7	Assembly-02	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	3.0	NA	3	NA	1,052	3.19	4.9
Lights	31	Education-04	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	43	NA	43.0	NA	14,430	3.19	4.9
Hot Water	85	Office-13	Office	hot water central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	32.0	NA	32.0	NA	459	3.19	4.9
Lights	151	Service-07	Mercantile & Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	52.0	NA	52.0	NA	15,812	3.18	4.9
Roof	142	Public Order-02	Public Order Safety	roof insulation R-value 0.00	Suspended Ceiling - Increase insulation by R-19	NA	NA	NA	NA	[illegible]	3.18	4.9
Lights	97	Office-26	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	87	NA	87	NA	29,427	3.18	4.9
Lights	6	Assembly-19	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	35	NA	35	NA	[illegible]	[illegible]	4.9
Lights	59	Food Service-02	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	[illegible]	NA	[illegible]	NA	[illegible]	[illegible]	4.9
Lights	5	Assembly-18	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	[illegible]	NA	[illegible]	NA	[illegible]	[illegible]	[illegible]
Lights	119	Other-19	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	[illegible]	NA	[illegible]	NA	[illegible]	[illegible]	[illegible]

Table 3.7a

Building ERIs Constituting the Minimum Life-Cycle Cost Efficiency Resources: Annual Energy and Demand Reductions

End Use	Bldg Set No.	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement Energy Savings (MBtu)	Full Implement Demand Savings (kW-mo)	Net Present Value (1995 $)	Savings to Investment Ratio	Discounted Payback Period
Cooling	82	Office-01	Office	package unit	Single Zone Packaged AC Unit (5.4167 to 11.25 tons cooling)	11.0	NA	11.0	NA	12,118	3.14	5.0
Lights	65	Health Care-02	Health Care	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	2.0	NA	2.0	NA	635	3.13	5.0
Lights	57	Food Service-15	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40/T12 ELC3	39.0	NA	39.0	NA	14,289	3.13	5.0
Lights	91	Office-18	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	7.0	NA	7.0	NA	2,242	3.13	5.0
Lights	151	Service-07	Mercantile & Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	3.0	NA	3.0	NA	1,039	3.12	5.0
Lights	146	Service-01	Mercantile & Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5.0	NA	5.0	NA	1,746	3.12	5.0
Lights	47	FH-Detached-07	Single Family Detached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 - BLST UNIT	1.0	NA	1.0	NA	702	3.11	5.0
Lights	55	Food Service-12	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40/T12 ELC3	9.0	NA	9.0	NA	3,211	3.11	5.0
Lights	62	Food Service-08	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	63.0	NA	63.0	NA	20,786	3.11	5.0
Lights	102	Office-31	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	10.0	NA	10.0	NA	3,149	3.10	5.0
Lights	72	Lodging-11	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	755.0	NA	755.0	NA	245,363	3.10	5.0
Lights	75	Lodging-15	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	17.0	NA	17.0	NA	5,594	3.10	5.0
Lights	134	Other-41	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	92.0	NA	92.0	NA	29,995	3.10	5.0
Lights	115	Other-16	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	26.0	NA	26.0	NA	8,425	3.09	5.1
Lights	12	Assembly-03	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	38.0	NA	38.0	NA	12,305	3.09	5.1
Lights	162	Warehouse-21	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	7.0	NA	7.0	NA	2,264	3.09	5.1
Lights	76	Lodging-16	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	55.0	NA	55.0	NA	17,603	3.07	5.1
Lights	27	Education-02	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	11.0	NA	11.0	NA	3,402	3.07	5.1
Lights	30	FH-attached-04	Single Family Attached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 - BLST UNIT	2.0	NA	2.0	NA	1,294	3.07	5.1
Lights	101	Office-30	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	37.0	NA	37.0	NA	11,900	3.06	5.1
Lights	66	Health Care-03	Health Care	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	2.0	NA	2.0	NA	589	3.06	5.1
Lights	73	Lodging-12	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	95.0	NA	95.0	NA	30,606	3.06	5.1
Lights	53	Food Service-01	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5.0	NA	5.0	NA	1,623	3.06	5.1
Lights	74	Lodging-13	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	119.0	NA	119.0	NA	37,863	3.06	5.1
Lights	83	Office-01g	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	13.0	NA	13.0	NA	4,076	3.06	5.1
Lights	56	Food Service-13	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	3.0	NA	3.0	NA	[illegible]	3.06	5.1
Heating	87	Office-15	Office	other conv furn	Conventional Gas Furnace	14.0	NA	14.0	NA	3,854	3.05	5.1
Lights	121	Other-20	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	41.0	NA	41.0	NA	13,007	3.04	5.1
Lights	45	FH-Detached-04	Single Family Detached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 - BLST UNIT	10.0	NA	10.0	NA	3,523	3.04	5.1
Lights	111	Other-01	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	29.0	NA	29.0	NA	9,138	3.04	5.1
Lights	49	FH-attached-03	Single Family Attached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 - BLST UNIT	91.0	NA	91.0	NA	16,660	3.04	5.1
Lights	33	Education-08	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	61.0	NA	61.0	NA	19,117	3.04	5.1
Lights	92	Office-02	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	26.0	NA	26.0	NA	8,932	3.04	5.1
Lights	126	Other-29	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	29.0	NA	29.0	NA	9,104	3.03	5.2
Lights	114	Other-15	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	28.0	NA	28.0	NA	8,776	3.02	5.2
Lights	169	Warehouse-30	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	35.0	NA	35.0	NA	10,847	3.02	5.2
Lights	122	Other-23	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	20.0	NA	20.0	NA	6,204	3.02	5.2
Lights	125	Other-27	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	11.0	NA	11.0	NA	3,486	3.02	5.2
Lights	174	Warehouse-09	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	7.0	NA	7.0	NA	2,192	3.02	5.2
Lights	161	Warehouse-02	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1.0	NA	1.0	NA	414	3.02	5.2
Lights	77	Lodging-19	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	166.0	NA	166.0	NA	51,977	3.02	5.2
Lights	163	Warehouse-23	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	43.0	NA	43.0	NA	13,535	3.02	5.2
Lights	130	Other-32	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	132.0	NA	132.0	NA	41,254	3.02	5.2
Lights	155	Warehouse-11	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	28.0	NA	28.0	NA	8,851	3.01	5.2
Heating	105	Office-37	Office	oil conv boiler	Add Automatic Electric Damper	3.0	NA	3.0	NA	167	3.01	5.2
Lights	160	Warehouse-19	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	12.0	NA	12.0	NA	3,681	3.01	5.2
Lights	113	Other-10	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	34.0	NA	34.0	NA	10,655	3.01	5.2
Lights	167	Warehouse-29	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5.0	NA	5.0	NA	1,421	3.01	5.2
Lights	98	Office-28	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	19.0	NA	19.0	NA	6,059	3.01	5.2
Lights	157	Warehouse-13	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	9.0	NA	9.0	NA	2,666	3.00	5.2
Hot Water	41	FH-2 to 4-09	2 to 4 Unit Buildings	electric shw heater	Better Elec. WH (RES), Ins. Pipe, LFSHs, Aer., Lower Tank Temp.	190.0	NA	190.0	NA	1,867	2.99	5.2
Lights	154	Warehouse-01	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	18.0	NA	18.0	NA	5,572	2.99	5.2
Lights	139	Other-09	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	33.0	NA	33.0	NA	10,313	2.99	5.2
Lights	88	Office-15mg	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	63.0	NA	63.0	NA	19,192	2.98	5.2
Lights	20	Education-12	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	13.0	NA	13.0	NA	3,833	2.98	5.2
Hot Water	84	Office-10	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp.	10.0	NA	10.0	NA	93	2.98	5.2
Lights	10	Assembly-23	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	10.0	NA	10.0	NA	2,991	2.98	5.2
Lights	168	Warehouse-03	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	119.0	NA	119.0	NA	36,468	2.98	5.2
Heating	141	Public Order-01	Public Order Safety	oil conv furn	Conventional Gas Furnace	7.0	NA	7.0	NA	1,117	2.98	5.2
Lights	13	Assembly-04	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	24.0	NA	24.0	NA	7,331	2.97	5.3
Lights	43	FH-Detached-01	Single Family Detached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 - BLST UNIT	3.0	NA	3.0	NA	1,359	2.97	5.3
Lights	172	Warehouse-07	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	7.0	NA	7.0	NA	2,128	2.97	5.3
Lights	3	Assembly-15	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	9.0	NA	9.0	NA	2,629	2.97	5.3
Lights	67	Health Care-04	Health Care	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40/T12 ELC3	178.0	NA	178.0	NA	53,597	2.96	5.3
Lights	37	FH-2 to 4-12	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 - BLST UNIT	324.0	NA	324.0	NA	165,[illegible]	2.96	5.3
Lights	80	Lodging-07	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	[illegible]	NA	[illegible]	NA	110,[illegible]	2.95	5.3
Lights	129	Other-31	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	[illegible]	NA	[illegible]	NA	364	2.95	5.3
Lights	25	Education-18	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	[illegible]	NA	[illegible]	NA	27,458	2.95	5.3
Lights	120	Other-02	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	43.0	NA	43.0	NA	13,741	2.95	5.3
Lights	165	Warehouse-25	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	[illegible]	NA	[illegible]	NA	10,[illegible]	2.95	5.3

Table 3.7a

Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MWh)	First Year Demand Savings (kW-mo)	Full Implement Energy Savings (MWh)	Full Implement Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	63	Food Service-09	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	6.0	NA	6.0	NA	1,898	2.96	5.3
Lights	26	Education-19	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	63.0	NA	63.0	NA	18,868	2.96	5.3
Lights	81	Lodging-08	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	15.0	NA	15.0	NA	4,556	2.95	5.3
Lights	143	Public Order-03	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	3.0	NA	3.0	NA	782	2.95	5.3
Lights	35	FH-2 to 4-01	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	88.0	NA	88.0	NA	44,455	2.95	5.3
Lights	58	Food Service-17	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	103.0	NA	103.0	NA	32,936	2.93	5.3
Lights	29	Education-23	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	12.0	NA	12.0	NA	3,714	2.93	5.3
Lights	164	Warehouse-24	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1.0	NA	1.0	NA	356	2.92	5.3
Lights	116	Other-17	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	16.0	NA	16.0	NA	4,896	2.92	5.4
Lights	60	Food Service-04	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	78.0	NA	78.0	NA	23,122	2.92	5.4
Lights	2	Assembly-13	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	17.0	NA	17.0	NA	4,936	2.92	5.4
Lights	23	Education-16	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	2.0	NA	2.0	NA	668	2.91	5.4
Lights	34	Education-09	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	10.0	NA	10.0	NA	3,065	2.90	5.4
Lights	42	FH-5 or More-01	5 or More Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	124.0	NA	124.0	NA	61,293	2.89	5.4
Lights	46	FH-Detached-05	Single Family Detached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	5.0	NA	5.0	NA	2,486	2.89	5.4
Roof	143	Public Order-03	Public Order Safety	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-19	NA	NA	NA	NA	2,316	2.88	5.4
Lights	114	Other-15	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	84.0	NA	84.0	NA	27,825	2.88	5.4
Lights	117	Other-17ng	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	55.0	NA	55.0	NA	16,066	2.88	5.4
Lights	150	Service-06	Mercantile & Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	52.0	NA	52.0	NA	17,136	2.88	5.4
Lights	79	Lodging-05	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	133.0	NA	133.0	NA	38,626	2.88	5.4
Lights	138	Other-08	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	65.0	NA	65.0	NA	18,973	2.88	5.4
Roof	64	Health Care-01	Health Care	roof insulation R-value 0.00	Suspended Ceiling - Increase insulation by R-30	NA	NA	NA	NA	911	2.87	5.4
Lights	159	Warehouse-18	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	4.0	NA	4.0	NA	1,146	2.87	5.4
Lights	123	Other-24	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	30.0	NA	30.0	NA	8,826	2.87	5.4
Lights	16	Assembly-08	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	7.0	NA	7.0	NA	2,051	2.87	5.4
Lights	171	Warehouse-05	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	3.0	NA	3.0	NA	956	2.87	5.4
Lights	21	Education-14	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	8.0	NA	8.0	NA	2,395	2.87	5.4
Lights	173	Warehouse-08	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	8.0	NA	8.0	NA	2,465	2.87	5.5
Lights	66	Health Care-03	Health Care	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	36.0	NA	36.0	NA	10,024	2.86	5.5
Lights	19	Education-11	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	6.0	NA	6.0	NA	1,783	2.86	5.5
Lights	75	Lodging-15	Lodging	IN15 INC 60 TABLE LAMP	FL181 CFL 15 + BLST UNIT	5.0	NA	5.0	NA	1,985	2.85	5.5
Lights	158	Warehouse-16	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	7.0	NA	7.0	NA	1,865	2.85	5.5
Lights	32	Education-07	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	22.0	NA	22.0	NA	6,338	2.85	5.5
Lights	166	Warehouse-26	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1.0	NA	1.0	NA	366	2.85	5.5
Lights	17	Assembly-09	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	26.0	NA	26.0	NA	7,458	2.85	5.5
Lights	36	FH-2 to 4-10	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	236.0	NA	236.0	NA	111,682	2.84	5.5
Lights	1	Assembly-10	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	18.0	NA	18.0	NA	5,085	2.84	5.5
Lights	170	Warehouse-04	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	19.0	NA	19.0	NA	5,410	2.83	5.5
Lights	64	Health Care-01	Health Care	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	7.0	NA	7.0	NA	1,286	2.83	5.5
Lights	127	Other-03	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	3.0	NA	3.0	NA	722	2.83	5.5
Lights	44	FH-Detached-03	Single Family Detached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	1.0	NA	1.0	NA	336	2.83	5.5
Lights	150	Service-06	Mercantile & Service	IN39 INC 150 FLD	HS31 HPS 70 FLD	236.0	NA	236.0	NA	133,769	2.82	5.5
Heating	92	Office-02	Office	other conv furn	Conventional Gas Furnace	12.0	NA	12.0	NA	3,166	2.82	5.5
Lights	131	Other-36	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	180.0	NA	180.0	NA	57,783	2.82	5.5
Lights	135	Other-42	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	92.0	NA	92.0	NA	25,946	2.82	5.5
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	137.0	NA	137.0	NA	64,473	2.82	5.5
Lights	68	Health Care-06	Health Care	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	171.0	NA	171.0	NA	36,775	2.82	5.5
Lights	9	Assembly-22	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	35.0	NA	35.0	NA	9,866	2.82	5.5
Lights	118	Other-18	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1.0	NA	1.0	NA	223	2.81	5.6
Lights	132	Other-37	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	6.0	NA	6.0	NA	1,665	2.81	5.6
Lights	40	FH-2 to 4-07	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	427.0	NA	427.0	NA	202,161	2.81	5.6
Lights	89	Office-16	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	8.0	NA	8.0	NA	2,146	2.81	5.6
Lights	22	Education-15	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	3.0	NA	3.0	NA	844	2.81	5.6
Lights	24	Education-17	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	27.0	NA	27.0	NA	7,561	2.81	5.6
Lights	39	FH-2 to 4-06	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	173.0	NA	173.0	NA	81,964	2.81	5.6
Lights	136	Warehouse-12	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5.0	NA	5.0	NA	1,477	2.81	5.6
Hot Water	146	Service-01	Mercantile & Service	gas slw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer. - Lower Tank Temp	18.0	NA	18.0	NA	164	2.80	5.6
Lights	41	FH-2 to 4-09	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	46.0	NA	46.0	NA	18,745	2.80	5.6
Lights	93	Office-02g	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	8.0	NA	8.0	NA	2,192	2.80	5.6
Wall	64	Health Care-01	Health Care	wall insulation R-value 0.00	Blow in Insulation - Increase Insulation by R-13	NA	NA	NA	NA	2,566	2.80	5.6
Lights	28	Education-22	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	22.0	NA	22.0	NA	6,236	2.79	5.6
Heating	122	Other-23	Other	other conv furn	Conventional Gas Furnace	4.0	NA	4.0	NA	264	2.79	5.6
Heating	16	Assembly-08	Assembly	other conv furn	Conventional Gas Furnace	2.0	NA	2.0	NA	347	2.79	5.6
Lights	48	FH-attached-01	Single Family Attached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	507.0	NA	507.0	NA	237,161	2.79	5.6
Lights	140	Other-09g	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5.0	NA	5.0	NA	1,565	2.78	5.6
Lights	119	Other-19	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	77.0	NA	77.0	NA	24,167	2.77	5.6
Lights	30	Education-24	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	76.0	NA	76.0	NA	21,366	2.77	5.6
Lights	128	Other-30	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	151.0	NA	151.0	NA	46,875	2.77	5.7
Heating	170	Warehouse-04	Warehouse & Storage	other conv furn	Conventional Gas Furnace	[illegible]	NA	[illegible]	NA	4,167	2.76	5.7
Lights	75	Lodging-15	Lodging	IN23 INC 60 WALL	FL181 CFL 13 + BLST UNIT	[illegible]	NA	[illegible]	NA	1,616	2.75	5.7

Table 3.7a

Building EEOs Constituting the Minimum Life Cycle Cost Efficiency Resource: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement Energy Savings (MBtu)	Full Implement Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	70	Lodging-01	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	7.0	NA	7.0	NA	1,787	2.79	5.7
Hot Water	106	Office-38	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	19.0	NA	19.0	NA	378	2.73	5.7
Lights	10	Assembly-23	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	43.0	NA	43.0	NA	15,244	2.72	5.7
Lights	9	Assembly-01	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	46.0	NA	46.0	NA	12,196	2.71	5.8
Lights	71	Lodging-10	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	223.0	NA	223.0	NA	58,909	2.71	5.8
Lights	112	Other-01g	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	37.0	NA	37.0	NA	9,613	2.68	5.8
Hot Water	35	Education-08	Education	other shw heater	0.76 Gas WH (COM), Ins. Pipe, LFSHs, Aeration, Lower Tank Temp	246.0	NA	246.0	NA	7,763	2.68	5.8
Lights	128	Other-30	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	2.0	NA	2.0	NA	589	2.68	5.8
Hot Water	113	Other-10	Other	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	22.0	NA	22.0	NA	198	2.68	5.8
Lights	106	Office-38	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	149.0	NA	149.0	NA	43,283	2.65	5.9
Hot Water	36	FH-2 to 4-10	2 to 4 Unit Buildings	gas shw heater	Wrap Old Gas Tank w. Ins., Ins. Pipe, LFSHs, Aeration	5,556.0	NA	5,556.0	NA	48,637	2.65	5.9
Roof	18	Education-01	Education	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-19	NA	NA	NA	NA	16,641	2.65	5.9
Heating	146	Service-01	Mercantile & Service	other conv furn	Conventional Gas Furnace	3.0	NA	3.0	NA	784	2.64	5.9
Heating	82	Office-01	Office	other conv furn	Conventional Gas Furnace	9.0	NA	9.0	NA	2,217	2.63	5.9
Lights	15	Assembly-07	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1.0	NA	1.0	NA	376	2.63	5.9
Roof	146	Service-01	Mercantile & Service	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-19	NA	NA	NA	NA	16,111	2.62	6.0
Hot Water	6	Assembly-19	Assembly	oil shw heater	Wrap Old Oil Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	91.0	NA	91.0	NA	1,279	2.61	6.0
Lights	54	Food Service-11	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	121.0	NA	121.0	NA	35,068	2.59	6.0
Lights	130	Other-32	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	364.0	NA	364.0	NA	101,480	2.58	6.1
Lights	113	Other-10	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	101.0	NA	101.0	NA	28,101	2.57	6.1
Lights	6	Assembly-19	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	34.0	NA	34.0	NA	9,394	2.57	6.1
Lights	111	Other-01	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	42.0	NA	42.0	NA	11,357	2.55	6.1
Lights	120	Other-02	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	24.0	NA	24.0	NA	6,556	2.55	6.1
Lights	56	Food Service-13	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	8.0	NA	8.0	NA	2,180	2.54	6.2
Lights	122	Other-23	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	35.0	NA	35.0	NA	9,243	2.52	6.2
Lights	126	Other-29	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	57.0	NA	57.0	NA	15,191	2.51	6.2
Lights	18	Education-01	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	18.0	NA	18.0	NA	4,223	2.51	6.2
Lights	14	Assembly-05	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	13.0	NA	13.0	NA	3,734	2.50	6.2
Heating	100	Office-03	Office	other conv furn	Conventional Oil Furnace	20.0	NA	20.0	NA	2,799	2.49	6.3
Lights	94	Office-20	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	16.0	NA	16.0	NA	3,366	2.49	6.3
Lights	133	Other-38	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	861.0	NA	861.0	NA	209,036	2.48	6.3
Lights	109	Office-08	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	351.0	NA	351.0	NA	86,624	2.47	6.3
Lights	81	Lodging-08	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	1.0	NA	1.0	NA	463	2.46	6.3
Heating	116	Other-17	Other	other conv furn	Conventional Gas Furnace	4.0	NA	4.0	NA	1,000	2.44	6.4
Lights	81	Lodging-08	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	2.0	NA	2.0	NA	486	2.43	6.4
Lights	4	Assembly-16	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	46.0	NA	46.0	NA	13,187	2.43	6.4
Lights	15	Assembly-07	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	7.0	NA	7.0	NA	1,919	2.42	6.5
Hot Water	31	Education-04	Education	other shw heater	0.76 Gas WH (COM), Ins. Pipe, LFSHs, Aeration, Lower Tank Temp	107.0	NA	107.0	NA	3,114	2.41	6.5
Lights	7	Assembly-02	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	11.0	NA	11.0	NA	3,936	2.39	6.5
Lights	37	FH-2 to 4-12	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	96.0	NA	96.0	NA	28,466	2.39	6.5
Roof	127	Other-03	Other	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-11	NA	NA	NA	NA	1,666	2.38	6.6
Lights	73	Lodging-12	Lodging	IN15 INC 60 TABLE LAMP	FL181 CFL 13 + BLST UNIT	24.0	NA	24.0	NA	6,393	2.37	6.6
Lights	106	Office-38	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	96.0	NA	96.0	NA	9,168	2.37	6.6
Lights	110	Office-09	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	33.0	NA	33.0	NA	10,196	2.36	6.7
Lights	46	FH-Detached-05	Single Family Detached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	2.0	NA	2.0	NA	773	2.36	6.7
Lights	69	Health Care-07	Health Care	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	586.0	NA	586.0	NA	171,461	2.34	6.7
Roof	53	Food Service-01	Food Service	roof insulation R-value 0.00	Attic Ceiling - Increase Insulation by R-8	NA	NA	NA	NA	3,619	2.32	6.7
Lights	91	Office-18	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	43.0	NA	43.0	NA	7,582	2.32	6.7
Roof	12	Assembly-03	Assembly	roof insulation R-value 0.00	Suspended Ceiling - Increase insulation by R-19	NA	NA	NA	NA	33,467	2.32	6.7
Lights	30	FH-attached-04	Single Family Attached	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	7.0	NA	7.0	NA	3,237	2.32	6.7
Lights	5	Assembly-18	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	56.0	NA	56.0	NA	14,857	2.30	6.8
Lights	104	Office-35	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	81.0	NA	81.0	NA	14,678	2.29	6.8
Lights	31	FH-attached-05	Single Family Attached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	87.0	NA	87.0	NA	37,236	2.29	6.8
Hot Water	7	Assembly-02	Assembly	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	11.0	NA	11.0	NA	96	2.29	6.8
Hot Water	17	Assembly-09	Assembly	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	87.0	NA	87.0	NA	685	2.26	6.9
Hot Water	44	FH-Detached-03	Single Family Detached	other shw heater	0.85 LPG [illegible] (RES), Ins. Pipe, LFSHs, Aeration, Lower Tank Temp	21.0	NA	21.0	NA	82	2.26	6.9
Lights	52	Food Sales-01	Food Sales	FL62 FL 1X8 2F96T12 STD2	FL131 FL 1X8 2F96T12ES ELC2 REF	543.0	NA	543.0	NA	136,973	2.25	6.9
Roof	59	Food Service-02	Food Service	roof insulation R-value 0.00	Attic Ceiling - Increase Insulation by R-8	NA	NA	NA	NA	7,437	2.25	6.9
Lights	47	FH-Detached-07	Single Family Detached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	[illegible]	NA	[illegible]	NA	187	2.25	7.0
Lights	12	Assembly-03	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	28.0	NA	28.0	NA	8,326	2.25	7.0
Lights	45	FH-Detached-04	Single Family Detached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	4.0	NA	4.0	NA	1,515	2.24	7.0
Lights	111	Other-01	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	24.0	NA	24.0	NA	5,136	2.24	7.0
Lights	61	Food Service-07	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	20.0	NA	[illegible]	NA	4,586	2.22	7.0
Lights	122	Other-23	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	[illegible]	NA	[illegible]	NA	2,118	2.22	7.0
Lights	107	Office-04	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	[illegible]	NA	[illegible]	NA	17,716	2.22	7.0
Lights	126	Other-29	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	[illegible]	NA	[illegible]	NA	1,626	2.21	7.1
Roof	43	FH-Detached-04	Single Family Detached	roof insulation R-value 5.00	Attic Ceiling - Increase Insulation by R-8	NA	NA	NA	NA	[illegible]	2.21	7.1
Hot Water	42	Office-02	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	[illegible]	NA	[illegible]	NA	[illegible]	2.21	7.1
Lights	92	Office-02	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	[illegible]	NA	[illegible]	NA	[illegible]	2.20	7.1
Lights	162	Warehouse-21	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	[illegible]	NA	[illegible]	NA	478	2.20	7.1

Table 3.7a

Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MWh)	First Year Demand Savings (kW-mo)	Full Implement Energy Savings (MWh)	Full Implement Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Roof	100	Office-03	Office	roof insulation R value 0.00	Attic Ceiling - Increase insulation by R-11	NA	NA	NA	NA	96,271	2.20	7.1
Lights	139	Other-09	Other	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	20.0	NA	20.0	NA	6,003	2.19	7.1
Lights	102	Office 31	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELA'4	7.0	NA	7.0	NA	1,278	2.19	7.1
Lights	109	Office-08	Office	FL3 FL 2X4 2F40T12 STD2	FL31 FL 2X4 2F32T8 ELA'2	8.0	NA	8.0	NA	2,054	2.19	7.1
Lights	111	Other-01	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELA'4	2.0	NA	2.0	NA	551	2.18	7.2
Roof	72	Lodging 11	Lodging	roof insulation R value 8.00	Suspended Ceiling - Increase Insulation by R-8	NA	NA	NA	NA	114,571	2.18	7.2
Lights	11	Assembly 24	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELA'3	16.0	NA	16.0	NA	4,563	2.17	7.2
Hot Water	52	Food Sales-01	Food Sales	gas elec heater	Wrap Old Gas Tank, Ins. Pipe, LFShs, Aer., Lower Tank Temp	179.0	NA	179.0	NA	1,519	2.17	7.2
Lights	101	Office 30	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELA'4	29.0	NA	29.0	NA	4,890	2.16	7.2
Lights	6	Assembly-01	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	160.0	NA	160.0	NA	48,482	2.16	7.2
Lights	116	Other 17	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELA'4	0.0	NA	0.0	NA	86	2.16	7.2
Lights	105	Office 34	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELA'3	44.0	NA	44.0	NA	10,500	2.16	7.2
Lights	116	Other 17	Other	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	27.0	NA	27.0	NA	5,577	2.15	7.3
Lights	42	FH 5 or More-01	5 or More Unit Buildings	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	41.0	NA	41.0	NA	16,054	2.15	7.3
Lights	50	FH 2 to 4-06	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	179.0	NA	179.0	NA	67,180	2.14	7.3
Heating	130	Other 32	Other	oil conv boiler	Add Automatic Electric Damper	7.0	NA	7.0	NA	556	2.14	7.3
Lights	41	FH 2 to 4-09	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	40.0	NA	40.0	NA	15,323	2.14	7.3
Lights	1	Assembly 10	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELA'3	14.0	NA	14.0	NA	3,543	2.13	7.3
Lights	38	FH 2 to 4-05	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	91.0	NA	91.0	NA	35,291	2.13	7.3
Lights	6	Office 28	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELA'4	15.0	NA	15.0	NA	2,436	2.13	7.4
Lights	37	FH 2 to 4 12	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	111.0	NA	111.0	NA	41,446	2.12	7.4
Roof	136	Other-05	Other	roof insulation R value 0.00	Attic Ceiling - Increase insulation by R-11	NA	NA	NA	NA	9,172	2.12	7.4
Lights	136	Warehouse 12	Warehouse & Storage	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	2.0	NA	2.0	NA	556	2.11	7.4
Lights	95	Office 21	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELA'3	92.0	NA	92.0	NA	20,272	2.10	7.4
Hot Water	108	Office-07	Office	gas elec heater	Wrap Old Gas Tank, Ins. Pipe, LFShs, Aer., Lower Tank Temp	22.0	NA	22.0	NA	161	2.10	7.5
Lights	125	Other 27	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELA'2	5.0	NA	5.0	NA	863	2.09	7.5
Heating	78	Lodging-02	Lodging	oil conv furn	Conventional Gas Furnace	15.0	NA	15.0	NA	1,660	2.07	7.5
Lights	64	Health Care-01	Health Care	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELA'3	4.0	NA	4.0	NA	768	2.07	7.5
Lights	112	Other-01g	Other	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	28.0	NA	28.0	NA	5,611	2.06	7.6
Lights	120	Other-02	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELA'4	12.0	NA	12.0	NA	2,076	2.06	7.6
Lights	94	Office 20	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELA'3	75.0	NA	75.0	NA	16,960	2.06	7.6
Hot Water	107	Office-06	Office	gas elec heater	Wrap Old Gas Tank, Ins. Pipe, LFShs, Aer., Lower Tank Temp	8.0	NA	8.0	NA	58	2.05	7.6
Roof	120	Other-02	Other	roof insulation R value 0.00	Attic Ceiling - Increase insulation by R-11	NA	NA	NA	NA	21,067	2.05	7.6
Lights	96	Office 29	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELA'3	21.0	NA	21.0	NA	4,570	2.05	7.6
Hot Water	45	FH Detached-01	Single Family Detached	gas elec heater	0.83 Gas WH (HiSS), Ins. Pipe, LFShs, Aerators, Lower Tank Temp	89.0	NA	89.0	NA	125	2.04	7.6
Lights	160	Warehouse 18	Warehouse & Storage	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	5.0	NA	5.0	NA	698	2.04	7.7
Lights	155	Warehouse 11	Warehouse & Storage	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	9.0	NA	9.0	NA	1,675	2.04	7.7
Lights	86	Office 14	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELA'3 REF	471.0	NA	471.0	NA	89,076	2.03	7.7
Roof	76	Lodging-05	Lodging	roof insulation R value 8.00	Suspended Ceiling - Increase insulation by R-19	NA	NA	NA	NA	31,560	2.03	7.7
Lights	33	FH 2 to 4-01	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	81.0	NA	81.0	NA	30,618	2.02	7.7
Lights	169	Warehouse 30	Warehouse & Storage	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	10.0	NA	10.0	NA	1,906	2.02	7.7
Hot Water	87	Office 15	Office	gas elec heater	Wrap Old Gas Tank, Ins. Pipe, LFShs, Aer., Lower Tank Temp	21.0	NA	21.0	NA	148	2.01	7.8
Lights	161	Warehouse-02	Warehouse & Storage	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	0.0	NA	0.0	NA	76	2.01	7.8
Lights	174	Warehouse-09	Warehouse & Storage	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	2.0	NA	2.0	NA	402	2.01	7.8
Lights	163	Warehouse 23	Warehouse & Storage	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	13.0	NA	13.0	NA	2,485	2.01	7.8
Lights	42	FH 5 or More-01	5 or More Unit Buildings	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	50.0	NA	50.0	NA	16,580	2.01	7.8
Lights	157	Warehouse 15	Warehouse & Storage	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	4.0	NA	4.0	NA	493	2.01	7.8
Lights	103	Office 37	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELA'3	218.0	NA	218.0	NA	44,563	2.01	7.8
Lights	65	Health Care-01	Health Care	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELA'3	25.0	NA	25.0	NA	6,228	2.01	7.8
Lights	115	Other 16	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	45.0	NA	45.0	NA	15,886	2.00	7.8
Lights	43	FH Detached-01	Single Family Detached	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	1.0	NA	1.0	NA	315	2.00	7.8
Lights	97	Office 26	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELA'3	347.0	NA	347.0	NA	66,786	2.00	7.8
Lights	167	Warehouse 29	Warehouse & Storage	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	1.0	NA	1.0	NA	256	2.00	7.8
Lights	171	Warehouse-05	Warehouse & Storage	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	1.0	NA	1.0	NA	185	2.00	7.8
Lights	103	Office 34	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELA'3 REF	12.0	NA	12.0	NA	2,217	1.99	7.8
Lights	168	Warehouse-03	Warehouse & Storage	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	35.0	NA	35.0	NA	6,678	1.99	7.8
Lights	108	Office-07	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELA'3 REF	92.0	NA	[illegible]	NA	17,024	1.99	7.9
Lights	170	Warehouse-04	Warehouse & Storage	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	[illegible]	NA	[illegible]	NA	1,064	1.99	7.9
Lights	118	Other 18	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELA'2	[illegible]	NA	[illegible]	NA	55	1.98	7.9
Lights	20	Education 12	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELA'3	[illegible]	NA	[illegible]	NA	[illegible]	1.98	7.9
Lights	49	FH attached-03	Single Family Attached	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	[illegible]	NA	[illegible]	NA	5,625	1.98	7.9
Lights	158	Warehouse 16	Warehouse & Storage	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	[illegible]	NA	[illegible]	NA	457	[illegible]	[illegible]
Lights	104	Office 33	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELA'3	[illegible]	NA	[illegible]	NA	[illegible]	1.97	8.0
Lights	154	Warehouse-01	Warehouse & Storage	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	[illegible]	NA	[illegible]	NA	[illegible]	[illegible]	8.0
Lights	48	FH attached-01	Single Family Attached	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	[illegible]	NA	[illegible]	NA	[illegible]	[illegible]	8.0
Lights	44	FH Detached-03	Single Family Detached	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	[illegible]	NA	[illegible]	NA	54	[illegible]	8.0
Lights	[illegible]	Office-03	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELA'3 REF	[illegible]	NA	[illegible]	NA	[illegible]	[illegible]	8.0
Lights	96	Office 22	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELA'3	[illegible]	NA	[illegible]	NA	[illegible]	[illegible]	8.0
Cooling	96	Office 22	Office	package unit	Multizone Packaged AC Unit (20 to 135 Tons cooling)	[illegible]	NA	[illegible]	NA	[illegible]	[illegible]	8.0
Lights	175	Warehouse-06	Warehouse & Storage	IN11 INC 100 CEIL	FL109 CFL 2 13 CEIL FIXT	[illegible]	NA	[illegible]	NA	445	[illegible]	8.0

Table 3.7a
Building EEOs Constituting the Minimum Life-Cycle Cost Efficiency Resources: Annual Energy and Demand Reductions

End Use	Bldg Set No.	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MWh)	First Year Demand Savings (kW, ave)	Full Implement Energy Savings (MWh)	Full Implement Demand Savings (kW, ave)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	164	Warehouse-24	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	0.0	NA	0.0	NA	63	1.94	8.1
Lights	117	Other-17ng	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	79.0	NA	79.0	NA	14,632	1.94	8.1
Lights	140	Other-09g	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	3.0	NA	3.0	NA	475	1.93	8.1
Lights	39	FH-2 to 4-06	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	41.0	NA	41.0	NA	12,619	1.93	8.1
Lights	16	Assembly-08	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	24.0	NA	24.0	NA	3,993	1.93	8.1
Lights	31	Education-04	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	118.0	NA	118.0	NA	30,685	1.92	8.1
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	38.0	NA	38.0	NA	11,441	1.91	8.2
Lights	9	Assembly-22	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	26.0	NA	26.0	NA	5,384	1.91	8.2
Hot Water	119	Other-19	Other	gas slw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	10.0	NA	10.0	NA	66	1.90	8.2
Hot Water	120	Other-02	Other	gas slw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	17.0	NA	17.0	NA	113	1.90	8.2
Lights	166	Warehouse-26	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	0.0	NA	0.0	NA	64	1.90	8.2
Lights	40	FH-2 to 4-07	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	62.0	NA	62.0	NA	18,436	1.90	8.2
Lights	112	Other-01g	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	2.0	NA	2.0	NA	319	1.90	8.2
Heating	120	Other-02	Other	oil conv furn	Conventional Gas Furnace	3.0	NA	3.0	NA	428	1.90	8.2
Lights	90	Office-17	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	48.0	NA	48.0	NA	8,120	1.89	8.2
Lights	172	Warehouse-07	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	2.0	NA	2.0	NA	353	1.89	8.2
Lights	93	Office-21	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	24.0	NA	24.0	NA	4,015	1.89	8.3
Lights	80	Lodging-07	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	35.0	NA	35.0	NA	6,775	1.89	8.3
Lights	8	Assembly-20	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	49.0	NA	49.0	NA	11,729	1.89	8.3
Hot Water	145	Public Order-05	Public Order Safety	gas slw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	46.0	NA	46.0	NA	303	1.88	8.3
Lights	27	Education-02	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	30.0	NA	30.0	NA	7,295	1.88	8.3
Lights	17	Assembly-09	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	18.0	NA	18.0	NA	3,975	1.87	8.4
Lights	85	Office-13	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	44.0	NA	44.0	NA	7,030	1.87	8.4
Heating	69	Health Care-07	Health Care	hot water fan coil	New Conventional Individual Building Gas Boiler	135.0	NA	135.0	NA	4,481	1.87	8.4
Lights	82	Office-01	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	212.0	NA	212.0	NA	35,252	1.86	8.4
Lights	36	FH-2 to 4-10	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	80.0	NA	80.0	NA	22,756	1.86	8.4
Hot Water	24	Education-17	Education	gas slw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	27.0	NA	27.0	NA	173	1.85	8.4
Lights	80	Lodging-07	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	37.0	NA	37.0	NA	6,832	1.85	8.5
Lights	99	Office-29	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	6.0	NA	6.0	NA	899	1.84	8.5
Lights	21	Education-14	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	23.0	NA	23.0	NA	3,434	1.84	8.5
Lights	84	Office-10	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	52.0	NA	52.0	NA	8,301	1.84	8.5
Lights	87	Office-15	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	119.0	NA	119.0	NA	18,331	1.84	8.5
Lights	102	Office-31	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	36.0	NA	36.0	NA	6,145	1.83	8.5
Lights	2	Assembly-13	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	11.0	NA	11.0	NA	2,423	1.83	8.5
Lights	139	Warehouse-18	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	1.0	NA	1.0	NA	186	1.83	8.6
Lights	3	Assembly-15	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	24.0	NA	24.0	NA	6,409	1.82	8.6
Lights	41	FH-2 to 4-09	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	9.0	NA	9.0	NA	2,382	1.82	8.6
Lights	98	Office-28	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	72.0	NA	72.0	NA	12,179	1.82	8.6
Lights	29	Education-23	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	37.0	NA	37.0	NA	7,897	1.81	8.6
Lights	101	Office-30	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	138.0	NA	138.0	NA	23,282	1.81	8.6
Lights	105	Office-37	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	36.0	NA	36.0	NA	8,739	1.81	8.6
Lights	117	Other-17ng	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	1.0	NA	1.0	NA	154	1.81	8.6
Lights	34	Education-09	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	31.0	NA	31.0	NA	6,473	1.80	8.7
Lights	97	Office-26	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	91.0	NA	91.0	NA	13,038	1.80	8.7
Wall	45	FH-Detached-04	Single Family Detached	wall insulation R-value 0.00	Blow-in Insulation - Increase Insulation by R-6.5	NA	NA	NA	NA	18,205	1.80	8.7
Roof	77	Lodging-19	Lodging	roof insulation R-value 8.90	Suspended Ceiling - Increase Insulation by R-8	NA	NA	NA	NA	16,982	1.79	8.7
Lights	32	Education-07	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	63.0	NA	63.0	NA	15,682	1.79	8.7
Lights	22	Education-13	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	8.0	NA	8.0	NA	1,841	1.78	8.8
Lights	33	Education-08	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	172.0	NA	172.0	NA	36,391	1.77	8.8
Lights	86	Office-14	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	11.0	NA	11.0	NA	1,822	1.77	8.8
Lights	96	Office-22	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	415.0	NA	415.0	NA	99,834	1.77	8.8
Heating	98	Office-28	Office	electric forced air furNAce	Conventional Oil Furnace	3.0	NA	3.0	NA	347	1.74	9.0
Roof	8	Assembly-20	Assembly	roof insulation R-value 8.90	Suspended Ceiling - Increase Insulation by R-8	NA	NA	NA	NA	16,436	1.74	9.0
Roof	121	Other-20	Other	roof insulation R-value 5.00	Attic Ceiling - Increase Insulation by R-8	NA	NA	NA	NA	11,109	1.73	9.0
Lights	23	Education-16	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	6.0	NA	6.0	NA	1,287	1.73	9.0
Hot Water	168	Warehouse-03	Warehouse & Storage	gas slw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	29.0	NA	29.0	NA	174	1.73	9.0
Cooling	33	Education-08	Education	single conv chiller	Air-Cooled Reciprocating Chiller (20 to 75 tons cooling)	106.0	NA	106.0	NA	43,005	1.73	9.1
Roof	74	Lodging-13	Lodging	roof insulation R-value 8.90	Suspended Ceiling - Increase Insulation by R-8	NA	NA	NA	NA	16,972	1.72	9.1
Heating	127	Other-03	Other	oil conv boiler	Add Automatic Electric Damper	2.0	NA	2.0	NA	99	1.72	9.1
Lights	52	Food Sales-01	Food Sales	HS17 HPS 250 PEND	LS5 LPS 135 PEND	152.0	NA	152.0	NA	22,823	1.71	9.1
Lights	28	Education-22	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	64.0	NA	64.0	NA	12,292	1.70	9.2
Lights	67	Health Care-04	Health Care	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	26.0	NA	26.0	NA	5,119	1.70	9.2
Lights	66	Health Care-03	Health Care	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	5.0	NA	5.0	NA	968	1.70	9.2
Hot Water	26	Education-19	Education	gas slw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	145.0	NA	145.0	NA	835	1.69	9.2
Lights	70	Lodging-01	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	1.0	NA	1.0	NA	161	1.69	9.2
Lights	55	Food Service-12	Food Service	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	4.0	NA	4.0	NA	615	1.69	9.3
Hot Water	92	Office-02	Office	other slw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	4.0	NA	4.0	NA	33	1.69	9.3
Lights	165	Warehouse-25	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	10.0	NA	10.0	NA	1,565	1.68	9.3
Hot Water	35	FH-2 to 4-01	2 to 4 Unit Buildings	gas slw heater	0.85 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	52.0	NA	52.0	NA	57	1.68	9.3
Lights	70	Lodging-01	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	1.0	NA	1.0	NA	43	1.67	9.3

Table 3.7a

Building ERUs Constituting the Minnesota Life-Cycle Cost Efficiency Resources Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement Energy Savings (MBtu)	Full Implement Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	57	Food Service-15	Food Service	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	13.0	NA	13.0	NA	2,387	1.66	9.4
Lights	25	Education-18	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	241.0	NA	241.0	NA	46,394	1.63	9.4
Lights	110	Office-09	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	2.0	NA	2.0	NA	243	1.63	9.5
Lights	130	Other-32	Other	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	11.0	NA	11.0	NA	1,997	1.64	9.5
Lights	58	Food Service-17	Food Service	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	34.0	NA	34.0	NA	6,423	1.64	9.5
Roof	63	Health Care-02	Health Care	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-19	NA	NA	NA	NA	1,857	1.64	9.5
Lights	106	Office-38	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	5.0	NA	5.0	NA	799	1.63	9.6
Hot Water	67	Health Care-04	Health Care	other dhw heater	0.76 Gas WH (COM), Insulate Pipe, Low Flow SHs, Aerators	35.0	NA	35.0	NA	1,614	1.63	9.6
Lights	24	Education-17	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	75.0	NA	75.0	NA	13,302	1.63	9.6
Roof	93	Office-02g	Office	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-11	NA	NA	NA	NA	3,578	1.63	9.6
Hot Water	30	Education-24	Education	gas dhw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	139.0	NA	139.0	NA	836	1.62	9.6
Lights	19	Education-11	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	16.0	NA	16.0	NA	2,994	1.62	9.7
Roof	15	Assembly-07	Assembly	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-11	NA	NA	NA	NA	423	1.61	9.7
Roof	99	Office-29	Office	roof insulation R-value 8.90	Suspended Ceiling Increase insulation by R-8	NA	NA	NA	NA	1,118	1.61	9.7
Lights	68	Health Care-06	Health Care	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	25.0	NA	25.0	NA	4,946	1.61	9.7
Lights	84	Office-10	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	1.0	NA	1.0	NA	179	1.60	9.7
Cooling	100	Office-03	Office	package unit	Single Zone Packaged AC Unit (11.25 to 20 tons cooling)	3.0	NA	3.0	NA	8,363	1.60	9.8
Hot Water	123	Other-24	Other	gas dhw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	9.0	NA	9.0	NA	49	1.58	9.9
Roof	32	Education-07	Education	roof insulation R-value 11.00	Attic Ceiling Increase insulation by R-11	NA	NA	NA	NA	4,939	1.58	9.9
Lights	71	Lodging-10	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	23.0	NA	23.0	NA	2,766	1.56	10.0
Lights	100	Office-03	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	6.0	NA	6.0	NA	807	1.56	10.0
Lights	71	Lodging-10	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	21.0	NA	21.0	NA	2,539	1.55	10.1
Lights	90	Office-17	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	1.0	NA	1.0	NA	144	1.54	10.1
Cooling	92	Office-02	Office	package unit	Single Zone Packaged AC Unit (5.4167 to 11.25 tons cooling)	16.0	NA	16.0	NA	4,439	1.53	10.2
Lights	109	Office-08	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	86.0	NA	86.0	NA	12,364	1.52	10.3
Lights	54	Food Service-11	Food Service	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	46.0	NA	46.0	NA	6,676	1.52	10.3
Hot Water	9	Assembly-22	Assembly	electric dhw heater	Wrap Old Electric Tank w. Ins., Ins. Pipe, LFSHs, Aerators	2.0	NA	2.0	NA	53	1.51	10.3
Lights	6	Assembly-19	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	24.0	NA	24.0	NA	3,897	1.51	10.3
Lights	13	Assembly-04	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	57.0	NA	57.0	NA	10,709	1.49	10.5
Roof	39	FH 2 to 4-06	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling Increase Insulation by R-8	NA	NA	NA	NA	36,724	1.48	10.5
Lights	4	Assembly-16	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	28.0	NA	28.0	NA	3,571	1.48	10.5
Lights	14	Assembly-03	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	9.0	NA	9.0	NA	1,489	1.48	10.6
Lights	10	Assembly-23	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	5.0	NA	5.0	NA	829	1.48	10.6
Roof	40	FH 2 to 4-07	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling Increase insulation by R-11	NA	NA	NA	NA	139,269	1.48	10.6
Lights	82	Office-01	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	5.0	NA	5.0	NA	571	1.48	10.6
Roof	38	FH 2 to 4-03	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling Increase insulation by R-11	NA	NA	NA	NA	44,630	1.47	10.6
Lights	108	Office-07	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	2.0	NA	2.0	NA	233	1.47	10.7
Lights	103	Office-34	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	0.0	NA	0.0	NA	46	1.46	10.7
Heating	130	Service-06	Mercantile & Service	other conv furn	Conventional Gas Furnace	3.0	NA	3.0	NA	113	1.46	10.7
Lights	56	Food Service-13	Food Service	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	3.0	NA	3.0	NA	376	1.45	10.8
Lights	59	Food Service-02	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	17.0	NA	17.0	NA	2,823	1.45	10.8
Lights	53	Food Service-01	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	8.0	NA	8.0	NA	1,291	1.45	10.8
Heating	139	Other-09	Other	oil conv furn	Conventional Gas Furnace	3.0	NA	3.0	NA	211	1.45	10.8
Lights	106	Office-38	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	1.0	NA	1.0	NA	134	1.45	10.8
Lights	91	Office-18	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	1.0	NA	1.0	NA	123	1.44	10.8
Lights	85	Office-13	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	1.0	NA	1.0	NA	104	1.44	10.9
Roof	44	FH Detached-03	Single Family Detached	roof insulation R-value 11.00	Attic Ceiling Increase Insulation by R-8	NA	NA	NA	NA	238	1.43	10.9
Roof	37	FH 2 to 4-12	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling Increase Insulation by R-8	NA	NA	NA	NA	30,732	1.43	11.0
Lights	128	Other-30	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1.0	NA	1.0	NA	197	1.42	11.0
Lights	5	Assembly-18	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	35.0	NA	35.0	NA	6,008	1.42	11.0
Lights	88	Office-15ug	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	200.0	NA	200.0	NA	22,005	1.42	11.0
Lights	83	Office-01g	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	38.0	NA	38.0	NA	4,429	1.41	11.1
Heating	134	Warehouse-01	Warehouse & Storage	other conv furn	Conventional Gas Furnace	15.0	NA	15.0	NA	1,792	1.41	11.1
Lights	87	Office-15	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	3.0	NA	3.0	NA	262	1.41	11.1
Roof	33	Education-08	Education	roof insulation R-value 15.00	Suspended Ceiling Increase insulation by R-11	NA	NA	NA	NA	11,339	1.41	11.1
Roof	42	FH 5 or More-01	5 or More Unit Buildings	roof insulation R-value 11.00	Attic Ceiling Increase Insulation by R-8	NA	NA	NA	NA	14,334	1.40	11.2
Lights	121	Other-20	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	4.0	NA	4.0	NA	755	1.40	11.2
Hot Water	40	FH 2 to 4-07	2 to 4 Unit Buildings	gas dhw heater	0.85 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	3,027.0	NA	3,027.0	NA	3,836	1.40	11.2
Lights	60	Food Service-04	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	116.0	NA	116.0	NA	17,408	1.40	11.2
Lights	93	Office-02g	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	25.0	NA	25.0	NA	2,617	1.39	11.2
Lights	63	Food Service-09	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	10.0	NA	10.0	NA	1,397	1.39	11.2
Heating	168	Warehouse-03	Warehouse & Storage	other conv furn	Conventional Gas Furnace	3.0	NA	3.0	NA	413	1.39	11.2
Hot Water	55	Food Service-12	Food Service	oil dhw heater	Wrap Old Oil Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	6.0	NA	6.0	NA	189	1.39	11.3
Roof	90	Office-17	Office	roof insulation R-value 11.00	Attic Ceiling Increase insulation by R-11	NA	NA	NA	NA	898	1.39	11.3
Lights	62	Food Service-08	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	[illegible]	NA	[illegible]	NA	13,061	1.39	11.3
Roof	41	FH 2 to 4-09	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling Increase Insulation by R-8	NA	NA	NA	NA	6,736	1.38	11.3
Lights	89	Office-16	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	[illegible]	NA	[illegible]	NA	2,469	1.37	11.4
Heating	111	Other-01	Other	oil conv furn	Conventional Gas Furnace	[illegible]	NA	[illegible]	NA	[illegible]	1.37	11.4
Lights	92	Office-02	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	[illegible]	NA	[illegible]	NA	984	1.36	11.5
Lights	12	Assembly-03	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	[illegible]	NA	[illegible]	NA	[illegible]	1.36	11.5

Table 3.7a

Building ERCs Constituting the Minimum Life-Cycle Cost Efficiency Resources: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement Energy Savings (MBtu)	Full Implement Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	103	Office-34	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	1.0	NA	1.0	NA	142	1.36	11.5
Lights	137	Other-07	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	2.0	NA	2.0	NA	312	1.33	11.6
Roof	31	Education-04	Education	roof insulation R-value 11.00	Attic Ceiling Increase insulation by R-8	NA	NA	NA	NA	4,492	1.33	11.6
Lights	51	FH attached-03	Single Family Attached	FL4 FL 1X4 2F40T12 STD2	FL52 FL 1X4 2F32T8 ELC2	25.0	NA	25.0	NA	3,598	1.33	11.6
Heating	92	Office-02	Office	oil conv boiler	Add Automatic Electric Damper	8.0	NA	8.0	NA	161	1.33	11.6
Heating	33	Education-08	Education	oil conv boiler	Gas Pulse Condensing Boiler	64.0	NA	64.0	NA	1,446	1.34	11.7
Cooling	58	Food Service-17	Food Service	single conv chiller	Centrifugal Liquid (Water) Chiller (200 to 300 tons cooling)	688.0	NA	688.0	NA	15,686	1.33	11.7
Roof	19	Education-11	Education	roof insulation R-value 13.00	Suspended Ceiling Increase insulation by R-11	NA	NA	NA	NA	956	1.33	11.7
Heating	37	Food Service-15	Food Service	oil conv boiler	Add Automatic Electric Damper	2.0	NA	2.0	NA	37	1.32	11.8
Roof	83	Office-01g	Office	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-11	NA	NA	NA	NA	2,990	1.32	11.8
Lights	86	Office-14	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	115.0	NA	115.0	NA	10,363	1.32	11.8
Lights	13	Assembly-07	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	1.0	NA	1.0	NA	84	1.32	11.8
Heating	124	Other-26	Other	oil conv boiler	Add Automatic Electric Damper	2.0	NA	2.0	NA	33	1.31	11.9
Roof	34	Education-09	Education	roof insulation R-value 13.00	Suspended Ceiling Increase insulation by R-8	NA	NA	NA	NA	1,185	1.31	11.9
Roof	81	Lodging-08	Lodging	roof insulation R-value 8.00	Attic Ceiling Increase insulation by R-8	NA	NA	NA	NA	1,503	1.31	11.9
Lights	123	Other-24	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1.0	NA	1.0	NA	85	1.30	12.0
Lights	26	Education-19	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	120.0	NA	120.0	NA	14,930	1.30	12.0
Cooling	14	Assembly-03	Assembly	single conv chiller	Air-Cooled Reciprocating Chiller (20 to 75 tons cooling)	47.0	NA	47.0	NA	5,794	1.30	12.0
Hot Water	63	Health Care-02	Health Care	other shw heater	0.76 Gas WH (COM), Insulate Pipe, Low Flow SHs, Aerators	26.0	NA	26.0	NA	343	1.29	12.1
Lights	1	Assembly-10	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	10.0	NA	10.0	NA	1,128	1.29	12.1
Lights	105	Office-37	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	7.0	NA	7.0	NA	552	1.29	12.1
Lights	107	Office-04	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	3.0	NA	3.0	NA	202	1.28	12.2
Lights	11	Assembly-24	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	11.0	NA	11.0	NA	1,356	1.28	12.2
Lights	63	Health Care-02	Health Care	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	3.0	NA	3.0	NA	437	1.27	12.3
Lights	162	Warehouse-21	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	7.0	NA	7.0	NA	700	1.27	12.3
Lights	113	Other-10	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	0.0	NA	0.0	NA	8	1.27	12.3
Roof	171	Warehouse-03	Warehouse & Storage	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-8	NA	NA	NA	NA	643	1.27	12.3
Lights	95	Office-21	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	3.0	NA	3.0	NA	211	1.26	12.4
Hot Water	94	Office-20	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	12.0	NA	12.0	NA	33	1.26	12.4
Heating	107	Office-04	Office	oil conv boiler	Gas Pulse Condensing Boiler	28.0	NA	28.0	NA	1,153	1.25	12.5
Heating	110	Office-09	Office	oil conv furn	Conventional Gas Furnace	9.0	NA	9.0	NA	423	1.24	12.6
Lights	155	Warehouse-11	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	32.0	NA	32.0	NA	2,309	1.24	12.6
Lights	61	Food Service-07	Food Service	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	6.0	NA	6.0	NA	300	1.23	12.7
Lights	154	Warehouse-01	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	20.0	NA	20.0	NA	1,478	1.22	12.8
Lights	136	Other-03	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1.0	NA	1.0	NA	94	1.22	12.8
Lights	139	Other-09	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	3.0	NA	3.0	NA	232	1.22	12.8
Lights	37	FH-2 to 4-12	2 to 4 Unit Buildings	FL4 FL 1X4 2F40T12 STD2	FL52 FL 1X4 2F32T8 ELC2	40.0	NA	40.0	NA	3,366	1.21	12.9
Lights	111	Other-01	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	2.0	NA	2.0	NA	201	1.21	12.9
Lights	97	Office-26	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	12.0	NA	12.0	NA	622	1.21	12.9
Lights	122	Other-23	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1.0	NA	1.0	NA	71	1.21	12.9
Lights	126	Other-29	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	2.0	NA	2.0	NA	141	1.21	12.9
Lights	130	Other-32	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1.0	NA	1.0	NA	96	1.21	12.9
Lights	122	Other-23	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1.0	NA	1.0	NA	50	1.21	12.9
Lights	30	Education-24	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	154.0	NA	154.0	NA	12,255	1.20	13.0
Lights	96	Office-22	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	32.0	NA	32.0	NA	2,737	1.20	13.1
Lights	95	Office-21	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	1.0	NA	1.0	NA	39	1.19	13.1
Lights	116	Other-17	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	2.0	NA	2.0	NA	186	1.19	13.1
Lights	64	Health Care-03	Health Care	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1.0	NA	1.0	NA	33	1.19	13.1
Lights	160	Warehouse-19	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	13.0	NA	13.0	NA	822	1.19	13.1
Heating	157	Warehouse-13	Warehouse & Storage	other conv furn	Conventional Gas Furnace	1.0	NA	1.0	NA	61	1.18	13.2
Lights	102	Office-31	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	1.0	NA	1.0	NA	59	1.18	13.2
Lights	161	Warehouse-02	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	1.0	NA	1.0	NA	86	1.18	13.3
Lights	103	Office-37	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	1.0	NA	1.0	NA	85	1.18	13.3
Lights	9	Assembly-22	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	18.0	NA	18.0	NA	1,339	1.18	13.3
Lights	174	Warehouse-09	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	7.0	NA	7.0	NA	453	1.17	13.3
Lights	163	Warehouse-23	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	46.0	NA	46.0	NA	2,802	1.17	13.3
Lights	169	Warehouse-30	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	37.0	NA	37.0	NA	2,231	1.17	13.3
Lights	120	Other-02	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	4.0	NA	4.0	NA	302	1.17	13.3
Lights	42	FH-5 or More-01	5 or More Unit Buildings	FL4 FL 1X4 2F40T12 STD2	FL52 FL 1X4 2F32T8 ELC2	31.0	NA	31.0	NA	2,120	1.17	13.4
Lights	157	Warehouse-13	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	9.0	NA	9.0	NA	532	1.17	13.4
Lights	108	Office-07	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	22	NA	22.0	NA	1,163	1.17	13.4
Hot Water	103	Office-34	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	1.0	NA	1.0	NA	12	1.17	13.4
Lights	97	Office-26	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	2.0	NA	2.0	NA	117	1.16	13.5
Lights	167	Warehouse-29	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	5.0	NA	5.0	NA	267	1.16	13.5
Lights	2	Assembly-13	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	8.0	NA	8.0	NA	576	1.16	13.5
Lights	156	Warehouse-12	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	6.0	NA	6.0	NA	366	1.16	13.5
Roof	112	Other-01g	Other	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-8	NA	NA	NA	NA	2,039	1.15	13.5
Lights	172	Warehouse-07	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	7.0	NA	7.0	NA	392	1.15	13.6
Lights	104	Office-35	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	13.0	NA	13.0	NA	392	1.15	13.6
Lights	165	Warehouse-25	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	36.0	NA	36.0	NA	1,816	1.15	13.6

Table 3.7a

Building ERCs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW/mo)	Full Implement Energy Savings (MBtu)	Full Implement Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	162	Warehouse-21	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	6.0	NA	6.0	NA	341	1.14	13.6
Lights	7	Assembly-02	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	1.0	NA	1.0	NA	78	1.14	13.7
Lights	164	Warehouse-24	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	1.0	NA	1.0	NA	62	1.14	13.7
Lights	173	Warehouse-08	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	9.0	NA	9.0	NA	430	1.14	13.7
Lights	17	Assembly-09	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	13.0	NA	13.0	NA	798	1.14	13.7
Lights	171	Warehouse-03	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	4.0	NA	4.0	NA	173	1.14	13.8
Lights	168	Warehouse-03	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	126.0	NA	126.0	NA	5,800	1.13	13.8
Heating	13	Assembly-04	Assembly	other conv furn	Conventional Oil Furnace	18.0	NA	18.0	NA	461	1.13	13.8
Lights	159	Warehouse-18	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	4.0	NA	4.0	NA	185	1.13	13.9
Heating	87	Office-15	Office	oil conv furn	Conventional Gas Furnace	16.0	NA	16.0	NA	419	1.12	13.9
Lights	155	Warehouse-11	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	23.0	NA	23.0	NA	1,169	1.12	13.9
Lights	135	Other-42	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	16.0	NA	16.0	NA	790	1.12	13.9
Lights	112	Other-01g	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	3.0	NA	3.0	NA	141	1.12	14.0
Lights	90	Office-17	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	12.0	NA	12.0	NA	432	1.12	14.0
Lights	154	Warehouse-01	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	16.0	NA	16.0	NA	700	1.12	14.0
Lights	100	Office-03	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	64.0	NA	64.0	NA	2,287	1.11	14.0
Lights	166	Warehouse-26	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	1.0	NA	1.0	NA	52	1.11	14.1
Hot Water	13	Assembly-04	Assembly	other shw heater	Better Elec WH (COM), Ins Pipe, LFSHs, Aer , Lower Tank Temp	112.0	NA	112.0	NA	294	1.11	14.1
Heating	80	Lodging-07	Lodging	other conv furn	Conventional Oil Furnace	422.0	NA	422.0	NA	9,268	1.11	14.1
Lights	158	Warehouse-16	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	7.0	NA	7.0	NA	254	1.11	14.1
Heating	83	Office-01g	Office	other conv furn	Conventional Oil Furnace	61.0	NA	61.0	NA	65	1.11	14.1
Hot Water	93	Office-02g	Office	other shw heater	Better Elec WH (COM), Ins Pipe, LFSHs, Aer , Lower Tank Temp	24.0	NA	24.0	NA	55	1.10	14.2
Lights	94	Office-20	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	0.0	NA	0.0	NA	16	1.09	14.3
Lights	98	Office-28	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	2.0	NA	2.0	NA	61	1.09	14.3
Roof	119	Other-19	Other	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-11	NA	NA	NA	NA	1,361	1.09	14.3
Roof	168	Warehouse-03	Warehouse & Storage	roof insulation R-value 0.00	Attic Ceiling Increase Insulation by R-8	NA	NA	NA	NA	7,437	1.09	14.3
Lights	96	Office-22	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	10.0	NA	10.0	NA	310	1.09	14.3
Lights	87	Office-15	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	29.0	NA	29.0	NA	697	1.08	14.5
Lights	101	Office-30	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	5.0	NA	5.0	NA	98	1.08	14.5
Roof	156	Warehouse-12	Warehouse & Storage	roof insulation R-value 0.00	Attic Ceiling Increase Insulation by R-8	NA	NA	NA	NA	284	1.08	14.5
Lights	75	Lodging-15	Lodging	FL5 FL 1X4 1F40T12 STD1	FL29 FL 1X4 1F40T12 ELC1	4.0	NA	4.0	NA	156	1.08	14.5
Lights	84	Office-10	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	13.0	NA	13.0	NA	295	1.07	14.6
Lights	110	Office-09	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	16.0	NA	16.0	NA	371	1.07	14.6
Lights	117	Other-17ng	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	7.0	NA	7.0	NA	231	1.07	14.6
Lights	85	Office-13	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	11.0	NA	11.0	NA	235	1.07	14.6
Lights	170	Warehouse-04	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	20.0	NA	20.0	NA	303	1.07	14.6
Lights	160	Warehouse-19	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	10.0	NA	10.0	NA	279	1.07	14.6
Lights	140	Other-09g	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	0.0	NA	0.0	NA	11	1.07	14.6
Lights	82	Office-01	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	52.0	NA	52.0	NA	1,110	1.07	14.6
Wall	15	Assembly-07	Assembly	wall insulation R-value 0.00	Blow-in Insulation Increase Insulation by R-13	NA	NA	NA	NA	270	1.07	14.6
Lights	169	Warehouse-30	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	28.0	NA	28.0	NA	764	1.07	14.7
Lights	174	Warehouse-09	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	6.0	NA	6.0	NA	154	1.07	14.7
Lights	161	Warehouse-02	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	1.0	NA	1.0	NA	29	1.07	14.7
Lights	163	Warehouse-23	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	36.0	NA	36.0	NA	940	1.06	14.7
Roof	118	Other-18	Other	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-11	NA	NA	NA	NA	28	1.06	14.7
Lights	167	Warehouse-29	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	4.0	NA	4.0	NA	95	1.06	14.7
Lights	156	Warehouse-12	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	5.0	NA	5.0	NA	109	1.06	14.7
Lights	157	Warehouse-13	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	7.0	NA	7.0	NA	170	1.06	14.8
Lights	168	Warehouse-03	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	98.0	NA	98.0	NA	2,227	1.06	14.8
Lights	93	Office-02g	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	1.0	NA	1.0	NA	18	1.06	14.8
Roof	172	Warehouse-07	Warehouse & Storage	roof insulation R-value 0.00	Attic Ceiling Increase Insulation by R-8	NA	NA	NA	NA	268	1.05	14.8
Roof	80	Lodging-07	Lodging	roof insulation R-value 8.00	Attic Ceiling Increase Insulation by R-8	NA	NA	NA	NA	4,883	1.04	15.0
Lights	6	Assembly-01	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	18.0	NA	18.0	NA	334	1.04	15.0
Heating	22	Education-15	Education	other conv furn	High Efficiency LPG Furnace	67.0	NA	67.0	NA	45	1.04	15.0
Heating	122	Other-23	Other	oil conv furn	Conventional Gas Furnace	11.0	NA	11.0	NA	18	1.04	15.1
Hot Water	46	FH-Detached-03	Single Family Detached	gas shw heater	Wrap Old Gas Tank w/ Ins , Ins Pipe, LFSHs, Aerators	33.0	NA	33.0	NA	16	1.04	15.1
Lights	171	Warehouse-03	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	3.0	NA	3.0	NA	37	1.03	15.1
Lights	170	Warehouse-04	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	16.0	NA	16.0	NA	204	1.03	15.1
Lights	158	Warehouse-16	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	3.0	NA	3.0	NA	69	1.03	15.1
Lights	159	Warehouse-18	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	3.0	NA	3.0	NA	37	1.03	15.2
Heating	123	Other-24	Other	oil conv furn	Conventional Gas Furnace	3.0	NA	3.0	NA	6	1.03	15.2
Lights	16	Assembly-08	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	3.0	NA	3.0	NA	30	1.02	15.3
Lights	91	Office-18	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	13.0	NA	13.0	NA	84	1.02	15.3
Lights	164	Warehouse-24	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	1.0	NA	1.0	NA	8	1.02	15.3
Wall	143	Public Order-03	Public Order Safety	wall insulation R-value 0.00	Blow-in Insulation Increase Insulation by R-13	NA	NA	NA	NA	60	1.02	15.4
Lights	104	Office-35	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	2.0	NA	2.0	NA	12	1.01	15.4
Roof	85	Office-21	Office	roof insulation R-value 13.00	Suspended Ceiling Increase Insulation by R-8	NA	NA	NA	NA	66	1.01	15.4
Lights	166	Warehouse-26	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	1.0	NA	1.0	NA	1	1.00	15.6
Lights	163	Warehouse-23	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	25.0	NA	25.0	NA	8	1.00	15.6
Lights	99	Office-29	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	0.0	NA	0.0	NA	0	1.00	15.6

Table 3.7b
Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement Energy Savings (MBtu)	Full Implement Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
T&D		Substation	Substation	Sub Transformers	Conservation Voltage Reduction - RI	4,265 5	2,447 0	4,265 5	2,447 0	826,805	2,068 01	0 0
Lights		Ext Lighting	8 Ball Fields	Lighting Controls	Lighting Controls - RI	7,952 8	51 7	7,952 8	51 7	877,537	22 94	0 7
Motors		54 CEP	Other	Cond Pump	VSD & EEM - RI	731 4	296 7	731 4	296 7	244,186	18 88	0 8
Transportation	Conversion	Truck	Vehicles	Tractor, 6x4, 24,000-44,500 GVW	CNG Vehicle - ROF	0 0	0 0	23 2	0 0	70,099	15 78	1 0
Motors		41 CEP	Other	Cond Pump	VSD to Existing - RI	2,290 0	929 0	2,317 7	940 3	403,860	12 34	1 3
Motors		50	Other	Pumps	VSD to Existing - RI	629 1	252 5	643 7	258 4	100,408	12 31	1 3
Motors		49	Other	Pumps	VSD to Existing - RI	505 0	202 7	518 2	208 0	80,809	12 16	1 3
Motors		48	Other	Pumps	VSD to Existing - RI	382 2	153 4	391 9	157 3	61,105	12 01	1 3
Motors		42 CEP	Other	Cond Pump	VSD to Existing - RI	1,620 4	654 8	1,641 4	663 3	299,239	11 67	1 3
Motors		21 CEP	Other	CTwr Fan	VSD to Existing - RI	517 1	202 0	529 1	206 7	94,088	11 59	1 3
Motors		20 CEP	Other	CTwr Fan	VSD to Existing - RI	1,292 6	505 0	1,322 7	516 7	230,413	9 65	1 6
T&D		Substation	Substation	Capacitor Bank	Power Factor Correction to .95 - RI	18 5	9 7	18 5	9 7	96,512	7 87	2 0
Motors		40	Other	Cond Pump	VSD to Existing - RI	174 5	76 7	179 0	78 7	36,323	7 53	2 1
Motors		37 CEP	Other	FD Fan #4	EEM - RI	101 7	40 8	101 7	40 8	12,514	6 57	2 4
Cooling		Hsg-fam-1	Hsg-fam-1	AC and Heat Source	Shade Screen - RI	124 0	108 0	124 0	108 0	32,009	6 53	2 4
Motors		12	Health Care	Cond Pump	VSD to Existing - RI	68 9	40 4	72 3	42 4	11,731	6 48	2 4
Motors		7	Health Care	CTwr Fan	VSD to Existing - RI	68 9	40 4	72 3	42 4	11,731	6 48	2 4
Cooling		Hsg-fam-2	Hsg-fam-2	AC and Heat Source	Shade Screen - RI	198 8	168 7	198 8	168 7	50,139	6 40	2 4
Motors		15	Service	Cond Pump	VSD to Existing - RI	50 8	51 9	52 5	53 7	17,008	5 77	2 7
Motors		9	Service	CTwr Fan	VSD to Existing - RI	50 8	51 9	52 5	53 7	17,008	5 77	2 7
Motors		15	Food Service	CTwr Fan	VSD to Existing - RI	65 5	39 0	67 4	40 1	15,131	5 58	2 8
Motors		21	Food Service	Cond Pump	VSD to Existing - RI	65 5	39 0	67 4	40 1	15,131	5 58	2 8
Motors		51 CEP	Other	HTW Pump	EEM - RI	84 8	34 0	84 8	34 0	10,213	5 55	2 8
Motors		19	Other	CTwr Fan	VSD to Existing - RI	121 3	53 3	126 0	55 4	23,850	5 52	2 8
Motors		18	Warehouse	Refrig	EEM - RI	77 4	34 0	77 4	34 0	9,143	5 07	3 1
Motors		56 CEP	Other	CWtr Pump	EEM - RI	69 7	28 4	69 7	28 4	8,771	4 91	3 2
Motors		39	Other	Cond Pump	VSD to Existing - RI	45 4	39 0	46 8	40 1	12,773	4 83	3 2
Motors		58 CEP	Other	Under Air #4	EEM - RI	140 2	56 3	140 2	56 3	15,838	4 72	3 3
Motors		5	Food Sales	Refrig	EEM - RI	30 3	16 4	30 3	16 4	4,065	4 64	3 4
Motors		14	Office	CTwr Fan	VSD to Existing - RI	49 0	35 6	50 9	36 9	10,236	4 61	3 4
Motors		25	Office	Cond Pump	VSD to Existing - RI	49 0	35 6	50 9	36 9	10,236	4 61	3 4
Motors		29	Other	Cure Pump	EEM - RI	28 8	11 6	28 8	11 6	3,424	4 59	3 4
Motors		43	Other	HTW Pump	EEM - RI	28 8	11 6	28 8	11 6	3,424	4 59	3 4
Motors		53 CEP	Other	CWtr Pump	VSD & EEM - RI	3,612 4	1,465 5	3,612 4	1,465 5	788,483	4 51	3 5
Motors		45 CEP	Other	HTW Pump	EEM - RI	171 1	68 7	171 1	68 7	17,863	4 49	3 5
Motors		44 CEP	Other	HTW Pump	EEM - RI	140 7	56 3	140 2	56 3	14,788	4 48	3 5
Motors		6	Health Care	AHU	EEM - RI	28 0	16 4	28 0	16 4	3,865	4 46	3 5
Motors		5 WELL	Water Well	P-4524	EEM - RI	122 7	56 3	122 7	56 3	14,315	4 37	3 6
Motors		17	Warehouse	Refrig	EEM - RI	11 3	5 0	11 3	5 0	1,454	4 35	3 6
Motors		6	Food Sales	Refrig	EEM - RI	39 8	21 5	39 8	21 5	5,096	4 30	3 6
Motors		4	Health Care	AHU	EEM - RI	13 3	7 8	13 3	7 8	1,942	4 20	3 7
Motors		16	Education	CTwr Fan	VSD to Existing - RI	61 9	53 3	64 3	55 4	16,670	4 16	3 8
Motors		26	Education	Cond Pump	VSD to Existing - RI	61 9	53 3	64 3	55 4	16,670	4 16	3 8
Motors		27	Education	Refrig	EEM - RI	15 5	9 1	15 5	9 1	2,167	4 07	3 8
Motors		55 CEP	Other	CWtr Pump	EEM - RI	35 5	14 3	35 5	14 3	4,752	4 07	3 8
Transportation	Conversion	Ambulance	Vehicles	Modular, 4x2	CNG Vehicle - ROF	0 0	0 0	119 5	0 0	93,827	4 04	3 9
Motors		5	Health Care	AHU	EEM - RI	31 0	18 1	31 0	18 1	4,254	4 02	3 9
Motors		13	Health Care	Vac Sys	EEM - RI	13 3	7 8	13 3	7 8	1,802	3 97	3 9
Motors		18	Other	CTwr Fan	VSD to Existing - RI	31 1	26 7	32 3	27 7	8,010	3 87	4 0
Motors		38	Other	Cond Pump	VSD to Existing - RI	31 1	26 7	32 3	27 7	8,010	3 87	4 0
Motors		52 CEP	Other	Makeup Pump	EEM - RI	20 4	16 4	20 4	16 4	3,133	3 81	4 1
Transportation	Conversion	Bus	Vehicles	Bus, Intercity, 41-51 pagr, 4x2	CNG Vehicle - ROF	0 0	0 0	333 9	0 0	202,692	3 79	4 1
Motors		15	Education	CTwr Fan	VSD to Existing - RI	46 9	40 4	49 2	42 4	12,231	3 74	4 2
Motors		25	Education	Cond Pump	VSD to Existing - RI	46 9	40 4	49 2	42 4	12,231	3 74	4 2
Motors		2 WELL	Water Well	P-456	EEM - RI	110 5	68 7	110 5	68 7	13,863	3 71	4 2
Motors		16	Other	Air Comp	EEM - RI	38 7	34 0	38 7	34 0	6,021	3 68	4 2
Motors		4 WELL	Water Well	T-9961	EEM - RI	106 9	68 7	106 9	68 7	13,544	3 64	4 3
Motors		3 WELL	Water Well	P-1345	EEM - RI	99 8	68 7	99 8	68 7	12,901	3 52	4 4
Transportation	Conversion	Bus	Vehicles	Bus, School, 42-45 pagr	CNG Vehicle - ROF	0 0	0 0	44 3	0 0	52,812	3 48	4 5
Motors		17	Assembly	CTwr Fan	VSD to Existing - RI	29 3	53 3	30 4	55 4	12,732	3 41	4 6
Motors		31	Assembly	Cond Pump	VSD to Existing - RI	29 3	53 3	30 4	55 4	12,732	3 41	4 6
Motors		25 CEP	Other	CWtr Pump	VSD to Existing - RI	4,012 1	1,610 3	3,998 1	1,604 7	437,587	3 36	4 6
Motors		26 CEP	Other	CWtr Pump	VSD to Existing - RI	4,746 2	1,905 0	4,712 4	1,891 4	516,886	3 35	4 7
Motors		47	Other	Oil Pump	EEM - RI	29 0	22 7	29 0	22 7	3,241	3 33	4 7
Motors		27 CEP	Other	CWtr Pump	VSD to Existing - RI	5,555 4	2,229 7	5,524 6	2,217 4	602,699	3 32	4 7
Motors		1 WELL	Water Well	P-933	EEM - RI	171 2	109 9	171 2	109 9	21,235	3 31	4 7
Motors		11	Food Service	AHU	EEM - RI	28 6	34 0	28 6	34 0	3,170	3 30	4 7
Motors		24	Office	Cond Fan	EEM - RI	14 4	16 4	14 4	16 4	2,776	3 29	4 8
Motors		2	Food Sales	AHU	EEM - RI	24 8	32 8	24 8	32 8	3,074	3 27	4 8

Table 3.7b
Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resources: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement Energy Savings (MBtu)	Full Implement Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		25	Food Service	Refrig	EEM - RI	11.8	6.9	11.8	6.9	1,726	3.27	4.8
Motors		3	Health Care	AHU	EEM - RI	11.8	6.9	11.8	6.9	1,726	3.27	4.8
Motors		11	Health Care	Cond. Fan	EEM - RI	5.9	3.5	5.9	3.5	863	3.27	4.8
Motors		12	Office	AHU	EEM - RI	19.8	21.5	19.8	21.5	3,462	3.24	4.8
Motors		4	Food Sales	Cond. Fan	EEM - RI	25.7	17.0	25.7	17.0	4,971	3.21	4.9
Motors		9 B	Office	AHU	EEM - RI	35.9	39.1	35.9	39.1	6,709	3.21	4.9
Motors		9 A	Office	AHU	EEM - RI	28.7	31.3	28.7	31.3	5,367	3.21	4.9
Motors		13	Food Service	Air Comp	EEM - RI	6.6	7.8	6.6	7.8	1,333	3.20	4.9
Motors		20	Food Service	Cond. Fan	EEM - RI	6.6	3.9	6.6	3.9	1,333	3.20	4.9
Motors		10 A	Office	AHU	EEM - RI	25.0	27.2	25.0	27.2	4,644	3.20	4.9
Motors		10 B	Office	AHU	EEM - RI	33.3	36.3	33.3	36.3	6,193	3.20	4.9
Motors		13	Office	Air Comp	EEM - RI	33.3	36.3	33.3	36.3	6,193	3.20	4.9
Motors		14	Food Service	Air Comp	EEM - RI	18.1	21.5	18.1	21.5	3,325	3.15	5.0
Motors		9	Food Service	AHU	EEM - RI	7.6	9.1	7.6	9.1	1,487	3.11	5.0
Motors		1	Food Sales	AHU	EEM - RI	5.9	7.8	5.9	7.8	1,273	3.10	5.0
Motors		4	Public Order	AHU	EEM - RI	7.7	7.8	7.7	7.8	1,259	3.07	5.1
Motors		16	Assembly	CTwr Fan	VSD to Existing - RI	22.2	40.4	23.3	42.4	9,179	3.07	5.1
Motors		30	Assembly	Cond. Pump	VSD to Existing - RI	22.2	40.4	23.3	42.4	9,179	3.07	5.1
Transportation	Conversion	Truck	Vehicles	Carryall, 4x4, 7,500 GVW	CNG Vehicle - ROF	0.0	0.0	170.1	0.0	57,953	3.05	5.1
Motors		10	Education	AHU	EEM - RI	19.0	32.8	19.0	32.8	4,585	3.05	5.1
Motors		13	Education	Air Comp	EEM - RI	9.5	16.4	9.5	16.4	2,293	3.05	5.1
Motors		8	Lodging	AHU	EEM - RI	5.6	5.9	5.6	5.9	1,242	3.05	5.1
Motors		13	Other	Air Comp	EEM - RI	19.8	34.0	19.8	34.0	4,499	3.00	5.2
Transportation	Conversion	Truck	Vehicles	Carryall, 4x2, Conv, 15 pagr, 7,700 GVW	CNG Vehicle - ROF	0.0	0.0	278.2	0.0	71,327	2.99	5.2
Motors		11	Office	AHU	EEM - RI	21.3	23.1	21.3	23.1	3,767	2.97	5.3
Motors		8 B	Office	AHU	EEM - RI	73.3	79.7	73.3	79.7	13,474	2.94	5.3
Motors		8 A	Office	AHU	EEM - RI	50.4	54.8	50.4	54.8	9,264	2.94	5.3
Motors		23	Office	Cond. Fan	EEM - RI	64.1	46.5	64.1	46.5	11,790	2.94	5.3
Motors		8	Warehouse	AHU	EEM - RI	6.0	6.8	6.0	6.8	1,346	2.91	5.4
Motors		8 B	Food Service	AHU	EEM - RI	8.4	10.0	8.4	10.0	1,651	2.90	5.4
Motors		12	Food Service	Air Comp.	EEM - RI	4.2	5.0	4.2	5.0	826	2.90	5.4
Motors		19	Food Service	Cond. Fan	EEM - RI	4.2	2.5	4.2	2.5	826	2.90	5.4
Motors		22	Food Service	HW Circ	EEM - RI	4.2	5.0	4.2	5.0	826	2.90	5.4
Motors		8 A	Food Service	AHU	EEM - RI	4.2	5.0	4.2	5.0	826	2.90	5.4
Motors		10	Food Service	AHU	EEM - RI	9.7	11.6	9.7	11.6	1,809	2.90	5.4
Motors		24	Education	Cond. Fan	EEM - RI	4.5	3.9	4.5	3.9	1,150	2.90	5.4
Motors		7	Service	AHU	EEM - RI	16.6	34.0	16.6	34.0	4,242	2.89	5.4
Motors		14	Other	Air Comp	EEM - RI	23.1	43.0	23.1	43.0	5,745	2.86	5.5
Motors		11	Education	AHU	EEM - RI	23.0	43.0	23.0	43.0	5,735	2.85	5.5
Motors		14	Education	Air Comp.	EEM - RI	12.5	21.5	12.5	21.5	2,867	2.85	5.5
Motors		13	Other	Air Comp	EEM - RI	10.6	18.1	10.6	18.1	2,569	2.82	5.5
Motors		17 A	Education	CWtr Pump	EEM - RI	10.5	9.1	10.5	9.1	2,563	2.82	5.5
Motors		8	Education	AHU	EEM - RI	5.3	9.1	5.3	9.1	1,282	2.82	5.5
Motors		3	Food Sales	Cond. Fan	EEM - RI	3.8	2.5	3.8	2.5	788	2.82	5.5
Motors		10	Other	AHU	EEM - RI	12.5	21.5	12.5	21.5	2,780	2.80	5.6
Motors		7	Lodging	AHU	EEM - RI	7.1	7.5	7.1	7.5	1,538	2.77	5.6
Motors		9	Lodging	Air Comp	EEM - RI	24.8	34.9	24.8	34.9	5,382	2.77	5.6
Motors		24 CEP	Other	CWtr Pump	VSD to Existing - RI	728.2	328.2	729.9	329.0	78,564	2.76	5.7
Motors		3	Public Order	AHU	EEM - RI	4.9	5.0	4.9	5.0	757	2.75	5.7
Motors		8	Public Order	Cond. Fan	EEM - RI	4.9	2.5	4.9	2.5	757	2.75	5.7
Motors		8 B	Other	AHU	EEM - RI	9.1	15.6	9.1	15.6	2,093	2.72	5.7
Motors		8 A	Other	AHU	EEM - RI	4.6	7.8	4.6	7.8	1,046	2.72	5.7
Motors		16	Warehouse	Cond. Fan	EEM - RI	3.3	2.5	3.3	2.5	747	2.72	5.7
Motors		24	Food Service	Refrig	EEM - RI	13.5	9.1	13.5	9.1	2,171	2.71	5.8
Motors		2	Health Care	AHU	EEM - RI	7.7	4.5	7.7	4.5	1,085	2.71	5.8
Motors		12	Assembly	AHU	EEM - RI	13.5	49.2	13.5	49.2	5,596	2.67	5.8
Motors		12	Education	Air Comp	EEM - RI	5.8	10.0	5.8	10.0	1,423	2.64	5.9
Motors		23	Education	Cond. Fan	EEM - RI	5.8	5.0	5.8	5.0	1,423	2.64	5.9
Motors		14	Assembly	AHU	EEM - RI	7.8	28.6	7.8	28.6	3,128	2.63	5.9
Motors		12	Other	Air Comp	EEM - RI	3.9	3.5	3.9	3.5	611	2.61	6.0
Motors		9	Education	AHU	EEM - RI	20.1	34.7	20.1	34.7	4,364	2.59	6.0
Motors		9	Warehouse	AHU	EEM - RI	7.6	8.7	7.6	8.7	1,362	2.57	6.1
Motors		22	Office	Cond. Fan	EEM - RI	31.8	23.1	31.8	23.1	5,942	2.56	6.1
Motors		7 A	Office	AHU	EEM - RI	31.8	34.6	31.8	34.6	5,942	2.56	6.1
Motors		7 B	Office	AHU	EEM - RI	50.9	55.4	50.9	55.4	9,507	2.56	6.1
Motors		7 WELL	Water Well	S-19222	EEM - RI	3.3	6.0	3.3	6.0	1,109	2.56	6.1
Motors		7 A	Food Service	AHU	EEM - RI	8.7	10.4	8.7	10.4	1,759	2.55	6.1
Motors		7 B	Food Service	AHU	EEM - RI	14.5	17.3	14.5	17.3	2,945	2.55	6.1
Motors		18	Food Service	Cond. Fan	EEM - RI	3.8	3.5	3.8	3.5	1,189	2.55	6.1

Table 3.7b
Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resources Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement Energy Savings (MBtu)	Full Implement Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		7 A	Other	AHU	EEM - RI	20 3	34 9	20 3	34 9	4,707	2 35	6 1
Motors		7 B	Other	AHU	EEM - RI	32 0	54 8	32 0	54 8	7,396	2 35	6 1
Motors		6	Service	AHU	EEM - RI	2 4	5 0	2 4	5 0	672	2 35	6 1
Motors		28	Assembly	Cond Fan	EEM - RI	4 3	7 8	4 3	7 8	1,871	2 34	6 1
Motors		18	Assembly	CWtr Pump	EEM - RI	2 1	3 9	2 1	3 9	936	2 34	6 1
Motors		9	Assembly	AHU	EEM - RI	2 1	7 8	2 1	7 8	936	2 34	6 1
Motors		13	Assembly	AHU	EEM - RI	5 9	21 5	5 9	21 5	2,330	2 51	6 2
Motors		9	Other	AHU	EEM - RI	13 5	23 1	13 5	23 1	2,839	2 49	6 3
Motors		10 A	Assembly	AHU	EEM - RI	5 0	18 1	5 0	18 1	2,084	2 48	6 3
Motors		10 B	Assembly	AHU	EEM - RI	5 0	18 1	5 0	18 1	2,084	2 48	6 3
Motors		15	Assembly	Air Comp	EEM - RI	2 5	9 1	2 5	9 1	1,042	2 48	6 3
Motors		29	Assembly	Cond Fan	EEM - RI	2 5	4 5	2 5	4 5	1,042	2 48	6 3
Motors		2	Publa Order	AHU	EEM - RI	3 4	3 5	3 4	3 5	561	2 48	6 3
Motors		37	Other	Cond Fan	EEM - RI	2 9	2 5	2 9	2 5	635	2 46	6 3
Motors		16	Lodging	Cond Fan	EEM - RI	4 9	3 5	4 9	3 5	1,098	2 44	6 4
Motors		19	Assembly	CWtr Pump	EEM - RI	5 0	9 1	5 0	9 1	2,016	2 43	6 4
Motors		7 B	Warehouse	AHU	EEM - RI	6 9	7 8	6 9	7 8	1,600	2 40	6 5
Motors		7 A	Warehouse	AHU	EEM - RI	4 6	5 2	4 6	5 2	1,066	2 40	6 5
Motors		6 A	Lodging	AHU	EEM - RI	12 3	13 0	12 3	13 0	2,638	2 39	6 5
Motors		6 B	Lodging	AHU	EEM - RI	19 7	20 8	19 7	20 8	4,220	2 39	6 5
Motors		8	Health Care	CWtr Pump	VSD to Existing - RI	118 3	69 3	119 5	70 0	11,935	2 37	6 6
Motors		8	Service	Air Comp	EEM - RI	53 8	109 9	53 8	109 9	12,418	2 35	6 6
Transportation	Conversion	Truck	Vehicles	Stake, 4x2, 7,000 GVW	CNG Vehicle - ROF	0 0	0 0	1 391 6	0 0	304,815	2 34	6 7
Motors		27	Assembly	Cond Fan	EEM - RI	5 5	10 0	5 5	10 0	2,311	2 33	6 7
Motors		10	Health Care	Cond Fan	EEM - RI	2 5	1 5	2 5	1 5	365	2 33	6 7
Motors		11	Assembly	AHU	EEM - RI	6 3	23 1	6 3	23 1	2,530	2 33	6 7
Motors		20	Assembly	CWtr Pump	EEM - RI	3 2	5 8	3 2	5 8	1,265	2 33	6 7
Motors		17	Other	Air Comp	EEM - RI	49 3	84 6	49 3	84 6	9,376	2 31	6 8
Motors		28	FH-Detached	AHU	EEM - RI	1 8	2 6	1 8	2 6	493	2 30	6 8
Transportation	Conversion	Sedan	Vehicles	Sedan	CNG Vehicle - ROF	0 0	0 0	384 6	0 0	141,482	2 28	6 8
Motors		7 A	Education	AHU	EEM - RI	12 1	20 8	12 1	20 8	2,913	2 28	6 9
Motors		7 B	Education	AHU	EEM - RI	20 1	34 6	20 1	34 6	4,855	2 28	6 9
Motors		7	Publa Order	Cond Fan	EEM - RI	3 4	1 7	3 4	1 7	482	2 27	6 9
Motors		16	Service	HTW Pump	EEM - RI	3 4	6 9	3 4	6 9	958	2 26	6 9
Motors		5 B	Service	AHU	EEM - RI	3 4	6 9	3 4	6 9	958	2 26	6 9
Motors		14	Service	Cond Fan	EEM - RI	1 7	1 7	1 7	1 7	479	2 26	6 9
Motors		5 A	Service	AHU	EEM - RI	1 7	3 5	1 7	3 5	479	2 26	6 9
Transportation	Conversion	Truck	Vehicles	Tractor, 4x2, 24,000-44,500 GVW	CNG Vehicle - ROF	0 0	0 0	32 3	0 0	12,382	2 26	6 9
Motors		1	Publa Order	AHU	EEM - RI	4 5	4 5	4 5	4 5	796	2 25	6 9
Motors		23	Other	CWtr Pump	VSD to Existing - RI	374 7	131 7	376 2	132 3	38,340	2 24	7 0
Motors		6 WELL	Water Well	T-7732	EEM - RI	4 5	9 5	4 5	9 5	2,353	2 23	7 0
Motors		6 B	Other	AHU	EEM - RI	12 1	20 8	12 1	20 8	2,791	2 22	7 0
Motors		6 A	Other	AHU	EEM - RI	8 1	13 8	8 1	13 8	1,861	2 22	7 0
Motors		28	Other	Circ Pump	EEM - RI	2 0	3 5	2 0	3 5	463	2 22	7 0
Motors		8 A	Assembly	AHU	EEM - RI	2 7	10 0	2 7	10 0	1,021	2 18	7 2
Motors		8 B	Assembly	AHU	EEM - RI	2 7	10 0	2 7	10 0	1,021	2 18	7 2
Motors		36	Other	Cond Fan	EEM - RI	20 2	17 3	20 2	17 3	4,447	2 17	7 2
Motors		6 WELL	Water Well	T-15003	EEM - RI	4 5	7 2	4 5	7 2	1,807	2 17	7 2
Motors		17	Food Service	Cond Fan	EEM - RI	7 6	4 5	7 6	4 5	1,473	2 16	7 2
Motors		6 A	Office	AHU	EEM - RI	29 1	31 7	29 1	31 7	5,125	2 15	7 3
Motors		6 B	Office	AHU	EEM - RI	45 8	49 8	45 8	49 8	8,053	2 15	7 3
Motors		21	Office	Cond Fan	EEM - RI	27 1	19 6	27 1	19 6	4,759	2 15	7 3
Motors		46	Other	Makeup Pmp	EEM - RI	2 0	3 5	2 0	3 5	423	2 12	7 4
Motors		15	Lodging	Cond Fan	EEM - RI	19 3	13 6	19 3	13 6	4,112	2 08	7 5
Motors		5	Lodging	AHU	EEM - RI	1 6	1 7	1 6	1 7	343	2 08	7 5
Motors		15	Warehouse	Cond Fan	EEM - RI	4 5	3 4	4 5	3 4	998	2 05	7 6
Motors		6	Publa Order	Cond Fan	EEM - RI	2 2	1 1	2 2	1 1	330	2 04	7 7
Motors		9	Health Care	Cond Fan	EEM - ROF	0 0	0 0	2 6	1 5	475	2 04	7 7
Motors		1	Health Care	AHU	EEM - ROF	0 0	0 0	1 3	0 8	237	2 04	7 7
Motors		22	Education	Cond Fan	EEM - ROF	0 0	0 0	2 9	2 5	949	2 03	7 7
Motors		27	FH-Detached	AHU	EEM - ROF	0 0	0 0	5 4	7 6	1,843	2 01	7 8
Motors		5	FH-2 to 4	AHU	EEM - ROF	0 0	0 0	25 2	35 5	8,612	2 01	7 8
Motors		32	FH-Detached	Cond Fan	EEM - ROF	0 0	0 0	0 9	0 8	308	2 01	7 8
Motors		6 A	Education	AHU	EEM - RI	5 6	13 6	5 9	13 6	1,898	1 99	7 8
Motors		6 B	Education	AHU	EEM - RI	18 4	31 7	18 4	31 7	4,427	1 99	7 8
Motors		6 A	Warehouse	AHU	EEM - RI	21 0	23 8	21 0	23 8	4,386	1 99	7 9
Motors		6 B	Warehouse	AHU	EEM - RI	36 0	34 0	36 0	34 0	6,266	1 99	7 9
Motors		20	Office	Cond Fan	EEM - ROF	0 0	0 0	12 7	9 2	3,115	1 98	7 9
Motors		19	FH Attached	AHU	EEM - ROF	0 0	0 0	14 5	2 9	6,345	1 98	7 9

Table 3.7b
Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resources: Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement Energy Savings (MBtu)	Full Implement Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		13	Service	Cond Fan	EEM - ROF	0.0	0.0	2.5	2.5	898	1.98	7.9
Motors		4 A	Service	AHU	EEM - ROF	0.0	0.0	1.7	3.4	599	1.98	7.9
Motors		4 B	Service	AHU	EEM - ROF	0.0	0.0	1.7	3.4	599	1.98	7.9
Motors		5 A	Office	AHU	EEM - ROF	0.0	0.0	4.2	4.6	974	1.96	8.0
Motors		5 B	Office	AHU	EEM - ROF	0.0	0.0	5.3	5.8	1,217	1.96	8.0
Motors		6	Food Service	AHU	EEM - RI	3.8	4.5	3.8	4.5	596	1.94	8.1
Motors		5 A	Other	AHU	EEM - RI	6.6	11.3	6.6	11.3	1,487	1.93	8.1
Motors		5 B	Other	AHU	EEM - RI	10.6	18.1	10.6	18.1	2,378	1.93	8.1
Motors		5	Food Service	AHU	EEM - ROF	0.0	0.0	1.9	2.3	468	1.92	8.1
Transportation	Conversion	Truck	Vehicles	Panel Truck, 4x2, 6,999 GVW & under	CNG Vehicle - ROF	0.0	0.0	131.2	0.0	25,533	1.91	8.2
Motors		7 A	Assembly	AHU	EEM - RI	1.9	6.9	1.9	6.9	685	1.90	8.2
Motors		7 B	Assembly	AHU	EEM - RI	1.9	6.9	1.9	6.9	685	1.90	8.2
Motors		4 A	Lodging	AHU	EEM - ROF	0.0	0.0	3.3	3.5	933	1.88	8.3
Motors		14	Lodging	Cond Fan	EEM - ROF	0.0	0.0	0.8	0.6	233	1.88	8.3
Motors		4 B	Lodging	AHU	EEM - ROF	0.0	0.0	4.1	4.3	1,167	1.88	8.3
Transportation	Conversion	Truck	Vehicles	Carryall, 4x2, 6,999 GVW & under	CNG Vehicle - ROF	0.0	0.0	404.1	0.0	60,991	1.88	8.3
Motors		35	Other	Cond Fan	EEM - RI	14.5	12.5	14.5	12.5	3,063	1.88	8.3
Motors		14	Warehouse	Cond Fan	EEM - ROF	0.0	0.0	2.3	1.7	681	1.86	8.4
Motors		26	Assembly	Cond Fan	EEM - ROF	0.0	0.0	1.4	2.5	779	1.85	8.4
Motors		5 A	Warehouse	AHU	EEM - ROF	0.0	0.0	3.8	4.3	1,064	1.84	8.5
Motors		5 B	Warehouse	AHU	EEM - ROF	0.0	0.0	5.4	6.1	1,499	1.84	8.5
Motors		34	Other	Cond Fan	EEM - ROF	0.0	0.0	2.0	1.7	651	1.82	8.6
Motors		11	Other	Air Comp	EEM - ROF	0.0	0.0	0.7	1.2	217	1.82	8.6
Motors		21	Education	Cond Fan	EEM - ROF	0.0	0.0	6.0	5.2	1,951	1.82	8.6
Motors		6 A	Assembly	AHU	EEM - ROF	0.0	0.0	2.3	8.4	1,139	1.81	8.6
Motors		6 B	Assembly	AHU	EEM - ROF	0.0	0.0	3.2	11.8	1,595	1.81	8.6
Motors		26	FH-Detached	AHU	EEM - ROF	0.0	0.0	9.9	13.9	3,373	1.80	8.7
Motors		4 B	Other	AHU	EEM - ROF	0.0	0.0	2.0	3.5	572	1.78	8.8
Motors		4 A	Other	AHU	EEM - ROF	0.0	0.0	1.3	2.3	381	1.78	8.8
Motors		5 A	Education	AHU	EEM - ROF	0.0	0.0	5.4	9.2	1,522	1.78	8.8
Motors		5 B	Education	AHU	EEM - ROF	0.0	0.0	8.7	13.0	2,473	1.78	8.8
Motors		4	FH-2 to 4	AHU	EEM - ROF	0.0	0.0	410.6	577.5	131,644	1.78	8.8
Motors		5	Public Order	Cond Fan	EEM - ROF	0.0	0.0	1.5	0.8	354	1.77	8.8
Motors		18	FH-Attached	AHU	EEM - ROF	0.0	0.0	59.2	83.2	17,764	1.76	8.9
Motors		3 B	Service	AHU	EEM - ROF	0.0	0.0	1.1	2.3	385	1.76	8.9
Motors		3 A	Service	AHU	EEM - ROF	0.0	0.0	0.6	1.2	192	1.76	8.9
Motors		16	Food Service	CWtr Pump	VSD to Existing - RI	113.4	67.5	114.3	68.0	11,406	1.74	9.0
Motors		4	Food Service	AHU	EEM - ROF	0.0	0.0	36.0	42.8	9,231	1.72	9.3
Motors		19	Office	Cond Fan	EEM - ROF	0.0	0.0	11.9	8.7	2,558	1.71	9.1
Motors		4	Office	AHU	EEM - ROF	0.0	0.0	2.8	3.1	692	1.71	9.1
Motors		12	FH-5 or More	AHU	EEM - ROF	0.0	0.0	21.0	29.5	5,113	1.69	9.2
Motors		25	Assembly	Cond Fan	EEM - ROF	0.0	0.0	0.3	0.6	178	1.67	9.3
Motors		3	Lodging	AHU	EEM - ROF	0.0	0.0	4.3	4.6	1,232	1.67	9.3
Motors		5 B	Assembly	AHU	EEM - ROF	0.0	0.0	1.6	5.8	835	1.66	9.4
Motors		5 A	Assembly	AHU	EEM - ROF	0.0	0.0	1.3	4.6	668	1.66	9.4
Motors		13	Warehouse	Cond Fan	EEM - ROF	0.0	0.0	3.5	2.7	1,049	1.65	9.4
Motors		15	Office	CWtr Pump	VSD to Existing - RI	63.7	46.2	64.3	46.7	5,533	1.63	9.6
Motors		20	Education	Cond Fan	EEM - ROF	0.0	0.0	2.2	1.9	715	1.63	9.6
Transportation	Conversion	Truck	Vehicles	Stake, 4x2, 10,000 GVW	CNG Vehicle - ROF	0.0	0.0	72.8	0.0	24,223	1.61	9.7
Motors		3	Other	AHU	EEM - ROF	0.0	0.0	7.1	12.2	2,150	1.61	9.7
Motors		9	FH-2 to 4	Cond Fan	EEM - ROF	0.0	0.0	6.5	6.1	2,226	1.61	9.7
Motors		23	FH-Attached	Cond Fan	EEM - ROF	0.0	0.0	8.1	7.6	2,783	1.61	9.7
Motors		31	FH-Detached	Cond Fan	EEM - ROF	0.0	0.0	2.4	2.3	835	1.61	9.7
Motors		4	Warehouse	AHU	EEM - ROF	0.0	0.0	4.0	4.6	984	1.60	9.7
Motors		33	Other	Cond Fan	EEM - ROF	0.0	0.0	4.5	3.8	1,258	1.59	9.8
Motors		3	FH-2 to 4	AHU	EEM - ROF	0.0	0.0	366.1	306.5	115,335	1.59	9.8
Motors		12	Service	Cond Fan	EEM - ROF	0.0	0.0	1.1	1.1	406	1.59	9.8
Motors		17	FH-Attached	AHU	EEM - ROF	0.0	0.0	153.2	215.4	45,921	1.58	9.9
Motors		2	Service	AHU	EEM - ROF	0.0	0.0	0.7	1.5	234	1.58	9.9
Motors		4	Education	AHU	EEM - ROF	0.0	0.0	1.8	3.1	438	1.56	10.0
Motors		17	Office	Cond Fan	EEM - ROF	0.0	0.0	1.8	1.3	444	1.55	10.1
Motors		2	Office	AHU	EEM - ROF	0.0	0.0	0.5	0.5	111	1.55	10.1
Motors		11	FH-5 or More	AHU	EEM - ROF	0.0	0.0	17.1	24.1	4,477	1.54	10.1
Motors		25	FH-Detached	AHU	EEM - ROF	0.0	0.0	6.1	8.6	1,486	1.53	10.2
Motors		23	Food Service	Refrig	EEM - ROF	0.0	0.0	0.6	0.4	113	1.52	10.3
Motors		24	Assembly	Cond Fan	EEM - ROF	0.0	0.0	1.3	2.3	705	1.51	10.3
Motors		4	Assembly	AHU	EEM - ROF	0.0	0.0	0.9	2.3	352	1.51	10.3
Motors		1	Office	AHU	EEM - ROF	0.0	0.0	31.5	34.3	7,[illegible]	1.50	10.4
Motors		16	Office	Cond Fan	EEM - ROF	0.0	0.0	0.8	4.9	[illegible]	1.50	10.4

Table 3.7b

Non Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resources Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement Energy Savings (MBtu)	Full Implement Demand Savings (kW-mo)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		12	Lodging	Cond Fan	EEM - ROF	0.0	0.0	0.7	0.5	199	1.30	10.4
Motors		1	Lodging	AHU	EEM - ROF	0.0	0.0	0.4	0.4	100	1.30	10.4
Motors		11	Warehouse	Cond Fan	EEM - ROF	0.0	0.0	0.7	0.5	194	1.48	10.5
Motors		1	Food Service	AHU	EEM - ROF	0.0	0.0	0.7	0.9	187	1.48	10.5
Motors		10	Lodging	CWtr Pump	VSD to Existing - RI	37.3	26.2	37.9	26.7	3,112	1.47	10.6
Motors		2	Warehouse	AHU	EEM - ROF	0.0	0.0	4.2	4.8	1,182	1.47	10.6
Motors		2	Food Service	AHU	EEM - ROF	0.0	0.0	0.8	1.0	152	1.46	10.7
Motors		2	Education	AHU	EEM - ROF	0.0	0.0	0.9	1.5	278	1.46	10.7
Motors		31	Other	Cond Fan	EEM - ROF	0.0	0.0	2.6	2.2	784	1.45	10.8
Motors		11	Lodging	Cond Fan	EEM - ROF	0.0	0.0	0.6	0.4	175	1.45	10.8
Motors		7	FH 2 to 4	Cond Fan	EEM - ROF	0.0	0.0	99.5	93.1	33,947	1.45	10.8
Motors		1	FH 2 to 4	AHU	EEM - ROF	0.0	0.0	0.3	0.4	96	1.45	10.8
Motors		21	FH Attached	Cond Fan	EEM - ROF	0.0	0.0	14.7	13.8	4,728	1.44	10.9
Motors		1	Warehouse	AHU	EEM - ROF	0.0	0.0	1.1	1.3	341	1.44	10.9
Motors		10	Warehouse	Cond Fan	EEM - ROF	0.0	0.0	3.4	2.6	959	1.43	10.9
Motors		18	Education	Cond Fan	EEM - ROF	0.0	0.0	0.9	0.7	228	1.43	10.9
Motors		30	Other	Cond Fan	EEM - ROF	0.0	0.0	2.5	2.2	815	1.42	11.0
Motors		1	Education	AHU	EEM - ROF	0.0	0.0	0.5	0.9	163	1.42	11.0
Motors		1	Other	AHU	EEM - ROF	0.0	0.0	0.9	1.5	213	1.42	11.0
Motors		14	FH 5 or More	Cond Fan	EEM - ROF	0.0	0.0	11.1	10.4	2,898	1.40	11.1
Motors		29	FH Detached	Cond Fan	EEM - ROF	0.0	0.0	1.8	1.7	483	1.40	11.1
Motors		6	FH 2 to 4	Cond Fan	EEM - ROF	0.0	0.0	25.4	23.8	7,638	1.39	11.3
Motors		2	Assembly	AHU	EEM - ROF	0.0	0.0	0.3	1.0	152	1.38	11.3
Motors		22	Assembly	Cond Fan	EEM - ROF	0.0	0.0	0.1	0.2	76	1.38	11.3
Motors		3	Office	AHU	EEM - ROF	0.0	0.0	16.0	17.4	3,664	1.36	11.5
Motors		18	Office	Cond Fan	EEM - ROF	0.0	0.0	2.7	1.9	611	1.36	11.5
Motors		3	Food Service	AHU	EEM - ROF	0.0	0.0	4.9	5.8	1,252	1.36	11.5
Motors		17.8	Education	CWtr Pump	VSD to Existing - RI	86.4	69.3	81.3	70.0	6,101	1.36	11.5
Motors		13	FH 5 or More	Cond Fan	EEM - ROF	0.0	0.0	6.7	6.3	1,637	1.35	11.5
Motors		1	Assembly	AHU	EEM - ROF	0.0	0.0	0.7	2.6	401	1.34	11.6
Motors		21	Assembly	Cond Fan	EEM - ROF	0.0	0.0	0.6	1.1	313	1.34	11.7
Motors		15	Lodging	Cond Fan	EEM - ROF	0.0	0.0	1.8	1.3	512	1.34	11.7
Motors		2	Lodging	AHU	EEM - ROF	0.0	0.0	34.8	37.8	15,303	1.34	11.7
Motors		20	FH Attached	Cond Fan	EEM - ROF	0.0	0.0	2.1	2.0	437	1.33	11.8
Motors		12	Warehouse	Cond Fan	EEM - ROF	0.0	0.0	2.2	1.6	640	1.33	11.8
Motors		22	Other	CWtr Pump	VSD to Existing - RI	46.4	34.7	46.8	35.0	2,762	1.32	11.9
Motors		2	Other	AHU	EEM - ROF	0.0	0.0	4.7	8.0	1,497	1.31	11.9
Motors		32	Other	Cond Fan	EEM - ROF	0.0	0.0	1.3	1.1	383	1.30	12.0
Motors		19	Education	Cond Fan	EEM - ROF	0.0	0.0	4.0	3.5	1,210	1.30	12.0
Motors		3	Warehouse	AHU	EEM - ROF	0.0	0.0	7.7	8.7	1,869	1.30	12.0
Motors		3	Education	AHU	EEM - ROF	0.0	0.0	2.5	4.4	715	1.30	12.1
Motors		8	FH 2 to 4	Cond Fan	EEM - ROF	0.0	0.0	225.1	209.1	71,287	1.30	12.1
Motors		1	Service	AHU	EEM - ROF	0.0	0.0	0.2	0.4	64	1.29	12.1
Motors		11	Service	Cond Fan	EEM - ROF	0.0	0.0	0.2	0.2	64	1.29	12.1
Motors		2	FH 2 to 4	AHU	EEM - ROF	0.0	0.0	21.1	29.7	6,319	1.29	12.1
Motors		36	FH Detached	Cond Fan	EEM - ROF	0.0	0.0	4.7	4.4	1,391	1.29	12.1
Motors		22	FH Attached	Cond Fan	EEM - ROF	0.0	0.0	86.6	73.6	24,117	1.29	12.1
Motors		24	FH Detached	AHU	EEM - ROF	0.0	0.0	0.4	0.5	108	1.28	12.2
Motors		15	FH 5 or More	Cond Fan	EEM - ROF	0.0	0.0	6.6	6.2	1,692	1.26	12.4
Motors		10	FH 5 or More	AHU	EEM - ROF	0.0	0.0	5.6	7.9	1,366	1.26	12.4
Motors		23	Assembly	Cond Fan	EEM - ROF	0.0	0.0	1.0	1.8	558	1.26	12.4
Motors		3	Assembly	AHU	EEM - ROF	0.0	0.0	1.3	4.7	680	1.25	12.5
Motors		10	Service	CWtr Pump	VSD to Existing - RI	51.4	32.5	52.2	33.3	3,254	1.25	12.5
Motors		16	FH Attached	AHU	EEM - ROF	0.0	0.0	1.7	2.5	364	1.24	12.6
Transportation	Conversion	Bus	Vehicles	Bus, School, 28-29 pax	CNG Vehicle - ROF	0.0	0.0	16.8	0.0	705	1.06	14.8

Table 3.8a

Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Hot Water	14	Assembly-05	Assembly	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	245	17,274	0	17,274	17,029	70.51	0.2
Hot Water	25	Education-18	Education	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	145	10,217	0	10,217	10,072	70.46	0.2
Hot Water	57	Food Service-15	Food Service	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	459	31,468	0	31,468	31,009	68.56	0.2
Hot Water	152	Service-08	Mercantile & Service	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	313	21,136	0	21,136	20,823	67.53	0.2
Hot Water	96	Office-22	Office	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	69	4,551	0	4,551	4,482	65.96	0.2
Hot Water	95	Office-21	Office	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	98	6,389	0	6,389	6,291	65.19	0.2
Hot Water	4	Assembly-16	Assembly	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	510	31,936	0	31,936	31,426	62.62	0.2
Hot Water	98	Office-28	Office	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	52	3,104	0	3,104	3,052	59.69	0.3
Hot Water	21	Education-14	Education	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	70	4,080	0	4,080	4,010	58.29	0.3
Hot Water	100	Office-03	Office	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	243	13,851	0	13,851	13,608	57.00	0.3
Hot Water	20	Education-12	Education	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	120	6,761	0	6,761	6,641	56.34	0.3
Hot Water	134	Other-41	Other	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	170	9,486	0	9,486	9,316	55.80	0.3
Hot Water	1	Assembly-10	Assembly	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	86	4,197	0	4,197	4,111	48.80	0.3
Hot Water	32	Education-07	Education	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	335	16,246	0	16,246	15,911	48.50	0.3
Hot Water	5	Food Service-17	Food Service	gas central boiler	Gas Wrap Tank w Insulation, LFSHs, Aerators	2,631	124,625	0	124,625	121,994	47.37	0.3
Hot Water	124	Other-26	Other	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	36	1,483	0	1,483	1,447	41.19	0.4
Hot Water	90	Office-17	Office	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	59	2,414	0	2,414	2,355	40.92	0.4
Hot Water	171	Warehouse-05	Warehouse & Storage	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	10	389	0	389	379	38.90	0.4
Hot Water	12	Assembly-03	Assembly	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	496	19,047	0	19,047	18,551	38.40	0.4
Hot Water	109	Office-08	Office	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	312	11,574	0	11,574	11,262	37.10	0.4
Hot Water	131	Other-36	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	385	9,038	0	9,038	8,653	23.48	0.7
Hot Water	78	Lodging-02	Lodging	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	1,681	39,210	0	39,210	37,529	23.33	0.7
Hot Water	137	Other-07	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	285	6,281	0	6,281	5,996	22.04	0.7
Hot Water	125	Other-27	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	338	7,050	0	7,050	6,712	20.86	0.7
Hot Water	130	Other-32	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	1,039	21,038	0	21,038	19,999	20.25	0.8
Hot Water	73	Lodging-12	Lodging	hot water central hxer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	4,077	82,546	0	82,546	78,469	20.25	0.8
Hot Water	38	FH-2 to 4-03	2 to 4 Unit Buildings	electric shw heater	0.85 Gas WH (RES), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	281	5,604	0	5,604	5,323	19.94	0.8
Heating	109	Office-08	Office	oil conv boiler	Add Automatic Electric Damper	146	2,660	0	2,660	2,514	18.22	0.9
Hot Water	105	Office-37	Office	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	605	10,539	0	10,539	9,934	17.42	0.9
Hot Water	107	Office-04	Office	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	384	6,020	0	6,020	5,636	15.68	1.0
Hot Water	33	Education-08	Education	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	468	6,874	0	6,874	6,406	14.69	1.1
Hot Water	43	FH Detached-01	Single Family Detached	electric shw heater	0.85 Gas WH (RES), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	118	1,695	0	1,695	1,577	14.36	1.1
Hot Water	168	Warehouse-03	Warehouse & Storage	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	253	3,578	0	3,578	3,325	14.14	1.1
Heating	30	Education-24	Education	gas conv boiler	Add Automatic Electric Damper	172	2,391	0	2,391	2,219	13.90	1.1
Heating	25	Education-18	Education	oil conv boiler	Add Automatic Electric Damper	114	1,509	0	1,509	1,395	13.24	1.2
Hot Water	82	Office-01	Office	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	2,764	36,146	0	36,146	33,382	13.08	1.2
Hot Water	36	FH-2 to 4-10	2 to 4 Unit Buildings	electric shw heater	0.85 Gas WH (RES), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	1,341	16,535	0	16,535	15,194	12.33	1.3
Hot Water	131	Other-36	Other	hot water central hxer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	772	9,271	0	9,271	8,499	12.01	1.3
Roof	48	FH-attached-01	Single Family Attached	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	225,778	2,692,487	0	2,692,487	2,466,709	11.93	1.3
Heating	96	Office-22	Office	oil conv boiler	Add Automatic Electric Damper	105	1,210	0	1,210	1,105	11.52	1.4
Hot Water	76	Lodging-16	Lodging	gas central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	2,735	31,370	0	31,370	28,635	11.47	1.4
Hot Water	35	FH-2 to 4-01	2 to 4 Unit Buildings	electric shw heater	0.85 Gas WH (RES), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	2,734	31,268	0	31,268	28,534	11.44	1.4
Hot Water	147	Service-03	Mercantile & Service	hot water central hxer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	2,210	24,921	0	24,921	22,711	11.28	1.4
Heating	8	Assembly-20	Assembly	gas conv boiler	Add Automatic Electric Damper	175	1,949	0	1,949	1,774	11.14	1.4
Heating	28	Education-22	Education	other conv furn	Conventional Gas Furnace	540	6,009	0	6,009	5,469	11.13	1.4
Heating	12	Assembly-03	Assembly	oil conv boiler	Add Automatic Electric Damper	263	2,880	0	2,880	2,617	10.95	1.4
Hot Water	5	Assembly-18	Assembly	hot water central hxer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	3,553	38,724	0	38,724	35,171	10.90	1.4
Hot Water	77	Lodging-19	Lodging	hot water central hxer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	13,686	148,804	0	148,804	135,118	10.87	1.4
Hot Water	127	Other-03	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	257	2,777	0	2,777	2,520	10.81	1.4
Hot Water	97	Office-26	Office	hot water central hxer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	2,589	27,926	0	27,926	25,337	10.79	1.4
Heating	4	Assembly-16	Assembly	oil conv boiler	Add Automatic Electric Damper	335	3,526	0	3,526	3,191	10.53	1.5
Heating	90	Office-17	Office	oil conv boiler	Add Automatic Electric Damper	114	1,184	0	1,184	1,070	10.39	1.5
Hot Water	105	Office-37	Office	hot water central hxer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	1,211	12,566	0	12,566	11,355	10.38	1.5
Heating	76	Lodging-16	Lodging	gas conv boiler	Add Automatic Electric Damper	259	2,650	0	2,650	2,391	10.23	1.5
Heating	33	Education-08	Education	other conv furn	Conventional Gas Furnace	5,774	59,005	0	59,005	53,231	10.22	1.5
Heating	26	Education-12	Education	oil conv boiler	Add Automatic Electric Damper	117	1,189	0	1,189	1,072	10.16	1.5
Hot Water	69	Health Care-07	Health Care	hot water central hxer	Conventional Gas Boiler, Wrap Tank w Insulation, LFSHs, Aerators	104,453	1,047,232	0	1,047,232	942,779	10.03	1.6
Hot Water	54	Food Service-11	Food Service	hot water central hxer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	22,402	222,379	0	222,379	199,977	9.93	1.6
Heating	14	Assembly-05	Assembly	oil conv boiler	Add Automatic Electric Damper	117	1,149	0	1,149	1,032	9.82	1.6
Hot Water	130	Other-32	Other	hot water central hxer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	2,429	23,826	0	23,826	21,397	9.81	1.6
Heating	95	Office-21	Office	oil conv boiler	Add Automatic Electric Damper	205	1,908	0	1,908	1,703	9.31	1.7
Lights	133	Other-38	Other	INS INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	223,974	1,337,942	737,267	2,075,209	1,851,235	9.27	1.7
Hot Water	24	Education-17	Education	hot water central hxer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	1,712	15,053	0	15,053	13,341	8.79	1.8
Heating	84	Office-10	Office	other conv furn	Conventional Gas Furnace	1,001	8,163		8,163	7,162	8.15	1.9
Hot Water	67	Health Care-04	Health Care	hot water central hxer	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	1,721	13,945	0	13,945	12,224	8.10	1.9
Hot Water	82	Office-01	Office	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer, Lower Tank Temp	74	599	0	599	525	8.09	1.9
Hot Water	37	FH-2 to 4-12	2 to 4 Unit Buildings	electric shw heater	Better Elec WH (RES), Ins Pipe, LFSHs, Aer, Lower Tank Temp	12,439	100,412	0	100,412	87,973	8.07	1.9
Hot Water	32	Education-07	Education	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer, Lower Tank Temp	79	634		634	555	8.03	1.9
Heating	5	Assembly-18	Assembly	other conv furn	Conventional Gas Furnace	1,873	14,776	0	14,776	12,903	7.89	2.0
Hot Water	139	Other-09	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	52	409		409	357	7.87	2.0

Table 3.8a

Building EEOs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Heating	134	Other-41	Other	oil conv boiler	Add Automatic Electric Damper	192	1,456	0	1,456	1,264	7.58	2.1
Lights	46	FH-Detached-05	Single Family Detached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	158	811	381	1,192	1,034	7.54	2.1
Hot Water	68	Health Care-06	Health Care	hot water central hser	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	4,872	36,125	0	36,125	31,253	7.41	2.1
Heating	31	Education-04	Education	gas conv boiler	Add Automatic Electric Damper	225	1,648	0	1,648	1,423	7.32	2.1
Lights	45	FH-Detached-04	Single Family Detached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	335	1,598	810	2,408	2,073	7.19	2.2
Lights	37	FH-2 to 4-12	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	2,255	10,533	5,444	15,977	13,722	7.09	2.2
Hot Water	102	Office-31	Office	hot water central hser	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	754	5,340	0	5,340	4,586	7.08	2.2
Heating	1	Assembly-10	Assembly	oil conv boiler	Add Automatic Electric Damper	102	713	0	713	611	6.99	2.2
Lights	47	FH-Detached-07	Single Family Detached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	41	183	99	282	241	6.88	2.3
Hot Water	84	Office-10	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp.	48	327	0	327	279	6.81	2.3
Hot Water	163	Warehouse-23	Warehouse & Storage	oil central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	284	1,926	0	1,926	1,642	6.78	2.3
Lights	36	FH-2 to 4-10	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	1,514	7,213	3,000	10,213	8,699	6.75	2.3
Heating	75	Lodging-15	Lodging	gas conv boiler	Add Automatic Electric Damper	111	744	0	744	633	6.70	2.3
Hot Water	87	Office-15	Office	oil central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	1,536	10,273	0	10,273	8,737	6.69	2.3
Roof	78	Lodging-02	Lodging	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	12,297	81,380	0	81,380	69,083	6.62	2.4
Heating	100	Office-03	Office	oil conv boiler	Add Automatic Electric Damper	535	3,526	0	3,526	2,991	6.59	2.4
Lights	50	FH-attached-04	Single Family Attached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	155	646	374	1,020	865	6.58	2.4
Lights	35	FH-2 to 4-01	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	2,852	11,872	6,886	18,758	15,906	6.58	2.4
Lights	69	Health Care-07	Health Care	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	602,728	2,919,411	1,042,899	3,962,310	3,359,582	6.57	2.4
Cooling	25	Education-18	Education	single conv chiller	Air-Cooled Reciprocating Chiller (20 to 75 tons cooling)	10,021	65,629	0	65,629	55,608	6.55	2.4
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	1,450	5,985	3,502	9,487	8,037	6.54	2.4
Heating	135	Other-42	Other	gas conv boiler	Add Automatic Electric Damper	164	1,070	0	1,070	906	6.52	2.4
Lights	8	Assembly-20	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	54,935	250,842	106,170	357,012	302,077	6.50	2.4
Roof	7	Assembly-02	Assembly	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-30	2,501	16,237	0	16,237	13,736	6.49	2.4
Lights	49	FH-attached-03	Single Family Attached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	1,012	4,104	2,445	6,549	5,537	6.47	2.4
Lights	43	FH-Detached-01	Single Family Detached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	85	344	206	550	465	6.47	2.4
Heating	107	Office-04	Office	other conv furn	Conventional Gas Furnace	2,040	13,187	0	13,187	11,147	6.46	2.4
Lights	36	FH-2 to 4-10	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	14,519	56,744	35,059	91,803	77,284	6.32	2.5
Lights	40	FH-2 to 4-07	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	26,214	101,114	63,298	164,412	138,198	6.27	2.5
Hot Water	39	FH-2 to 4-06	2 to 4 Unit Buildings	electric shw heater	Better Elec. WH (RES), Ins. Pipe, LFSHs, Aer., Lower Tank Temp	5,056	31,394	0	31,394	26,338	6.21	2.5
Hot Water	117	Other-17ng	Other	oil shw heater	0.80 Oil WH (COM), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	26,683	164,667	0	164,667	137,984	6.17	2.5
Hot Water	18	Education-01	Education	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp.	389	2,372	0	2,372	1,983	6.10	2.6
Lights	44	FH-Detached-03	Single Family Detached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	24	88	58	146	122	6.08	2.6
Hot Water	1	Assembly-10	Assembly	electric shw heater	Wrap Old Electric Tank w. Ins., Ins. Pipe, LFSHs, Aerators	159	960	0	960	801	6.04	2.6
Lights	40	FH-2 to 4-07	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	2,608	10,522	5,167	15,689	13,081	6.02	2.6
Roof	27	Education-02	Education	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	5,924	35,369	0	35,369	29,445	6.00	2.6
Lights	39	FH-2 to 4-06	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	4,355	16,903	8,397	25,300	20,945	5.81	2.7
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	2,326	8,837	4,608	13,445	11,119	5.78	2.7
Heating	78	Lodging-02	Lodging	other conv furn	Conventional Gas Furnace	509	2,867	0	2,867	2,358	5.63	2.8
Lights	6	Assembly-19	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	31,704	119,740	53,597	173,337	141,633	5.47	2.9
Lights	41	FH-2 to 4-09	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	1,010	3,432	2,001	5,433	4,423	5.38	2.9
Cooling	32	Education-07	Education	package unit	Single Zone Packaged AC Unit (5.4167 to 11.25 tons cooling)	4,095	21,821	0	21,821	17,726	5.33	2.9
Hot Water	51	FH-attached-05	Single Family Attached	electric shw heater	Wrap Old Electric Tank w. Ins., Ins. Pipe, LFSHs, Aerators	15,630	82,022	0	82,022	66,392	5.25	3.0
Lights	65	Health Care-02	Health Care	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	3,352	13,809	3,762	17,571	14,219	5.24	3.0
Hot Water	100	Office-03	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp.	71	366	0	366	295	5.15	3.0
Hot Water	19	Education-11	Education	hot water central hser	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	356	1,822	0	1,822	1,466	5.12	3.1
Lights	14	Assembly-05	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	12,893	44,691	20,855	65,546	52,653	5.08	3.1
Lights	124	Other-26	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	3,869	15,125	4,205	19,330	15,461	5.00	3.1
Lights	76	Lodging-16	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	1,211	4,472	1,526	5,998	4,787	4.95	3.2
Lights	76	Lodging-16	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	1,143	4,137	1,440	5,577	4,434	4.88	3.2
Hot Water	48	FH-attached-01	Single Family Attached	electric shw heater	0.76 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	14,624	71,303	0	71,303	56,679	4.88	3.2
Lights	121	Other-20	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	3,413	12,345	3,709	16,054	12,641	4.70	3.3
Lights	78	Lodging-02	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	461	1,584	575	2,159	1,698	4.68	3.3
Hot Water	107	Office-04	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp.	110	515	0	515	405	4.68	3.3
Lights	134	Other-41	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	21,739	78,098	23,627	101,725	79,986	4.68	3.3
Lights	74	Lodging-13	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	2,620	8,960	3,285	12,245	9,625	4.67	3.3
Lights	78	Lodging-02	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	435	1,485	542	2,027	1,592	4.66	3.4
Lights	4	Assembly-16	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	47,906	160,414	61,850	222,264	174,358	4.64	3.4
Lights	74	Lodging-13	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	2,473	8,335	3,100	11,435	8,962	4.62	3.4
Lights	144	Public Order-04	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	530	1,655	762	2,417	1,887	4.56	3.4
Lights	67	Health Care-04	Health Care	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	34,441	109,929	45,952	155,881	121,440	4.53	3.5
Heating	137	Other-07	Other	oil conv boiler	Add Automatic Electric Damper	119	536	0	536	417	4.50	3.5
Lights	141	Public Order-01	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	1,186	3,618	1,707	5,325	4,139	4.49	3.5
Hot Water	89	Office-16	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp.	124	554	0	554	430	4.47	3.5
Lights	145	Public Order-05	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	1,829	5,498	2,627	8,125	6,296	4.45	3.5
Hot Water	79	Lodging-05	Lodging	hot water central hser	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	3,799	16,344	0	16,344	12,545	4.42	3.5
Lights	66	Health Care-03	Health Care	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	6,348	20,741	8,186	28,927	22,579	4.42	3.5
Hot Water	116	Other-17	Other	oil central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	475	2,090	0	2,090	1,615	4.40	3.6
Roof	141	Public Order-01	Public Order Safety	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	3,599	15,811		15,811	12,212	4.39	3.6
Lights	139	Other-09	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	4,245	[illegible]	[illegible]	[illegible]	[illegible]	4.35	3.6

Table 3.8a

Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	73	Lodging-12	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	1,989	6,142	2,493	8,635	6,646	4.34	3.6
Lights	77	Lodging-19	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	3,673	11,292	4,582	15,874	12,201	4.32	3.6
Lights	142	Public Order-02	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	659	1,900	948	2,848	2,189	4.32	3.6
Lights	116	Other-17	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	371	1,197	403	1,600	1,229	4.31	3.6
Hot Water	62	Food Service-08	Food Service	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	11,498	49,340	0	49,340	37,842	4.29	3.6
Hot Water	63	Food Service-09	Food Service	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	1,140	4,884	0	4,884	3,744	4.28	3.6
Hot Water	88	Office-15ng	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	1,032	4,413	0	4,413	3,381	4.28	3.7
Lights	5	Assembly-18	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	59,095	176,224	76,295	252,519	193,424	4.27	3.7
Lights	77	Lodging-19	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	3,467	10,478	4,324	14,802	11,335	4.27	3.7
Lights	129	Other-31	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	439	1,392	478	1,870	1,431	4.26	3.7
Lights	69	Health Care-07	Health Care	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	495,203	1,545,174	537,549	2,082,723	1,587,520	4.21	3.7
Lights	112	Other-01g	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	4,148	12,192	5,249	17,441	13,293	4.20	3.7
Lights	123	Other-24	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	6,228	19,356	6,769	26,125	19,897	4.19	3.7
Hot Water	59	Food Service-02	Food Service	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	1,980	8,280	0	8,280	6,300	4.18	3.7
Hot Water	53	Food Service-01	Food Service	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	910	3,801	0	3,801	2,891	4.18	3.7
Hot Water	60	Food Service-04	Food Service	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	14,034	58,605	0	58,605	44,571	4.18	3.7
Roof	147	Service-03	Mercantile & Service	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-19	16,893	70,360	0	70,360	53,467	4.17	3.7
Lights	68	Health Care-06	Health Care	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	34,032	99,031	42,579	141,610	107,578	4.16	3.8
Lights	138	Other-08	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	15,361	46,938	16,695	63,633	48,272	4.14	3.8
Lights	127	Other-03	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	600	1,823	652	2,475	1,875	4.13	3.8
Hot Water	0	Assembly-01	Assembly	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	948	3,899	0	3,899	2,951	4.11	3.8
Lights	72	Lodging-11	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	16,673	47,617	20,705	68,322	51,649	4.11	3.8
Lights	12	Assembly-03	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	34,604	99,654	42,512	142,166	107,562	4.11	3.8
Lights	11	Assembly-24	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	20,359	58,754	24,739	83,493	63,134	4.10	3.8
Hot Water	86	Office-14	Office	hot water central hter	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	916	3,666	0	3,666	2,750	4.00	3.9
Lights	117	Other-17ng	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	1,239	3,484	1,396	4,880	3,641	3.94	4.0
Hot Water	22	Education-15	Education	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	65	256	0	256	191	3.94	4.0
Lights	79	Lodging-05	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	2,768	7,419	3,471	10,890	8,122	3.93	4.0
Lights	52	Food Sales-01	Food Sales	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	43,551	154,247	17,073	171,320	127,769	3.93	4.0
Hot Water	33	Education-08	Education	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	175	688	0	688	513	3.93	4.0
Lights	140	Other-09g	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	626	1,752	705	2,457	1,831	3.92	4.0
Lights	1	Assembly-10	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	16,265	42,007	20,999	63,006	46,741	3.87	4.0
Roof	0	Assembly-01	Assembly	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-19	25,675	99,182	0	99,182	73,507	3.86	4.0
Lights	143	Public Order-03	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	370	895	533	1,428	1,058	3.86	4.0
Hot Water	78	Lodging-02	Lodging	gas shw heater	Wrap Old Gas Tank w. Ins., Ins. Pipe, LFSHs, Aerators	533	2,056	0	2,056	1,523	3.86	4.0
Hot Water	129	Other-31	Other	hot water central hter	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	294	1,127	0	1,127	833	3.83	4.1
Lights	72	Lodging-11	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	15,736	40,412	19,730	60,142	44,406	3.82	4.1
Roof	70	Lodging-01	Lodging	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-19	3,890	14,826	0	14,826	10,936	3.81	4.1
Lights	79	Lodging-05	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	2,933	7,439	3,678	11,117	8,184	3.79	4.1
Hot Water	27	Education-02	Education	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	238	900	0	900	662	3.78	4.1
Lights	103	Office-34	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,848	4,472	2,465	6,937	5,089	3.75	4.2
Roof	84	Office-10	Office	roof insulation R-value 5.00	Suspended Ceiling - Increase insulation by R-19	8,877	33,227	0	33,227	24,350	3.74	4.2
Lights	55	Food Service-12	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	418	1,004	557	1,561	1,143	3.73	4.2
Hot Water	5	Assembly-18	Assembly	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	498	1,845	0	1,845	1,347	3.70	4.2
Heating	21	Education-14	Education	other conv furn	Conventional Oil Furnace	526	1,944	0	1,944	1,418	3.70	4.2
Heating	139	Other-09	Other	other conv furn	Conventional Gas Furnace	1,885	6,954	0	6,954	5,069	3.69	4.2
Lights	149	Service-05	Mercantile & Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	3,270	8,731	3,275	12,006	8,736	3.67	4.3
Hot Water	31	Education-04	Education	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	408	1,496	0	1,496	1,088	3.67	4.3
Lights	57	Food Service-15	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,843	4,291	2,458	6,749	4,906	3.66	4.3
Heating	148	Service-04	Mercantile & Service	other conv furn	Conventional Gas Furnace	429	1,556	0	1,556	1,127	3.63	4.3
Heating	111	Other-01	Other	other conv furn	Conventional Gas Furnace	2,113	7,660	0	7,660	5,547	3.63	4.3
Cooling	33	Education-08	Education	package unit	Single Zone Packaged AC Unit (5.4167 to 11.25 tons cooling)	16,454	59,645	0	59,645	43,191	3.62	4.3
Lights	106	Office-38	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5,544	12,585	7,406	19,991	14,447	3.61	4.3
Lights	153	Service-09	Mercantile & Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	2,831	7,361	2,835	10,196	7,365	3.60	4.3
Lights	153	Service-09	Mercantile & Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	191	430	255	685	494	3.59	4.4
Lights	109	Office-08	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	6,465	14,525	8,625	23,150	16,685	3.58	4.4
Lights	36	FH-2 to 4-10	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	50,055	130,015	49,053	179,068	129,013	3.58	4.4
Roof	35	FH-2 to 4-01	2 to 4 Unit Buildings	roof insulation R-value 5.00	Attic Ceiling - Increase insulation by R-19	120,604	431,017	0	431,017	310,413	3.57	4.4
Heating	67	Health Care-04	Health Care	other conv boiler	Gas Pulse Condensing Boiler	6,940	24,694	0	24,694	17,754	3.56	4.4
Hot Water	92	Office-02	Office	oil shw heater	Wrap Old Oil Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	120	426	0	426	306	3.55	4.4
Hot Water	82	Office-01	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	74	262	0	262	188	3.54	4.4
Hot Water	83	Office-01g	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	198	700	0	700	502	3.54	4.4
Heating	121	Other-20	Other	other conv furn	Conventional Gas Furnace	1,667	5,874	0	5,874	4,207	3.52	4.4
Lights	61	Food Service-07	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,030	2,253	1,375	3,628	2,598	3.52	4.4
Lights	149	Service-05	Mercantile & Service	IN39 INC 150 FLD	HS31 HPS 70 FLD	30,215	44,774	61,376	106,150	75,935	3.51	4.4
Lights	40	FH-2 to 4-07	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	38,138	96,593	37,417	134,010	95,872	3.51	4.5
Lights	148	Service-04	Mercantile & Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	4,066	10,162	4,072	14,234	10,168	3.50	4.5
Lights	150	Service-06	Mercantile & Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	636	1,367	823	2,190	1,554	3.44	4.5
Lights	144	Public Order-04	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	582	1,246	772	2,018	1,436	3.47	4.5
Lights	54	Food Service-11	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	6,355	13,178	8,778	21,956	15,601	3.45	4.5

Table 3.8a

Building ERUs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	8	Assembly-20	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT LED	9,360	20,097	12,487	32,584	23,224	3.48	4.5
Lights	152	Service-08	Mercantile & Service	EX1 EXIT - INC (2x20)	EX6 EXIT LED	3,242	6,913	4,325	11,238	7,996	3.47	4.5
Lights	108	Office-07	Office	EX1 EXIT - INC (2x20)	EX6 EXIT LED	1,885	4,015	2,515	6,530	4,645	3.46	4.5
Lights	145	Public Order-05	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT LED	1,996	4,245	2,663	6,908	4,912	3.46	4.5
Lights	9	Assembly-22	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	31,697	70,734	38,940	109,674	77,977	3.46	4.5
Hot Water	42	FH-5 or More-01	5 or More Unit Buildings	electric shw heater	Better Elec. WH (RES), Ins. Pipe, LFSHs, Aer., Lower Tank Temp.	5,867	20,282	0	20,282	14,415	3.46	4.5
Lights	153	Service-09	Mercantile & Service	IN39 INC 150 FLD	HS31 HPS 70 FLD	26,160	57,097	33,139	90,236	64,076	3.45	4.5
Lights	110	Office-09	Office	EX1 EXIT - INC (2x20)	EX6 EXIT LED	1,397	2,948	1,863	4,811	3,414	3.44	4.5
Lights	105	Office-37	Office	EX1 EXIT - INC (2x20)	EX6 EXIT LED	8,932	18,754	11,917	30,671	21,739	3.43	4.5
Roof	82	Office-01	Office	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-19	30,081	103,065	0	103,065	72,984	3.43	4.6
Lights	141	Public Order-01	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT LED	1,297	2,713	1,730	4,443	3,146	3.43	4.6
Lights	2	Assembly-13	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	13,108	33,444	18,277	51,721	38,613	3.42	4.6
Lights	69	Health Care-07	Health Care	EX1 EXIT - INC (2x20)	EX6 EXIT LED	24,467	50,952	32,640	83,592	59,125	3.42	4.6
Lights	148	Service-04	Mercantile & Service	IN39 INC 150 FLD	HS31 HPS 70 FLD	37,570	51,569	76,316	127,885	90,315	3.40	4.6
Heating	32	Education-07	Education	other conv furn	Conventional Oil Furnace	1,565	5,319	0	5,319	3,754	3.40	4.6
Hot Water	75	Lodging-15	Lodging	gas central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	2,067	7,008	0	7,008	4,941	3.39	4.6
Lights	100	Office-03	Office	EX1 EXIT - INC (2x20)	EX6 EXIT LED	5,414	11,127	7,223	18,350	12,936	3.39	4.6
Lights	149	Service-05	Mercantile & Service	EX1 EXIT - INC (2x20)	EX6 EXIT LED	221	455	294	749	528	3.39	4.6
Lights	67	Health Care-04	Health Care	EX1 EXIT - INC (2x20)	EX6 EXIT LED	1,398	2,869	1,865	4,734	3,336	3.39	4.6
Hot Water	112	Other-01g	Other	oil shw heater	0.80 Oil WH (COM), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp.	15,035	50,823	0	50,823	35,788	3.38	4.6
Lights	84	Office-10	Office	EX1 EXIT - INC (2x20)	EX6 EXIT LED	1,106	2,261	1,475	3,736	2,630	3.38	4.6
Lights	82	Office-01	Office	EX1 EXIT - INC (2x20)	EX6 EXIT LED	4,468	9,100	5,961	15,061	10,593	3.37	4.6
Heating	119	Office-09	Office	other conv furn	Conventional Gas Furnace	437	1,473	0	1,473	1,036	3.37	4.6
Lights	95	Office-21	Office	EX1 EXIT - INC (2x20)	EX6 EXIT LED	3,733	7,548	4,980	12,528	8,795	3.36	4.7
Lights	94	Office-20	Office	EX1 EXIT - INC (2x20)	EX6 EXIT LED	3,140	6,343	4,189	10,532	7,392	3.35	4.7
Lights	124	Other-26	Other	EX1 EXIT - INC (2x20)	EX6 EXIT LED	2,547	5,139	3,398	8,537	5,990	3.35	4.7
Lights	99	Office-29	Office	EX1 EXIT - INC (2x20)	EX6 EXIT LED	882	1,778	1,177	2,955	2,073	3.35	4.7
Lights	52	Food Sales-01	Food Sales	EX1 EXIT - INC (2x20)	EX6 EXIT LED	1,624	3,271	2,167	5,438	3,814	3.35	4.7
Lights	152	Service-08	Mercantile & Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELA'3	48,048	112,499	48,119	160,618	112,570	3.34	4.7
Lights	148	Service-04	Mercantile & Service	EX1 EXIT - INC (2x20)	EX6 EXIT LED	274	546	366	912	638	3.33	4.7
Lights	146	Service-01	Mercantile & Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELA'3	12,167	28,297	12,186	40,483	28,316	3.33	4.7
Lights	146	Service-01	Mercantile & Service	IN39 INC 150 FLD	HS31 HPS 70 FLD	112,426	144,985	228,370	373,355	260,929	3.32	4.7
Lights	58	Food Service-17	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT LED	4,687	9,310	6,253	15,563	10,876	3.32	4.7
Lights	152	Service-08	Mercantile & Service	IN39 INC 150 FLD	HS31 HPS 70 FLD	443,954	570,867	901,799	1,472,666	1,028,712	3.32	4.7
Hot Water	110	Office-09	Office	oil shw heater	Wrap Old Oil Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp.	76	251	0	251	175	3.30	4.7
Lights	90	Office-17	Office	EX1 EXIT - INC (2x20)	EX6 EXIT LED	994	1,957	1,325	3,282	2,288	3.30	4.7
Heating	31	Education-04	Education	other conv boiler	Gas Pulse Condensing Boiler	15,098	49,768	0	49,768	34,670	3.30	4.7
Lights	4	Assembly-16	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT LED	8,162	15,997	10,889	26,886	18,724	3.29	4.7
Lights	68	Health Care-06	Health Care	EX1 EXIT - INC (2x20)	EX6 EXIT LED	1,381	2,695	1,843	4,538	3,157	3.29	4.8
Lights	131	Other-36	Other	EX1 EXIT - INC (2x20)	EX6 EXIT LED	9,295	18,083	12,400	30,483	21,188	3.28	4.8
Lights	16	Assembly-05	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT LED	2,197	4,256	2,931	7,187	4,990	3.27	4.8
Lights	107	Office-04	Office	EX1 EXIT - INC (2x20)	EX6 EXIT LED	2,664	5,153	3,553	8,706	6,042	3.27	4.8
Lights	128	Other-30	Other	EX1 EXIT - INC (2x20)	EX6 EXIT LED	8,811	16,838	11,754	28,592	19,781	3.25	4.8
Lights	8	Assembly-20	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELA'3	10,604	25,050	9,345	34,395	23,791	3.24	4.8
Lights	136	Other-05	Other	EX1 EXIT - INC (2x20)	EX6 EXIT LED	926	1,768	1,235	3,003	2,077	3.24	4.8
Lights	137	Other-07	Other	EX1 EXIT - INC (2x20)	EX6 EXIT LED	4,939	9,422	6,589	16,011	11,072	3.24	4.8
Hot Water	38	FH-2 to 4-03	2 to 4 Unit Buildings	gas shw heater	Wrap Old Gas Tank w. Ins., Ins. Pipe, LFSHs, Aerators	12,925	41,890	0	41,890	28,965	3.24	4.8
Lights	78	Lodging-02	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT LED	3,232	6,162	4,312	10,474	7,242	3.24	4.8
Lights	104	Office-35	Office	EX1 EXIT - INC (2x20)	EX6 EXIT LED	15,839	30,155	21,131	51,286	35,447	3.24	4.8
Lights	85	Office-13	Office	EX1 EXIT - INC (2x20)	EX6 EXIT LED	888	1,689	1,185	2,874	1,986	3.24	4.8
Lights	151	Service-07	Mercantile & Service	IN39 INC 150 FLD	HS31 HPS 70 FLD	67,057	80,812	136,212	217,024	149,967	3.24	4.8
Lights	11	Assembly-24	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT LED	3,469	6,599	4,628	11,227	7,758	3.24	4.8
Lights	142	Public Order-02	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT LED	720	1,361	961	2,322	1,602	3.23	4.8
Lights	86	Office-14	Office	EX1 EXIT - INC (2x20)	EX6 EXIT LED	8,820	16,602	11,766	28,368	19,548	3.22	4.9
Lights	96	Office-22	Office	EX1 EXIT - INC (2x20)	EX6 EXIT LED	64,316	121,227	86,069	207,296	142,980	3.21	4.9
Lights	87	Office-15	Office	EX1 EXIT - INC (2x20)	EX6 EXIT LED	2,393	4,493	3,193	7,686	5,293	3.21	4.9
Lights	147	Service-03	Mercantile & Service	EX1 EXIT - INC (2x20)	EX6 EXIT LED	1,620	3,042	2,161	5,203	3,583	3.21	4.9
Roof	92	Office-02	Office	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-19	26,636	85,356	0	85,356	58,720	3.21	4.9
Lights	17	Assembly-09	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	23,213	49,499	25,928	75,427	52,214	3.20	4.9
Lights	51	FH-attached-05	Single Family Attached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	32,014	66,465	35,817	102,282	70,268	3.19	4.9
Lights	7	Assembly-02	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT LED	480	891	641	1,532	1,052	3.19	4.9
Lights	31	Education-04	Education	EX1 EXIT - INC (2x20)	EX6 EXIT LED	6,590	12,286	8,742	21,028	14,438	3.19	4.9
Hot Water	85	Office-13	Office	hot water central heater	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	187	596	0	596	409	3.19	4.9
Lights	151	Service-07	Mercantile & Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELA'3	7,257	15,801	7,268	23,069	15,812	3.18	4.9
Roof	142	Public Order-02	Public Order Safety	roof insulation R-value 0.00	Suspended Ceiling - Increase insulation by R-19	2,403	7,573		7,573	5,170	3.18	4.9
Lights	97	Office-29	Office	EX1 EXIT - INC (2x20)	EX6 EXIT LED	[illegible]	[illegible]	[illegible]	42,490	29,427	3.18	4.9
Lights	6	Assembly-19	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT LED	[illegible]	[illegible]	[illegible]	[illegible]	11,675	3.16	4.9
Lights	96	Food Service-02	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT LED	1,718	[illegible]	[illegible]	5,453	3,735	3.16	4.9
Lights	5	Assembly-18	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT LED	[illegible]	[illegible]	13,432	41,743	21,674	3.15	5.0
Lights	119	Other-19	Other	EX1 EXIT - INC (2x20)	EX6 EXIT LED	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5.0

Table 3.8e

Building EEMs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Present Values of Costs and Savings

End Use	Bldg Set No.	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Cooling	82	Office<1	Office	package unit	Single Zone Packaged AC Unit (5.4167 to 11.25 tons cooling)	5,662	17,780	0	17,780	12,118	3.14	5.0
Lights	65	Health Care<2	Health Care	EX1 EXIT INC (2x20)	EX6 EXIT LED	286	551	408	959	673	3.13	5.0
Lights	57	Food Service 15	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELA'3	6,711	14,441	6,494	21,000	14,289	3.13	5.0
Lights	91	Office 18	Office	EX1 EXIT INC (2x20)	EX6 EXIT LED	1,054	1,889	1,407	3,296	2,242	3.13	5.0
Lights	151	Service<7	Mercantile & Service	EX1 EXIT INC (2x20)	EX6 EXIT LED	450	876	453	1,329	1,079	3.12	5.0
Lights	146	Service<1	Mercantile & Service	EX1 EXIT INC (2x20)	EX6 EXIT LED	821	1,466	1,095	2,561	1,740	3.12	5.0
Lights	47	FH Detached<7	Single Family Detached	IN6 INC 2-60 CELL	FL1H2 CFL 2-13 + BLST UNIT	332	662	372	1,034	702	3.11	5.0
Lights	55	Food Service 12	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELA'3	1,521	3,365	1,367	4,732	3,211	3.11	5.0
Lights	62	Food Service<8	Food Service	EX1 EXIT INC (2x20)	EX6 EXIT LED	6,816	17,454	13,122	30,576	23,760	3.11	5.0
Lights	102	Office 31	Office	EX1 EXIT INC (2x20)	EX6 EXIT LED	1,437	2,649	1,967	4,616	3,149	3.10	5.0
Lights	72	Lodging 11	Lodging	EX1 EXIT INC (2x20)	EX6 EXIT LED	116,855	206,490	156,028	362,518	245,363	3.10	5.0
Lights	75	Lodging 15	Lodging	EX1 EXIT INC (2x20)	EX6 EXIT LED	2,668	4,703	3,559	8,262	5,594	3.10	5.0
Lights	134	Other 41	Other	EX1 EXIT INC (2x20)	EX6 EXIT LED	14,314	25,215	19,080	44,305	29,995	3.10	5.0
Lights	115	Other 16	Other	EX1 EXIT INC (2x20)	EX6 EXIT LED	4,036	7,076	5,385	12,461	8,425	3.09	5.1
Lights	12	Assembly<5	Assembly	EX1 EXIT INC (2x20)	EX6 EXIT LED	5,806	10,333	7,866	18,199	12,393	3.09	5.1
Lights	162	Warehouse 21	Warehouse & Storage	EX1 EXIT INC (2x20)	EX6 EXIT LED	1,085	1,901	1,448	3,349	2,264	3.09	5.1
Lights	76	Lodging 16	Lodging	EX1 EXIT INC (2x20)	EX6 EXIT LED	8,495	14,765	11,333	26,098	17,603	3.07	5.1
Lights	27	Education<2	Education	EX1 EXIT INC (2x20)	EX6 EXIT LED	1,642	2,854	2,190	5,044	3,402	3.07	5.1
Lights	50	FH attached<4	Single Family Attached	IN6 INC 2-60 CELL	FL1H2 CFL 2-13 + BLST UNIT	625	1,220	699	1,919	1,294	3.07	5.1
Lights	101	Office 30	Office	EX1 EXIT INC (2x20)	EX6 EXIT LED	5,764	10,024	7,736	17,734	11,990	3.06	5.1
Lights	66	Health Care<3	Health Care	EX1 EXIT INC (2x20)	EX6 EXIT LED	266	460	353	813	549	3.06	5.1
Lights	73	Lodging 12	Lodging	EX1 EXIT INC (2x20)	EX6 EXIT LED	14,780	25,552	19,718	45,270	30,490	3.06	5.1
Lights	53	Food Service<1	Food Service	EX1 EXIT INC (2x20)	EX6 EXIT LED	788	1,362	1,051	2,413	1,625	3.06	5.1
Lights	74	Lodging 13	Lodging	EX1 EXIT INC (2x20)	EX6 EXIT LED	18,378	31,724	24,517	56,241	37,863	3.06	5.1
Lights	83	Office<1g	Office	EX1 EXIT INC (2x20)	EX6 EXIT LED	1,966	3,415	2,641	6,056	4,070	3.06	5.1
Lights	56	Food Service 13	Food Service	EX1 EXIT INC (2x20)	EX6 EXIT LED	586	673	512	1,186	600	3.06	5.1
Heating	87	Office 15	Office	other conv furn	Conventional Gas Furnace	1,876	5,733	0	5,733	3,856	3.05	5.1
Lights	121	Other 20	Other	EX1 EXIT INC (2x20)	EX6 EXIT LED	6,570	10,876	8,498	19,377	13,007	3.04	5.1
Lights	45	FH Detached<4	Single Family Detached	IN6 INC 2-60 CELL	FL1H2 CFL 2-13 + BLST UNIT	2,707	5,212	3,028	8,230	5,523	3.04	5.1
Lights	111	Other<1	Other	EX1 EXIT INC (2x20)	EX6 EXIT LED	4,490	7,658	5,990	13,648	9,158	3.04	5.1
Lights	49	FH attached<3	Single Family Attached	IN6 INC 2-60 CELL	FL1H2 CFL 2-13 + BLST UNIT	8,171	15,689	9,142	24,831	16,660	3.04	5.1
Lights	33	Education<8	Education	EX1 EXIT INC (2x20)	EX6 EXIT LED	9,378	15,483	12,512	28,495	19,117	3.04	5.1
Lights	92	Office<2	Office	EX1 EXIT INC (2x20)	EX6 EXIT LED	3,956	6,731	5,277	12,008	8,052	3.04	5.1
Lights	126	Other 29	Other	EX1 EXIT INC (2x20)	EX6 EXIT LED	4,442	7,606	5,900	13,506	9,064	3.03	5.2
Lights	114	Other 15	Other	EX1 EXIT INC (2x20)	EX6 EXIT LED	4,336	7,327	5,785	13,112	8,776	3.02	5.2
Lights	159	Warehouse 30	Warehouse & Storage	EX1 EXIT INC (2x20)	EX6 EXIT LED	5,361	9,096	7,152	16,248	10,887	3.02	5.2
Lights	122	Other 23	Other	EX1 EXIT INC (2x20)	EX6 EXIT LED	3,116	5,263	4,157	9,420	6,304	3.02	5.2
Lights	125	Other 27	Other	EX1 EXIT INC (2x20)	EX6 EXIT LED	1,723	2,409	2,802	5,211	3,488	3.02	5.2
Lights	174	Warehouse<7	Warehouse & Storage	EX1 EXIT INC (2x20)	EX6 EXIT LED	1,085	1,829	1,448	3,277	2,192	3.02	5.2
Lights	161	Warehouse 2	Warehouse & Storage	EX1 EXIT INC (2x20)	EX6 EXIT LED	205	345	274	619	414	3.02	5.2
Lights	77	Lodging 19	Lodging	EX1 EXIT INC (2x20)	EX6 EXIT LED	25,767	43,369	34,375	77,744	51,977	3.02	5.2
Lights	163	Warehouse 23	Warehouse & Storage	EX1 EXIT INC (2x20)	EX6 EXIT LED	6,712	11,289	8,958	20,247	13,535	3.02	5.2
Lights	136	Other 32	Other	EX1 EXIT INC (2x20)	EX6 EXIT LED	20,473	34,415	27,312	61,727	41,254	3.02	5.2
Lights	155	Warehouse 11	Warehouse & Storage	EX1 EXIT INC (2x20)	EX6 EXIT LED	4,393	7,383	5,861	13,244	8,851	3.01	5.2
Heating	105	Office 37	Office	oil conv boiler	Add Automatic Gas/Stm. Damper	89	256	0	256	167	3.01	5.2
Lights	160	Warehouse 18	Warehouse & Storage	EX1 EXIT INC (2x20)	EX6 EXIT LED	1,831	3,069	2,443	5,512	3,681	3.01	5.2
Lights	113	Other 10	Other	EX1 EXIT INC (2x20)	EX6 EXIT LED	5,303	8,484	7,072	15,556	10,553	3.01	5.2
Lights	167	Warehouse 26	Warehouse & Storage	EX1 EXIT INC (2x20)	EX6 EXIT LED	707	1,185	943	2,128	1,421	3.01	5.2
Lights	98	Office 28	Office	EX1 EXIT INC (2x20)	EX6 EXIT LED	3,064	5,124	4,068	9,097	6,033	3.01	5.2
Lights	157	Warehouse 13	Warehouse & Storage	EX1 EXIT INC (2x20)	EX6 EXIT LED	1,332	2,215	1,777	3,992	2,660	3.00	5.2
Hot Water	41	FH 2 to 4<9	2 to 4 Unit Buildings	electric elec heater	Better Elec. WH (RES), Ins. Pipe, LF Shr, Aer., Lower Tank Temp	636	2,803	0	2,803	1,867	2.99	5.2
Lights	154	Warehouse<1	Warehouse & Storage	EX1 EXIT INC (2x20)	EX6 EXIT LED	2,806	4,457	3,795	8,372	5,372	2.98	5.2
Lights	139	Other<9	Other	EX1 EXIT INC (2x20)	EX6 EXIT LED	5,185	8,983	6,617	15,566	10,315	2.98	5.2
Lights	88	Office 15ng	Office	EX1 EXIT INC (2x20)	EX6 EXIT LED	9,683	15,457	12,418	28,875	19,192	2.98	5.2
Lights	26	Education 12	Education	EX1 EXIT INC (2x20)	EX6 EXIT LED	1,943	3,213	2,545	5,798	3,855	2.98	5.2
Hot Water	84	Office 10	Office	gas elec heater	Wrap Old Gas Tank, Ins. Pipe, LF Shr, Aer., Lower Tank Temp	48	143	0	143	95	2.98	5.2
Lights	10	Assembly 23	Assembly	EX1 EXIT INC (2x20)	EX6 EXIT LED	1,512	2,446	2,117	4,563	2,961	2.98	5.2
Lights	168	Warehouse<3	Warehouse & Storage	EX1 EXIT INC (2x20)	EX6 EXIT LED	18,412	30,297	24,503	54,825	36,413	2.98	5.2
Heating	141	Public Order<1	Public Order Safety	oil conv furn	Conventional Gas Furnace	545	1,642	0	1,642	1,117	2.98	5.2
Lights	13	Assembly<4	Assembly	EX1 EXIT INC (2x20)	EX6 EXIT LED	3,726	[illegible]	4,457	11,067	7,331	2.97	5.3
Lights	43	FH Detached<1	Single Family Detached	IN6 INC 2-60 CELL	FL1H2 CFL 2-13 + BLST UNIT	686	[illegible]	772	2,048	1,356	2.97	5.3
Lights	172	Warehouse<7	Warehouse & Storage	EX1 EXIT INC (2x20)	EX6 EXIT LED	[illegible]	[illegible]	1,646	3,507	2,328	2.97	5.3
Lights	3	Assembly 15	Assembly	EX1 EXIT INC (2x20)	EX6 EXIT LED	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.97	5.3
Lights	67	Health Care<4	Health Care	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELA'3	[illegible]	[illegible]	[illegible]	93,887	[illegible]	2.96	5.3
Lights	37	FH 2 to 4 12	2 to 4 Unit Buildings	IN6 INC 2-60 CELL	FL1H2 CFL 2-13 + BLST UNIT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.96	5.3
Lights	80	Lodging<7	Lodging	EX1 EXIT INC (2x20)	EX6 EXIT LED	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.95	5.3
Lights	124	Other 31	Other	EX1 EXIT INC (2x20)	EX6 EXIT LED	289	[illegible]	456	853	564	2.95	5.3
Lights	25	Education 18	Education	EX1 EXIT INC (2x20)	EX6 EXIT LED	[illegible]	[illegible]	[illegible]	[illegible]	27,458	2.95	5.3
Lights	120	Other<2	Other	EX1 EXIT INC (2x20)	EX6 EXIT LED	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.95	5.3
Lights	165	Warehouse [illegible]	Warehouse & Storage	EX1 EXIT INC (2x2	EX6 EXIT LED	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.95	5.3

Table 3.8a

Building LBEs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	63	Food Service-49	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	976	1,372	1,502	2,874	1,898	2.94	3.3
Lights	26	Education-19	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	9,730	15,617	12,981	28,598	18,868	2.94	3.3
Lights	81	Lodging-08	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	2,358	3,766	3,146	6,912	4,554	2.93	3.3
Lights	143	Public Order-03	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	405	647	540	1,187	782	2.93	3.3
Lights	35	FH-2 to 4-01	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	23,014	41,701	25,748	67,449	44,435	2.93	3.3
Lights	38	Food Service-17	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	17,068	34,398	15,699	50,097	32,939	2.93	3.3
Lights	29	Education-23	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,925	3,071	2,568	5,639	3,714	2.93	3.3
Lights	164	Warehouse-24	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	187	289	243	532	350	2.92	3.3
Lights	116	Other-17	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	2,548	4,038	3,400	7,438	4,890	2.92	3.4
Lights	60	Food Service-04	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	12,056	19,094	16,084	35,178	23,122	2.92	3.4
Lights	2	Assembly-13	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	2,574	4,076	3,434	7,510	4,936	2.92	3.4
Lights	23	Education-16	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	350	550	468	1,018	668	2.91	3.4
Lights	34	Education-09	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,600	2,510	2,135	4,645	3,045	2.90	3.4
Lights	42	FH-5 or More-01	5 or More Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	32,366	57,348	36,211	93,559	61,193	2.89	3.4
Lights	46	FH-Detached-05	Single Family Detached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	1,275	2,258	1,426	3,684	2,409	2.89	3.4
Roof	143	Public Order-03	Public Order Safety	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-19	1,123	3,233	0	3,233	2,110	2.88	3.4
Lights	114	Other-15	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	14,812	30,158	12,479	42,637	27,825	2.88	3.4
Lights	117	Other-17ng	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	8,519	13,154	11,365	24,519	16,000	2.88	3.4
Lights	150	Service-06	Mercantile & Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	9,126	18,060	8,202	26,262	17,136	2.88	3.4
Lights	79	Lodging-05	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	20,576	31,746	27,450	59,196	38,620	2.88	3.4
Lights	138	Other-08	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	10,114	15,594	13,493	29,087	18,973	2.88	3.4
Roof	64	Health Care-01	Health Care	roof insulation R-value 0.00	Suspended Ceiling - Increase insulation by R-30	486	1,397	0	1,397	911	2.87	3.4
Lights	159	Warehouse-18	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	613	944	818	1,762	1,149	2.87	3.4
Lights	125	Other-24	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	4,711	7,255	6,285	13,540	8,829	2.87	3.4
Lights	16	Assembly-08	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,095	1,685	1,461	3,146	2,051	2.87	3.4
Lights	171	Warehouse-05	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	533	817	712	1,529	996	2.87	3.4
Lights	21	Education-14	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,283	1,966	1,712	3,678	2,395	2.87	3.4
Lights	173	Warehouse-08	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,209	1,975	1,719	3,694	2,485	2.87	3.5
Lights	66	Health Care-03	Health Care	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	5,380	10,583	4,821	15,404	10,024	2.86	3.5
Lights	19	Education-11	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	960	1,464	1,281	2,745	1,785	2.86	3.5
Lights	73	Lodging-13	Lodging	IN15 INC 60 TABLE LAMP	FL181 CFL 13 + BLST UNIT	855	1,629	809	2,438	1,583	2.85	3.5
Lights	158	Warehouse-16	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,008	1,529	1,344	2,873	1,865	2.85	3.5
Lights	32	Education-07	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	3,443	5,208	4,593	9,801	6,358	2.85	3.5
Lights	166	Warehouse-26	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	195	295	260	555	360	2.85	3.5
Lights	17	Assembly-09	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	4,060	6,108	5,390	11,498	7,438	2.85	3.5
Lights	36	FH-2 to 4-10	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	60,231	103,927	67,386	171,313	111,082	2.84	3.5
Lights	1	Assembly-10	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	2,771	4,159	3,657	7,836	5,085	2.84	3.5
Lights	170	Warehouse-04	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	2,950	4,425	3,935	8,360	5,410	2.83	3.5
Lights	64	Health Care-01	Health Care	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	866	1,424	1,028	2,452	1,586	2.83	3.5
Lights	127	Other-03	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	395	590	527	1,117	722	2.83	3.5
Lights	44	FH-Detached-03	Single Family Detached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	195	333	218	551	356	2.83	3.5
Lights	150	Service-06	Mercantile & Service	IN39 INC 150 FLD	HS31 HPS 70 FLD	84,325	93,371	144,659	238,030	153,705	2.82	3.5
Heating	92	Office-02	Office	other conv furn	Conventional Gas Furnace	1,739	4,905	0	4,905	3,166	2.82	3.5
Lights	131	Other-36	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	31,747	62,782	26,748	89,530	57,783	2.82	3.5
Lights	135	Other-42	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	14,268	21,174	19,034	40,208	25,940	2.82	3.5
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	35,741	60,727	39,987	100,714	64,973	2.82	3.5
Lights	68	Health Care-06	Health Care	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	27,960	52,896	25,839	78,735	50,775	2.82	3.5
Lights	9	Assembly-22	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	5,401	8,062	7,205	15,267	9,866	2.82	3.5
Lights	118	Other-18	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	123	182	164	346	223	2.81	3.6
Lights	132	Other-37	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	885	1,307	1,181	2,488	1,603	2.81	3.6
Lights	40	FH-2 to 4-07	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	111,717	188,830	124,988	313,818	202,101	2.81	3.6
Lights	89	Office-16	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,187	1,749	1,584	3,333	2,146	2.81	3.6
Lights	22	Education-15	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	467	688	623	1,311	844	2.81	3.6
Lights	24	Education-17	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	4,184	6,163	5,582	11,745	7,561	2.81	3.6
Lights	39	FH-2 to 4-06	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	44,858	76,224	49,638	125,862	81,004	2.81	3.6
Lights	156	Warehouse-12	Warehouse & Storage	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	818	1,203	1,092	2,295	1,477	2.81	3.6
Hot Water	146	Service-01	Mercantile & Service	gas dhw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	91	255	0	255	164	2.80	3.6
Lights	41	FH-2 to 4-09	2 to 4 Unit Buildings	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	10,404	17,509	11,640	29,149	18,745	2.80	3.6
Lights	93	Office-02g	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,218	1,785	1,625	3,410	2,192	2.80	3.6
Wall	64	Health Care-01	Health Care	wall insulation R-value 0.00	Blow-in Insulation - Increase Insulation by R-13	1,427	3,993	0	3,993	2,566	2.80	3.6
Lights	28	Education-22	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	3,475	5,076	4,635	9,711	6,236	2.79	3.6
Heating	122	Other-23	Other	other conv furn	Conventional Gas Furnace	164	458	0	458	294	2.79	3.6
Heating	16	Assembly-08	Assembly	other conv furn	Conventional Gas Furnace	306	853	0	853	547	2.79	3.6
Lights	48	FH-attached-01	Single Family Attached	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	132,720	221,515	148,436	369,881	237,161	2.79	3.6
Lights	140	Other-09g	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	765	1,155	1,043	2,178	1,395	2.78	3.6
Lights	119	Other-19	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	13,618	20,317	17,478	37,785	24,167	2.77	3.6
Lights	30	Education-24	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	12,061	17,866	15,591	33,457	21,396	2.77	3.6
Lights	128	Other-30	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	26,596	51,068	22,404	73,472	46,875	2.76	3.7
Heating	170	Warehouse-04	Warehouse & Storage	other conv furn	Conventional Gas Furnace	1,580	4,386	0	4,386	[illegible]	2.76	3.7
Lights	75	Lodging-13	Lodging	IN23 INC 60 WALL	FL181 CFL 13 + BLST UNIT	56	[illegible]	[illegible]	2,223	1,416	2.75	3.7

Table 3.8a

Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	70	Lodging-01	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT LED	1,024	1,445	1,366	2,811	1,787	2.75	5.7
Hot Water	106	Office-38	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	218	596	0	596	378	2.73	5.7
Lights	10	Assembly-23	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	8,875	14,485	9,634	24,119	15,244	2.72	5.7
Lights	0	Assembly-01	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT LED	7,115	9,817	9,492	19,309	12,194	2.71	5.8
Lights	71	Lodging-10	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT LED	34,470	47,454	45,985	93,439	58,969	2.71	5.8
Lights	112	Other-01g	Other	EX1 EXIT - INC (2x20)	EX6 EXIT LED	5,709	7,708	7,616	15,324	9,615	2.68	5.8
Hot Water	33	Education-08	Education	other shw heater	0.76 Gas WH (COM), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	4,613	12,378	0	12,378	7,765	2.68	5.8
Lights	128	Other-30	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	381	835	186	1,021	640	2.68	5.8
Hot Water	113	Other-10	Other	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	118	316	0	316	198	2.68	5.8
Lights	106	Office-38	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	27,381	51,264	21,400	72,664	45,283	2.65	5.9
Hot Water	36	FH-2 to 4-10	2 to 4 Unit Buildings	gas shw heater	Wrap Old Gas Tank w. Ins., Ins. Pipe, LFSHs, Aerators	29,444	78,081	0	78,081	48,637	2.65	5.9
Roof	18	Education-01	Education	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-19	10,087	26,728	0	26,728	16,641	2.65	5.9
Heating	146	Service-01	Mercantile & Service	other conv furn	Conventional Gas Furnace	477	1,261	0	1,261	784	2.64	5.9
Heating	82	Office-01	Office	other conv furn	Conventional Gas Furnace	1,359	3,576	0	3,576	2,217	2.63	5.9
Lights	15	Assembly-07	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT LED	231	299	308	607	376	2.63	5.9
Roof	146	Service-01	Mercantile & Service	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-19	9,924	26,035	0	26,035	16,111	2.62	6.0
Hot Water	6	Assembly-19	Assembly	oil shw heater	Wrap Old Oil Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	792	2,065	0	2,065	1,273	2.61	6.0
Lights	54	Food Service-11	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	22,052	39,826	17,234	57,060	35,008	2.59	6.0
Lights	130	Other-32	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	64,234	111,594	54,120	165,714	101,480	2.58	6.1
Lights	113	Other-10	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	17,880	30,917	15,064	45,981	28,101	2.57	6.1
Lights	6	Assembly-19	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	6,120	10,899	4,815	15,714	9,594	2.57	6.1
Lights	111	Other-01	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	7,336	12,512	6,181	18,693	11,357	2.55	6.1
Lights	120	Other-02	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	4,232	7,205	3,566	10,771	6,539	2.55	6.1
Lights	56	Food Service-13	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	1,416	2,323	1,273	3,596	2,180	2.54	6.2
Lights	122	Other-23	Other	IN5 INC 60 CEIL	FL181 CFL 17 + BLST UNIT	6,100	10,203	5,140	15,343	9,243	2.52	6.2
Lights	126	Other-29	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	10,046	16,773	8,464	25,237	15,191	2.51	6.2
Lights	18	Education-01	Education	EX1 EXIT - INC (2x20)	EX6 EXIT LED	2,795	3,289	3,729	7,018	4,223	2.51	6.2
Lights	14	Assembly-05	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	2,489	4,253	1,970	6,223	3,734	2.50	6.2
Heating	100	Office-03	Office	other conv furn	Conventional Oil Furnace	1,848	4,607	0	4,607	2,759	2.49	6.3
Lights	94	Office-20	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	2,258	5,206	418	5,624	3,366	2.49	6.3
Lights	133	Other-38	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	141,347	271,490	78,893	350,383	209,036	2.48	6.3
Lights	109	Office-08	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	59,104	122,625	23,103	145,728	86,624	2.47	6.3
Lights	81	Lodging-08	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	317	580	200	780	463	2.46	6.3
Heating	116	Other-17	Other	other conv furn	Conventional Gas Furnace	693	1,693	0	1,693	1,000	2.44	6.4
Lights	81	Lodging-08	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	336	604	212	816	480	2.43	6.4
Lights	4	Assembly-16	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	9,247	14,713	7,721	22,434	13,187	2.43	6.4
Lights	15	Assembly-07	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	1,355	1,718	1,556	3,274	1,919	2.42	6.5
Hot Water	31	Education-04	Education	other shw heater	0.76 Gas WH (COM), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	2,203	5,317	0	5,317	3,114	2.41	6.5
Lights	7	Assembly-02	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	2,820	4,154	2,596	6,750	3,930	2.39	6.5
Lights	37	FH-2 to 4-12	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	13,269	20,401	11,334	31,735	18,466	2.39	6.5
Roof	127	Other-03	Other	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-11	1,210	2,876	0	2,876	1,666	2.38	6.6
Lights	73	Lodging-12	Lodging	IN15 INC 60 TABLE LAMP	FL181 CFL 13 + BLST UNIT	4,739	7,318	3,922	11,240	6,501	2.37	6.6
Lights	106	Office-38	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	6,689	13,577	2,280	15,857	9,168	2.37	6.6
Lights	110	Office-09	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	7,609	16,367	1,408	17,805	10,196	2.34	6.7
Lights	46	FH-Detached-05	Single Family Detached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	577	977	373	1,350	773	2.34	6.7
Lights	69	Health Care-07	Health Care	FL81 FL 2X4 2F40T12ES STD2	FL165 FL 2X4 2F40T12ES ELC2	128,118	223,075	76,5[illegible]	299,579	171,461	2.34	6.7
Roof	33	Food Service-01	Food Service	roof insulation R-value 0.00	Attic Ceiling - Increase Insulation by R-8	2,734	6,353	0	6,353	3,619	2.32	6.7
Lights	91	Office-18	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	5,744	12,291	1,035	13,326	7,582	2.32	6.7
Roof	12	Assembly-03	Assembly	roof insulation R-value 0.00	Suspended Ceiling - Increase insulation by R-19	25,367	58,834	0	58,834	33,467	2.32	6.7
Lights	50	FH-attached-04	Single Family Attached	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	2,457	3,565	2,1[illegible]	5,694	3,237	2.32	6.7
Lights	5	Assembly-18	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	11,407	19,740	6,524	26,264	14,857	2.30	6.8
Lights	104	Office-35	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	11,388	23,874	2,192	26,066	14,678	2.29	6.8
Lights	51	FH-attached-05	Single Family Attached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	28,956	47,474	18,738	66,212	37,256	2.29	6.8
Hot Water	7	Assembly-02	Assembly	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	70	160	0	160	90	2.29	6.8
Hot Water	17	Assembly-09	Assembly	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	540	1,223	0	1,223	683	2.26	6.9
Hot Water	44	FH-Detached-03	Single Family Detached	other shw heater	0.83 LPG WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	65	147	0	147	82	2.26	6.9
Lights	52	Food Sales-01	Food Sales	FL62 FL 1X8 2F96T12 STD2	FL131 FL 1X8 2F96T12ES ELC2 REF	104,776	[illegible]	26,720	235,731	130,9[illegible]	2.25	6.9
Roof	59	Food Service-02	Food Service	roof insulation R-value 0.00	Attic Ceiling - Increase Insulation by R-8	[illegible]	13,397	0	13,397	7,457	2.25	6.9
Lights	47	FH-Detached-07	Single Family Detached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	150	240	97	337	187	2.25	7.0
Lights	12	Assembly-03	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	[illegible]	[illegible]	[illegible]	[illegible]	8,32[illegible]	2.25	7.0
Lights	45	FH-Detached-04	Single Family Detached	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	1,224	1,447	792	2,739	1,515	2.24	7.0
Lights	111	Other-01	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	4,148	[illegible]	[illegible]	9,282	5,134	2.24	7.0
Lights	61	Food Service-07	Food Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	[illegible]	[illegible]	[illegible]	8,338	4,586	2.22	7.1
Lights	122	Other-23	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	[illegible]	[illegible]	844	3,851	2,118	2.22	7.1
Lights	107	Office-04	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	[illegible]	[illegible]	[illegible]	32,22[illegible]	[illegible]	2.22	[illegible]
Lights	125	Other-29	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.21	[illegible]
Roof	45	FH-Detached-04	Single Family Detached	roof insulation R-value 5.0	Attic Ceiling - Increase Insulation by R-8	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
Hot Water	42	Office-02	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Lights	42	Office-02	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Lights	152	Warehouse-21	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 3.8a

Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resources: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Roof	101	Office-03	Office	roof insulation R-value 6.00	Attic Ceiling Increase insulation by R-11	25,236	55,507	0	55,507	30,271	2.20	7.1
Lights	139	Other-09	Other	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	3,368	5,739	1,641	7,371	4,003	2.19	7.1
Lights	102	Office-31	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	1,076	2,155	199	2,354	1,278	2.19	7.1
Lights	109	Office-08	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	1,732	2,991	795	3,786	2,054	2.19	7.1
Lights	111	Other-01	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	280	455	156	611	331	2.18	7.2
Roof	72	Lodging-11	Lodging	roof insulation R-value 8.90	Suspended Ceiling Increase insulation by R-8	96,978	211,549	0	211,549	114,571	2.18	7.2
Lights	11	Assembly-24	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	3,930	5,282	3,241	8,523	4,593	2.17	7.2
Hot Water	52	Food Sales-01	Food Sales	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	1,127	2,440	0	2,440	1,313	2.17	7.2
Lights	101	Office-30	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	4,166	8,233	771	9,004	4,838	2.16	7.2
Lights	0	Assembly-01	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	41,761	52,340	37,903	90,243	48,482	2.16	7.2
Lights	116	Other-17	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	57	91	32	123	66	2.16	7.2
Lights	103	Office-34	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	9,127	13,395	4,292	19,687	10,560	2.16	7.2
Lights	116	Other-17	Other	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	4,657	7,765	2,269	10,034	5,377	2.15	7.3
Lights	42	FH-5 or More-01	5 or More Unit Buildings	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	13,941	18,086	11,909	29,995	16,054	2.15	7.3
Lights	39	FH-2 to 4-06	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	58,740	76,224	49,626	125,850	67,110	2.14	7.3
Heating	130	Other-32	Other	oil conv boiler	Add Automatic Electric Damper	297	636	0	636	339	2.14	7.3
Lights	41	FH-2 to 4-09	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	13,623	17,569	11,637	29,146	15,523	2.14	7.3
Lights	1	Assembly-10	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	3,140	4,064	2,621	6,685	3,545	2.13	7.3
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	31,316	39,857	26,750	66,607	35,291	2.13	7.3
Lights	98	Office-28	Office	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	2,160	4,190	400	4,590	2,430	2.13	7.4
Lights	37	FH-2 to 4-12	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	36,917	54,473	23,890	78,363	41,446	2.12	7.4
Roof	136	Other-05	Other	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-11	2,838	6,010	0	6,010	3,172	2.12	7.4
Lights	156	Warehouse-12	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	300	507	127	634	334	2.11	7.4
Lights	95	Office-21	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	18,439	29,693	9,018	38,711	20,272	2.10	7.4
Hot Water	108	Office-07	Office	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	147	308	0	308	161	2.10	7.5
Lights	125	Other-27	Other	FL81 FL 2X4 2F40T12ES STD2	FL103 FL 2X4 2F40T12ES ELC2	792	1,197	456	1,653	861	2.09	7.5
Heating	78	Lodging-02	Lodging	oil conv furn	Conventional Gas Furnace	1,328	3,168	0	3,168	1,840	2.07	7.5
Lights	64	Health Care-01	Health Care	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	712	828	648	1,476	764	2.07	7.5
Lights	112	Other-01g	Other	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	5,275	8,091	2,795	10,886	5,611	2.06	7.6
Lights	120	Other-02	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	1,957	2,941	1,092	4,033	2,076	2.06	7.6
Lights	94	Office-20	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	15,511	24,615	7,294	31,909	16,398	2.06	7.6
Hot Water	107	Office-04	Office	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	55	113	0	113	58	2.05	7.6
Roof	120	Other-02	Other	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-11	19,990	41,037	0	41,037	21,047	2.05	7.6
Lights	99	Office-29	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	4,357	6,878	2,049	8,927	4,570	2.05	7.6
Hot Water	43	FH-Detached-01	Single Family Detached	gas shw heater	0.85 Gas WH (RES), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	118	241	0	241	123	2.04	7.6
Lights	160	Warehouse-19	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	670	1,034	334	1,368	698	2.04	7.7
Lights	155	Warehouse-11	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	1,608	2,597	684	3,281	1,673	2.04	7.7
Lights	86	Office-14	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	80,633	136,228	27,484	163,712	83,079	2.03	7.7
Roof	79	Lodging-05	Lodging	roof insulation R-value 8.90	Suspended Ceiling Increase insulation by R-19	31,112	63,012	0	63,012	31,900	2.03	7.7
Lights	35	FH-2 to 4-01	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	10,408	14,291	6,735	21,026	10,618	2.02	7.7
Lights	169	Warehouse-30	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	1,962	2,984	977	3,961	1,999	2.02	7.7
Hot Water	87	Office-15	Office	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	146	294	0	294	148	2.01	7.8
Lights	161	Warehouse-02	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	75	114	37	151	76	2.01	7.8
Lights	174	Warehouse-09	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	397	601	198	799	402	2.01	7.8
Lights	163	Warehouse-23	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	2,457	3,717	1,223	4,940	2,483	2.01	7.8
Lights	42	FH-5 or More-01	5 or More Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	16,409	22,370	10,619	32,989	16,580	2.01	7.8
Lights	157	Warehouse-15	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	488	738	243	981	493	2.01	7.8
Lights	105	Office-37	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	44,119	67,937	20,747	88,684	44,565	2.01	7.8
Lights	65	Health Care-02	Health Care	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	6,193	8,106	4,315	12,421	6,228	2.01	7.8
Lights	115	Other-16	Other	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	13,786	17,810	9,825	27,635	13,849	2.00	7.8
Lights	43	FH-Detached-01	Single Family Detached	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	312	423	202	625	313	2.00	7.8
Lights	97	Office-26	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	66,741	101,637	31,890	133,527	66,786	2.00	7.8
Lights	167	Warehouse-29	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	259	389	129	518	259	2.00	7.8
Lights	171	Warehouse-05	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	195	293	97	390	195	2.00	7.8
Lights	103	Office-34	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	2,230	4,043	404	4,447	2,217	1.99	7.8
Lights	168	Warehouse-03	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	6,740	10,063	3,355	13,418	6,678	1.99	7.8
Lights	108	Office-07	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	17,236	31,019	3,246	34,265	17,029	1.99	7.9
Lights	170	Warehouse-04	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	1,080	1,606	538	2,144	1,064	1.99	7.9
Lights	118	Other-18	Other	FL81 FL 2X4 2F40T12ES STD2	FL103 FL 2X4 2F40T12ES ELC2	56	79	32	111	55	1.98	7.9
Lights	20	Education-12	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	9,807	12,634	6,802	19,436	9,629	1.98	7.9
Lights	49	FH-attached-03	Single Family Attached	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	3,655	4,929	2,391	7,320	3,623	1.98	7.9
Lights	158	Warehouse-16	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	369	542	184	726	357	1.97	7.9
Lights	104	Office-35	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	78,234	113,471	38,261	133,732	75,498	1.97	8.0
Lights	154	Warehouse-01	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	1,025	1,578	436	2,014	989	1.96	8.0
Lights	48	FH-attached-01	Single Family Attached	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	40,015	52,321	25,894	78,215	38,200	1.95	8.0
Lights	44	FH-Detached-03	Single Family Detached	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	88	135	37	172	84	1.95	8.0
Lights	100	Office-03	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	47,499	87,216	9,323	96,539	47,040	1.95	8.0
Lights	96	Office-22	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	318,538	463,347	157,843	621,190	302,332	1.95	8.0
Cooling	96	Office-22	Office	package unit	Multizone Packaged AC Unit (20 to 150 tons cooling)	38,424	74,898	0	74,898	36,474	1.95	8.0
Lights	173	Warehouse-08	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-13 CEIL FIXT	472	685	235	920	448	1.95	8.0

Table 3.8a

Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resources: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	164	Warehouse-24	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	67	97	33	130	63	1.94	8.1
Lights	117	Other-17ug	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	15,566	22,847	7,351	30,198	14,632	1.94	8.1
Lights	140	Other-09g	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	509	744	240	984	475	1.93	8.1
Lights	39	FH-2 to 4-06	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	13,530	17,626	8,523	26,149	12,619	1.93	8.1
Lights	16	Assembly-08	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	6,429	6,744	5,680	12,424	5,995	1.93	8.1
Lights	31	Education-04	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	33,226	41,376	22,535	63,911	30,685	1.92	8.1
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	12,519	15,859	8,101	23,960	11,441	1.91	8.2
Lights	9	Assembly-22	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	6,118	6,637	5,045	11,702	5,584	1.91	8.2
Hot Water	119	Other-19	Other	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	73	139	0	139	66	1.90	8.2
Hot Water	120	Other-02	Other	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	125	238	0	238	113	1.90	8.2
Lights	166	Warehouse-26	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	71	100	35	135	64	1.90	8.2
Lights	40	FH-2 to 4-07	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	20,453	25,633	13,236	38,889	18,436	1.90	8.2
Lights	112	Other-01g	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	356	512	163	675	319	1.90	8.2
Heating	120	Other-02	Other	oil conv furn	Conventional Gas Furnace	478	906	0	906	428	1.90	8.2
Lights	90	Office-17	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	9,083	15,500	1,711	17,211	8,128	1.89	8.2
Lights	172	Warehouse-07	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	395	551	197	748	353	1.89	8.2
Lights	95	Office-21	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	4,504	7,671	848	8,519	4,015	1.89	8.3
Lights	80	Lodging-07	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	7,648	9,658	4,765	14,423	6,775	1.89	8.3
Lights	8	Assembly-20	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	13,251	17,598	7,382	24,980	11,729	1.89	8.3
Hot Water	145	Public Order-05	Public Order Safety	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	346	651	0	651	305	1.88	8.3
Lights	27	Education-02	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	8,276	10,020	5,551	15,571	7,295	1.88	8.3
Lights	17	Assembly-09	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	4,577	4,878	3,674	8,552	3,975	1.87	8.4
Lights	85	Office-13	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	8,122	13,642	1,530	15,172	7,050	1.87	8.4
Heating	69	Health Care-07	Health Care	hot water fan coil	New Conventional Individual Building Gas Boiler	5,174	9,655	0	9,655	4,481	1.87	8.4
Lights	82	Office-01	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	40,849	68,703	7,398	76,101	35,252	1.86	8.4
Lights	36	FH-2 to 4-10	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	26,595	32,141	17,210	49,351	22,756	1.86	8.4
Hot Water	24	Education-17	Education	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	203	376	0	376	173	1.85	8.4
Lights	80	Lodging-07	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	8,104	9,907	5,049	14,956	6,852	1.85	8.5
Lights	99	Office-29	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	1,064	1,770	193	1,963	899	1.84	8.5
Lights	21	Education-14	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	6,469	7,436	4,487	11,923	5,454	1.84	8.5
Lights	84	Office-10	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	10,110	16,780	1,831	18,611	8,501	1.84	8.5
Lights	87	Office-15	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	21,881	36,111	4,121	40,232	18,351	1.84	8.5
Lights	102	Office-31	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	7,393	10,061	3,477	13,538	6,145	1.83	8.5
Lights	2	Assembly-13	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	2,916	3,316	2,023	5,339	2,423	1.83	8.5
Lights	159	Warehouse-18	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	225	299	112	411	186	1.83	8.6
Lights	3	Assembly-15	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	7,845	8,581	5,733	14,314	6,469	1.82	8.6
Lights	41	FH-2 to 4-09	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	3,138	3,689	2,031	5,720	2,582	1.82	8.6
Lights	98	Office-28	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	14,838	20,039	6,978	27,017	12,179	1.82	8.6
Lights	29	Education-23	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	9,704	10,869	6,732	17,601	7,897	1.81	8.6
Lights	101	Office-30	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	28,619	38,443	13,458	51,901	23,282	1.81	8.6
Lights	105	Office-37	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	10,778	17,585	1,952	19,537	8,759	1.81	8.6
Lights	117	Other-17ug	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	190	261	83	344	154	1.81	8.6
Lights	34	Education-09	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	8,068	8,944	5,597	14,541	6,473	1.80	8.7
Lights	97	Office-26	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	16,304	26,376	2,966	29,342	13,038	1.80	8.7
Wall	45	FH-Detached-04	Single Family Detached	wall insulation R-value 0.00	Blow-in Insulation Increase Insulation by R-6.5	22,889	41,085	0	41,085	18,205	1.80	8.7
Roof	77	Lodging-19	Lodging	roof insulation R-value 8.90	Suspended Ceiling Increase Insulation by R-8	21,365	38,347	0	38,347	16,982	1.79	8.7
Lights	32	Education-07	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	17,358	19,397	11,643	31,040	13,682	1.79	8.7
Lights	22	Education-15	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	2,354	2,651	1,544	4,195	1,841	1.78	8.8
Lights	33	Education-08	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	47,282	52,158	31,715	83,873	36,591	1.77	8.8
Lights	86	Office-14	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	2,363	3,243	942	4,185	1,822	1.77	8.8
Lights	96	Office-22	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	77,844	123,017	14,661	137,678	59,834	1.77	8.8
Heating	98	Office-28	Office	electric forced air furnAce	Conventional Oil Furnace	466	813	0	813	347	1.74	9.0
Roof	8	Assembly-20	Assembly	roof insulation R-value 8.90	Suspended Ceiling Increase Insulation by R-8	22,084	38,514	0	38,514	16,430	1.74	9.0
Roof	121	Other-20	Other	roof insulation R-value 5.00	Attic Ceiling Increase Insulation by R-8	15,187	26,296	0	26,296	11,109	1.73	9.0
Lights	23	Education-16	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	1,767	1,895	1,159	3,054	1,287	1.73	9.0
Hot Water	168	Warehouse-03	Warehouse & Storage	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	239	413	0	413	174	1.73	9.0
Cooling	33	Education-08	Education	single conv chiller	Air-Cooled Reciprocating Chiller (20 to 75 tons cooling)	60,470	104,375	0	104,375	43,905	1.73	9.1
Roof	74	Lodging-13	Lodging	roof insulation R-value 8.90	Suspended Ceiling Increase Insulation by R-8	15,238	26,210	0	26,210	10,972	1.72	9.1
Heating	127	Other-03	Other	oil conv boiler	Add Automatic Electric Damper	82	141	0	141	59	1.72	9.1
Lights	32	Food Sales-01	Food Sales	HS17 HPS 250 PEND	LS5 LPS 135 PEND	32,053	61,707	-6,831	54,876	22,823	1.71	9.1
Lights	28	Education-22	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	17,518	18,060	11,750	29,810	12,292	1.70	9.2
Lights	67	Health Care-04	Health Care	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	7,521	8,519	3,921	12,440	5,119	1.70	9.2
Lights	66	Health Care-03	Health Care	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1,392	1,563	797	2,360	968	1.70	9.2
Hot Water	26	Education-19	Education	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	1,202	2,037	0	2,037	835	1.69	9.2
Lights	70	Lodging-01	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	146	156	91	247	101	1.69	9.2
Lights	55	Food Service-12	Food Service	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	893	1,022	486	1,508	615	1.69	9.3
Hot Water	92	Office-02	Office	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	80	135	0	135	55	1.69	9.3
Lights	165	Warehouse-25	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	1,911	2,265	951	3,216	1,305	1.68	9.3
Hot Water	35	FH-2 to 4-01	2 to 4 Unit Buildings	gas shw heater	0.85 Gas WH (RES), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	84	141	0	141	57	1.68	9.3
Lights	70	Lodging-01	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	138	145	86	231	93	1.67	9.3

Table 3.8a

Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resources: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	57	Food Service-15	Food Service	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	3,942	4,383	2,146	6,529	2,587	1.66	9.4
Lights	23	Education-18	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	70,943	70,792	46,545	117,337	46,394	1.65	9.4
Lights	110	Office-09	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	374	561	56	617	243	1.65	9.5
Lights	130	Other-32	Other	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	2,490	2,019	2,068	4,087	1,597	1.64	9.5
Lights	58	Food Service-17	Food Service	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	10,026	11,034	5,415	16,449	6,423	1.64	9.5
Roof	65	Health Care-02	Health Care	roof insulation R-value 0.00	Suspended Ceiling: Increase insulation by R-19	2,912	4,769	0	4,769	1,857	1.64	9.5
Lights	106	Office-38	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	1,198	1,602	355	1,957	759	1.63	9.6
Hot Water	67	Health Care-04	Health Care	other shw heater	0.76 Gas WH (COM), Insulate Pipe, Low Flow SHs, Aerators	2,549	4,163	0	4,163	1,614	1.63	9.6
Lights	24	Education-17	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	21,094	20,950	14,346	34,396	13,302	1.63	9.6
Roof	93	Office-02g	Office	roof insulation R-value 0.00	Attic Ceiling: Increase insulation by R-11	5,679	9,257	0	9,257	3,578	1.63	9.6
Hot Water	30	Education-24	Education	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	1,380	2,236	0	2,236	856	1.62	9.6
Lights	19	Education-11	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	4,841	4,659	3,176	7,835	2,994	1.62	9.7
Roof	15	Assembly-07	Assembly	roof insulation R-value 0.00	Suspended Ceiling: Increase insulation by R-11	689	1,112	0	1,112	423	1.61	9.7
Roof	99	Office-29	Office	roof insulation R-value 8.90	Suspended Ceiling: Increase Insulation by R-8	1,826	2,944	0	2,944	1,118	1.61	9.7
Lights	68	Health Care-06	Health Care	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	7,234	7,612	4,012	11,624	4,390	1.61	9.7
Lights	84	Office-10	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	296	430	45	475	179	1.60	9.7
Cooling	100	Office-03	Office	package unit	Single Zone Packaged AC Unit (11.25 to 20 tons cooling)	14,058	22,423	0	22,423	8,365	1.60	9.8
Hot Water	123	Other-24	Other	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	84	133	0	133	49	1.58	9.9
Roof	32	Education-07	Education	roof insulation R-value 11.00	Attic Ceiling: Increase insulation by R-11	8,602	13,561	0	13,561	4,959	1.58	9.9
Lights	71	Lodging-10	Lodging	IN15: INC 60 TABLE LAMP	FL174: CFL 18 GLOBE UNIT	4,914	4,618	3,062	7,680	2,766	1.56	10.0
Lights	100	Office-03	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	1,450	2,030	227	2,257	807	1.56	10.0
Lights	71	Lodging-10	Lodging	IN23: INC 60 WALL	FL174: CFL 18 GLOBE UNIT	4,638	4,288	2,889	7,177	2,539	1.55	10.1
Lights	90	Office-17	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	266	368	42	410	144	1.54	10.1
Cooling	92	Office-02	Office	package unit	Single Zone Packaged AC Unit (5.4167 to 11.25 tons cooling)	8,348	12,787	0	12,787	4,439	1.53	10.2
Lights	109	Office-08	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	23,929	29,337	7,096	36,433	12,504	1.52	10.3
Lights	54	Food Service-11	Food Service	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	12,954	12,849	6,781	19,630	6,676	1.52	10.3
Hot Water	9	Assembly-22	Assembly	electric shw heater	Wrap Old Electric Tank w/ Ins., Ins. Pipe, LFSHs, Aerators	104	157	0	157	53	1.51	10.3
Lights	6	Assembly-19	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	7,648	7,541	4,004	11,545	3,897	1.51	10.3
Lights	13	Assembly-04	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	21,809	17,482	15,036	32,518	10,709	1.49	10.5
Roof	39	FH-2 to 4-06	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling: Increase Insulation by R-8	76,051	112,775	0	112,775	36,724	1.48	10.5
Lights	4	Assembly-16	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	11,556	10,424	6,703	17,127	5,571	1.48	10.5
Lights	14	Assembly-05	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	3,110	2,918	1,681	4,599	1,489	1.48	10.6
Lights	10	Assembly-23	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	1,713	1,391	1,142	2,533	820	1.48	10.6
Roof	40	FH-2 to 4-07	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling: Increase insulation by R-11	291,746	430,955	0	430,955	139,209	1.48	10.6
Lights	82	Office-01	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	1,197	1,588	180	1,768	571	1.48	10.6
Roof	38	FH-2 to 4-03	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling: Increase insulation by R-11	94,710	139,360	0	139,360	44,650	1.47	10.6
Lights	108	Office-07	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	505	661	79	740	235	1.47	10.7
Lights	103	Office-34	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	100	125	21	146	46	1.46	10.7
Heating	150	Service-06	Mercantile & Service	other conv furn	Conventional Gas Furnace	247	360	0	360	113	1.46	10.7
Lights	96	Food Service-13	Food Service	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	832	755	453	1,208	376	1.45	10.8
Lights	35	Food Service-02	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	6,255	5,046	4,032	9,078	2,823	1.45	10.8
Lights	53	Food Service-01	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	2,869	2,298	1,862	4,160	1,291	1.45	10.8
Heating	139	Other-09	Other	oil conv furn	Conventional Gas Furnace	471	682	0	682	211	1.45	10.8
Lights	106	Office-38	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	300	277	157	434	134	1.45	10.8
Lights	91	Office-18	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	282	367	40	407	125	1.44	10.8
Lights	85	Office-13	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	238	305	37	342	104	1.44	10.9
Roof	44	FH-Detached-03	Single Family Detached	roof insulation R-value 11.00	Attic Ceiling: Increase Insulation by R-8	549	787	0	787	238	1.43	10.9
Roof	37	FH-2 to 4-12	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling: Increase Insulation by R-8	119,173	169,905	0	169,905	50,732	1.43	11.0
Lights	128	Other-30	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	466	392	271	663	197	1.42	11.0
Lights	5	Assembly-18	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	14,255	11,995	8,268	20,263	6,008	1.42	11.0
Lights	88	Office-15ng	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	52,747	49,581	25,171	74,752	22,005	1.42	11.0
Lights	83	Office-01g	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	10,783	10,392	4,820	15,212	4,429	1.41	11.1
Heating	154	Warehouse-01	Warehouse & Storage	other conv furn	Conventional Gas Furnace	4,363	6,155	0	6,155	1,792	1.41	11.1
Lights	87	Office-15	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	641	803	100	903	262	1.41	11.1
Roof	33	Education-08	Education	roof insulation R-value 13.00	Suspended Ceiling: Increase insulation by R-11	27,985	39,344	0	39,344	11,359	1.41	11.1
Roof	42	FH-5 or More-01	5 or More Unit Buildings	roof insulation R-value 11.00	Attic Ceiling: Increase Insulation by R-8	35,811	50,145	0	50,145	14,334	1.40	11.2
Lights	121	Other-20	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	1,893	1,550	1,098	2,648	755	1.40	11.2
Hot Water	40	FH-2 to 4-07	2 to 4 Unit Buildings	gas shw heater	0.85 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	9,676	13,532	0	13,532	3,856	1.40	11.2
Lights	60	Food Service-04	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	43,905	33,014	28,299	61,313	17,408	1.40	11.2
Lights	93	Office-02g	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	6,637	6,048	3,206	9,254	2,617	1.39	11.2
Lights	63	Food Service-09	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	3,554	2,644	2,307	4,951	1,397	1.39	11.2
Heating	168	Warehouse-03	Warehouse & Storage	other conv furn	Conventional Gas Furnace	1,061	1,474	0	1,474	413	1.39	11.2
Hot Water	53	Food Service-12	Food Service	oil shw heater	Wrap Old Oil Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	487	676	0	676	189	1.39	11.3
Roof	90	Office-17	Office	roof insulation R-value 11.00	Attic Ceiling: Increase insulation by R-11	2,315	3,213	0	3,213	898	1.39	11.3
Lights	62	Food Service-08	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	35,818	26,374	23,245	49,619	13,801	1.39	11.3
Roof	41	FH-2 to 4-09	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling: Increase Insulation by R-8	17,638	24,368	0	24,368	6,730	1.38	11.3
Lights	89	Office-16	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	6,467	5,867	3,000	8,867	2,400	1.37	11.4
Heating	111	Other-01	Other	oil conv furn	Conventional Gas Furnace	845	1,155	0	1,155	310	1.37	11.4
Lights	92	Office-02	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	1,060	1,284	160	1,444	384	1.36	11.5
Lights	12	Assembly-03	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	8,347	6,521	4,842	11,363	3,016	1.36	11.5

Table 3.8a

Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resources: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	103	Office-34	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	399	513	28	541	142	1 36	11 5
Lights	137	Other-07	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	886	684	514	1,198	312	1 35	11 6
Roof	31	Education-04	Education	roof insulation R-value 11 00	Attic Ceiling Increase Insulation by R-8	12,896	17,298	0	17,298	4,492	1 35	11 6
Lights	51	FH-attached-03	Single Family Attached	FL4 FL 1X4 2F40T12 STD2	FL52 FL 1X4 2F32T8 ELC2	10,263	9,169	4,692	13,861	3,598	1 35	11 6
Heating	92	Office-02	Office	oil conv boiler	Add Automatic Electric Damper	460	621	0	621	161	1 35	11 6
Heating	33	Education-08	Education	oil conv boiler	Gas Pulse Condensing Boiler	4,249	5,695	0	5,695	1,446	1 34	11 7
Cooling	58	Food Service-17	Food Service	single conv chiller	Centrifugal Liquid (Water) Chiller (200 to 500 tons cooling)	46,962	62,648	0	62,648	15,686	1 33	11 7
Roof	19	Education-11	Education	roof insulation R-value 13 00	Suspended Ceiling Increase insulation by R-11	2,865	3,815	0	3,815	950	1 33	11 7
Heating	57	Food Service-15	Food Service	oil conv boiler	Add Automatic Electric Damper	114	151	0	151	37	1 32	11 8
Roof	83	Office-01g	Office	roof insulation R-value 0 00	Attic Ceiling Increase insulation by R-11	9,226	12,216	0	12,216	2,990	1 32	11 8
Lights	86	Office-14	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	32,645	33,529	9,681	43,210	10,565	1 32	11 8
Lights	15	Assembly-07	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	262	169	177	346	84	1 32	11 8
Heating	124	Other-26	Other	oil conv boiler	Add Automatic Electric Damper	105	138	0	138	33	1 31	11 9
Roof	34	Education-09	Education	roof insulation R-value 13 00	Suspended Ceiling Increase Insulation by R-8	3,776	4,961	0	4,961	1,185	1 31	11 9
Roof	81	Lodging-08	Lodging	roof insulation R-value 8 00	Attic Ceiling Increase Insulation by R-8	4,830	6,333	0	6,333	1,503	1 31	11 9
Lights	123	Other-24	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	279	202	162	364	85	1 30	12 0
Lights	26	Education-19	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	49,055	34,390	29,595	63,985	14,930	1 30	12 0
Cooling	14	Assembly-05	Assembly	single conv chiller	Air-Cooled Reciprocating Chiller (20 to 75 tons cooling)	19,423	25,217	0	25,217	5,794	1 30	12 0
Hot Water	65	Health Care-02	Health Care	other shw heater	0 76 Gas WH (COM), Insulate Pipe, Low Flow SHs, Aerators	1,191	1,536	0	1,536	345	1 29	12 1
Lights	1	Assembly-10	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	3,923	2,775	2,276	5,051	1,128	1 29	12 1
Lights	105	Office-37	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	1,931	2,346	137	2,483	552	1 29	12 1
Lights	107	Office-04	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	714	809	107	916	202	1 28	12 2
Lights	11	Assembly-24	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	4,911	3,418	2,849	6,267	1,356	1 28	12 2
Lights	65	Health Care-02	Health Care	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1,602	1,145	894	2,039	437	1 27	12 3
Lights	162	Warehouse-21	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	2,590	2,186	1,104	3,290	700	1 27	12 3
Lights	113	Other-10	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	30	20	18	38	8	1 27	12 3
Roof	171	Warehouse-03	Warehouse & Storage	roof insulation R-value 0 00	Attic Ceiling Increase Insulation by R-8	2,416	3,059	0	3,059	643	1 27	12 3
Lights	95	Office-21	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	807	959	59	1,018	211	1 26	12 4
Hot Water	94	Office-20	Office	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	137	172	0	172	35	1 26	12 4
Heating	107	Office-04	Office	oil conv boiler	Gas Pulse Condensing Boiler	4,564	5,717	0	5,717	1,153	1 25	12 5
Heating	110	Office-09	Office	oil conv furn	Conventional Gas Furnace	1,747	2,170	0	2,170	423	1 24	12 6
Lights	135	Warehouse-11	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	10,484	8,346	4,647	12,993	2,509	1 24	12 6
Lights	61	Food Service-07	Food Service	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	2,204	2,251	453	2,704	500	1 23	12 7
Lights	134	Warehouse-01	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	6,682	5,198	2,962	8,160	1,478	1 22	12 8
Lights	136	Other-05	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	425	273	246	519	94	1 22	12 8
Lights	139	Other-09	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1,067	680	619	1,299	232	1 22	12 8
Lights	37	FH-2 to 4-12	2 to 4 Unit Buildings	FL4 FL 1X4 2F40T12 STD2	FL52 FL 1X4 2F32T8 ELC2	16,683	12,623	7,626	20,249	3,566	1 21	12 9
Lights	111	Other-01	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	943	597	547	1,144	201	1 21	12 9
Lights	97	Office-26	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	2,921	3,375	168	3,543	622	1 21	12 9
Lights	122	Other-23	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	338	213	196	409	71	1 21	12 9
Lights	126	Other-29	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	676	425	392	817	141	1 21	12 9
Lights	130	Other-32	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	461	289	268	557	96	1 21	12 9
Lights	122	Other-23	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	242	152	140	292	50	1 21	12 9
Lights	30	Education-24	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	60,809	34,910	38,154	73,064	12,255	1 20	13 0
Lights	96	Office-22	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	13,944	15,653	1,028	16,681	2,737	1 20	13 1
Lights	95	Office-21	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	202	196	45	241	39	1 19	13 1
Lights	116	Other-17	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	964	591	559	1,150	186	1 19	13 1
Lights	64	Health Care-01	Health Care	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	184	120	99	219	35	1 19	13 1
Lights	160	Warehouse-19	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	4,370	3,330	1,862	5,192	822	1 19	13 1
Heating	157	Warehouse-15	Warehouse & Storage	other conv furn	Conventional Gas Furnace	332	393	0	393	61	1 18	13 2
Lights	102	Office-31	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	324	360	23	383	59	1 18	13 2
Lights	161	Warehouse-02	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	489	366	209	575	86	1 18	13 3
Lights	105	Office-37	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	484	466	103	569	85	1 18	13 3
Lights	9	Assembly-22	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	7,646	4,550	4,435	8,985	1,339	1 18	13 3
Lights	174	Warehouse-09	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	2,589	1,938	1,104	3,042	453	1 17	13 3
Lights	163	Warehouse-23	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	16,017	11,992	6,827	18,819	2,802	1 17	13 3
Lights	169	Warehouse-30	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	12,793	9,571	5,453	15,024	2,231	1 17	13 3
Lights	120	Other-02	Other	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	1,746	1,035	1,013	2,048	302	1 17	13 3
Lights	42	FH-5 or More-01	5 or More Unit Buildings	FL4 FL 1X4 2F40T12 STD2	FL52 FL 1X4 2F32T8 ELC2	12,636	8,990	5,786	14,776	2,120	1 17	13 4
Lights	157	Warehouse-15	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	3,178	2,355	1,355	3,710	532	1 17	13 4
Lights	108	Office-07	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	6,978	7,629	514	8,143	1,165	1 17	13 4
Hot Water	103	Office-34	Office	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	72	84	0	84	12	1 17	13 4
Lights	97	Office-26	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	731	698	150	848	117	1 16	13 5
Lights	167	Warehouse-29	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	1,686	1,234	719	1,953	267	1 16	13 5
Lights	2	Assembly-13	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	3,644	2,187	2,033	4,220	576	1 16	13 5
Lights	156	Warehouse-12	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	1,933	1,393	866	2,259	306	1 16	13 5
Roof	112	Other-01g	Other	roof insulation R-value 0 00	Attic Ceiling Increase Insulation by R-8	13,175	15,214	0	15,214	2,039	1 15	13 5
Lights	172	Warehouse-07	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	2,576	1,877	1,091	2,968	392	1 15	13 6
Lights	104	Office-35	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	3,424	3,674	252	3,926	502	1 15	13 6
Lights	165	Warehouse-25	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	12,457	8,964	5,309	14,273	1,816	1 15	13 6

Table 3.8a
Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Present Values of Costs and Savings

End Use	Bldg Set No.	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	162	Warehouse-21	Warehouse & Storage	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	2,356	1,693	1,004	2,697	341	1.14	13.6
Lights	7	Assembly-02	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	344	366	256	622	78	1.14	13.7
Lights	164	Warehouse-24	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	435	312	185	497	62	1.14	13.7
Lights	173	Warehouse-08	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	3,075	2,194	1,311	3,505	430	1.14	13.7
Lights	17	Assembly-09	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	5,720	3,328	3,190	6,518	798	1.14	13.7
Lights	171	Warehouse-05	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	1,273	904	542	1,446	173	1.14	13.8
Lights	168	Warehouse-03	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	43,939	31,012	18,727	49,739	5,800	1.13	13.8
Heating	13	Assembly-04	Assembly	other conv furn	Conventional Oil Furnace	3,581	4,042	0	4,042	461	1.13	13.8
Lights	159	Warehouse-18	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	1,464	1,025	624	1,649	185	1.13	13.9
Heating	87	Office-15	Office	oil conv furn	Conventional Gas Furnace	3,383	3,802	0	3,802	419	1.12	13.9
Lights	155	Warehouse-11	Warehouse & Storage	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	9,537	6,479	4,227	10,706	1,169	1.12	13.9
Lights	135	Other-42	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	6,546	3,539	3,797	7,336	790	1.12	13.9
Lights	112	Other-01g	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	1,199	671	669	1,340	141	1.12	14.0
Lights	90	Office-17	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	3,677	3,838	271	4,109	432	1.12	14.0
Lights	154	Warehouse-01	Warehouse & Storage	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	6,078	4,084	2,694	6,778	700	1.12	14.0
Lights	100	Office-03	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	20,040	20,850	1,477	22,327	2,287	1.11	14.0
Lights	166	Warehouse-26	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	465	319	198	517	52	1.11	14.1
Hot Water	13	Assembly-04	Assembly	other shw heater	Better Elec WH (COM), Ins Pipe, LFSHs, Aer , Lower Tank Temp	2,642	2,936	0	2,936	294	1.11	14.1
Heating	80	Lodging-07	Lodging	other conv furn	Conventional Oil Furnace	84,970	94,238	0	94,238	9,268	1.11	14.1
Lights	158	Warehouse-16	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	2,405	1,634	1,025	2,559	254	1.11	14.1
Heating	83	Office-01g	Office	other conv furn	Conventional Oil Furnace	616	681	0	681	65	1.11	14.1
Hot Water	93	Office-02g	Office	other shw heater	Better Elec WH (COM), Ins Pipe, LFSHs, Aer , Lower Tank Temp	551	606	0	606	55	1.10	14.2
Lights	94	Office-20	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	170	150	36	186	16	1.09	14.3
Lights	98	Office-28	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	649	664	46	710	61	1.09	14.3
Roof	119	Other-19	Other	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-11	14,597	15,958	0	15,958	1,361	1.09	14.3
Roof	168	Warehouse-03	Warehouse & Storage	roof insulation R-value 0.00	Attic Ceiling Increase Insulation by R-8	83,394	90,831	0	90,831	7,437	1.09	14.3
Lights	96	Office-22	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	3,493	3,029	774	3,803	310	1.09	14.3
Lights	87	Office-15	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	8,859	8,903	653	9,556	697	1.08	14.5
Lights	101	Office-30	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	1,252	1,261	89	1,350	98	1.08	14.5
Roof	156	Warehouse-12	Warehouse & Storage	roof insulation R-value 0.00	Attic Ceiling Increase Insulation by R-8	3,706	3,990	0	3,990	284	1.08	14.5
Lights	75	Lodging-15	Lodging	FL5: FL 1X4 1F40T12 STD1	FL29: FL 1X4 1F40T12 ELC1	2,072	1,158	1,070	2,228	156	1.08	14.5
Lights	84	Office-10	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	4,093	4,098	290	4,388	295	1.07	14.6
Lights	110	Office-09	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	5,170	5,175	366	5,541	371	1.07	14.6
Lights	117	Other-17ng	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	3,223	1,725	1,729	3,454	231	1.07	14.6
Lights	85	Office-13	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	3,288	3,281	242	3,523	235	1.07	14.6
Lights	170	Warehouse-04	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	7,039	4,542	3,000	7,542	503	1.07	14.6
Lights	160	Warehouse-19	Warehouse & Storage	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	3,975	2,560	1,694	4,254	279	1.07	14.6
Lights	140	Other-09g	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	161	86	86	172	11	1.07	14.6
Lights	82	Office-01	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	16,538	16,476	1,172	17,648	1,110	1.07	14.6
Wall	15	Assembly-07	Assembly	wall insulation R-value 0.00	Blow-in Insulation Increase Insulation by R-13	4,044	4,314	0	4,314	270	1.07	14.6
Lights	169	Warehouse-30	Warehouse & Storage	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	11,637	7,441	4,960	12,401	764	1.07	14.7
Lights	174	Warehouse-09	Warehouse & Storage	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	2,355	1,505	1,004	2,509	154	1.07	14.7
Lights	161	Warehouse-02	Warehouse & Storage	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	445	284	190	474	29	1.07	14.7
Lights	163	Warehouse-23	Warehouse & Storage	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	14,570	9,300	6,210	15,510	940	1.06	14.7
Roof	118	Other-18	Other	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-11	449	477	0	477	28	1.06	14.7
Lights	167	Warehouse-29	Warehouse & Storage	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	1,534	975	654	1,629	95	1.06	14.7
Lights	156	Warehouse-12	Warehouse & Storage	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	1,776	1,098	787	1,885	109	1.06	14.7
Lights	157	Warehouse-15	Warehouse & Storage	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	2,891	1,829	1,232	3,061	170	1.06	14.8
Lights	168	Warehouse-03	Warehouse & Storage	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	39,967	25,160	17,034	42,194	2,227	1.06	14.8
Lights	93	Office-02g	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	326	199	145	344	18	1.06	14.8
Roof	172	Warehouse-07	Warehouse & Storage	roof insulation R-value 0.00	Attic Ceiling Increase Insulation by R-8	4,888	5,156	0	5,156	268	1.05	14.8
Roof	80	Lodging-07	Lodging	roof insulation R-value 8.00	Attic Ceiling Increase Insulation by R-8	116,450	121,333	0	121,333	4,883	1.04	15.0
Lights	0	Assembly-01	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	8,061	4,573	3,822	8,395	334	1.04	15.0
Heating	22	Education-15	Education	other conv furn	High Efficiency LPG Furnace	1,129	1,174	0	1,174	45	1.04	15.0
Heating	122	Other-23	Other	oil conv furn	Conventional Gas Furnace	492	510	0	510	18	1.04	15.1
Hot Water	46	FH-Detached-03	Single Family Detached	gas shw heater	Wrap Old Gas Tank w/ Ins , Ins Pipe, LFSHs, Aerators	452	468	0	468	16	1.04	15.1
Lights	171	Warehouse-05	Warehouse & Storage	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	1,158	702	493	1,195	37	1.03	15.1
Lights	170	Warehouse-04	Warehouse & Storage	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	6,403	3,878	2,729	6,607	204	1.03	15.1
Lights	158	Warehouse-16	Warehouse & Storage	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	2,187	1,324	932	2,256	69	1.03	15.1
Lights	159	Warehouse-18	Warehouse & Storage	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	1,331	801	567	1,368	37	1.03	15.2
Heating	123	Other-24	Other	oil conv furn	Conventional Gas Furnace	221	227	0	227	6	1.03	15.2
Lights	16	Assembly-08	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	1,241	687	584	1,271	30	1.02	15.3
Lights	91	Office-18	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	3,903	3,763	224	3,987	84	1.02	15.3
Lights	164	Warehouse-24	Warehouse & Storage	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	395	234	159	393	8	1.02	15.3
Wall	143	Public Order-03	Public Order Safety	wall insulation R-value 0.00	Blow-in Insulation Increase Insulation by R-13	3,839	3,899	0	3,899	60	1.02	15.4
Lights	104	Office-35	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	857	679	190	869	12	1.01	15.4
Roof	95	Office-21	Office	roof insulation R-value 13.00	Suspended Ceiling Increase Insulation by R-8	7,726	7,822	0	7,822	96	1.01	15.4
Lights	166	Warehouse-26	Warehouse & Storage	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	423	244	180	424	1	1.00	15.6
Lights	163	Warehouse-23	Warehouse & Storage	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	11,331	6,500	4,839	11,339	8	1.00	15.6
Lights	99	Office-29	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	48	48	0	48	0	1.00	15.6

Table 3.8b

Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resource: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1995 $)	Present Value of Energy & Demand Savings (1995 $)	Present Value of O&M Savings (1995 $)	Present Value of Replacement Savings (1995 $)	Present Value of Total Savings (1995 $)	Net Present Value (1995 $)	Savings to Investment Ratio	Discounted Payback Period
T&D		Substation	Substation	Sub Transformers	Conservation Voltage Reduction RI	400	827,205	0	0	827,205	426,805	2,068.01	0.0
Lights		Ext Lighting	8 Ball Fields	Lighting Controls	Lighting Controls RI	40,000	933,740	0	16,205	917,537	877,537	22.94	0.7
Motors		54 CEP	Other	Cond Pump	VSD & EEM RI	13,657	254,969	156	3,059	257,843	244,186	18.88	0.8
Transportation	Conversion Truck		Vehicles	Tractor, 6x4, 24,000-44,500 GVW	CNG Vehicle ROF	4,742	10,087	66,648	1,894	74,841	70,099	15.78	1.0
Motors		41 CEP	Other	Cond Pump	VSD to Existing RI	35,627	440,425	312	626	439,487	403,860	12.34	1.3
Motors		50	Other	Pumps	VSD to Existing RI	8,881	110,021	156	575	109,289	100,408	12.31	1.3
Motors		49	Other	Pumps	VSD to Existing RI	7,241	88,558	156	332	88,050	80,809	12.16	1.3
Motors		48	Other	Pumps	VSD to Existing RI	5,549	66,978	156	168	66,654	61,105	12.01	1.3
Motors		42 CEP	Other	Cond Pump	VSD to Existing RI	28,041	326,464	156	972	327,280	299,239	11.67	1.3
Motors		21 CEP	Other	CTwr Fan	VSD to Existing RI	8,881	103,700	156	575	102,969	94,088	11.59	1.3
Motors		20 CEP	Other	CTwr Fan	VSD to Existing RI	26,643	259,251	469	1,726	257,056	230,413	9.65	1.6
T&D		Substation	Substation	Capacitor Bank	Power Factor Correction to .95 RI	14,040	110,596	44	0	110,552	96,512	7.87	2.0
Motors		40	Other	Cond Pump	VSD to Existing RI	5,549	42,195	156	168	41,872	36,323	7.55	2.1
Motors		57 CEP	Other	FD Fan #4	EEM RI	2,246	13,711	16	1,034	14,760	12,514	6.57	2.4
Cooling		Hsg fam 1	Hsg fam 1	AC and Heat Source	Shade Screen RI	5,791	43,162	0	5,363	37,800	32,009	6.53	2.4
Motors		12	Health Care	Cond Pump	VSD to Existing RI	2,141	14,115	156	87	13,872	11,731	6.48	2.4
Motors		7	Health Care	CTwr Fan	VSD to Existing RI	2,141	14,115	156	87	13,872	11,731	6.48	2.4
Cooling		Hsg fam 2	Hsg fam 2	AC and Heat Source	Shade Screen RI	9,280	68,012	0	8,594	59,419	50,139	6.40	2.4
Motors		15	Service	Cond Pump	VSD to Existing RI	3,567	20,674	156	57	20,575	17,008	5.77	2.7
Motors		9	Service	CTwr Fan	VSD to Existing RI	3,567	20,674	156	57	20,575	17,008	5.77	2.7
Motors		13	Food Service	CTwr Fan	VSD to Existing RI	3,304	18,703	156	111	18,435	15,131	5.58	2.8
Motors		23	Food Service	Cond Pump	VSD to Existing RI	3,304	18,703	156	111	18,435	15,131	5.58	2.8
Motors		51 CEP	Other	HTW Pump	EEM RI	2,246	11,426	0	1,034	12,459	10,213	5.55	2.8
Motors		19	Other	CTwr Fan	VSD to Existing RI	5,280	29,684	312	241	29,130	23,850	5.52	2.8
Motors		18	Warehouse	Refrig	EEM RI	2,246	9,337	0	2,052	11,389	9,143	5.07	3.1
Motors		56 CEP	Other	CWtr Pump	EEM RI	2,246	9,830	0	1,187	11,017	8,771	4.91	3.2
Motors		39	Other	Cond Pump	VSD to Existing RI	3,332	16,331	156	67	16,108	12,775	4.83	3.2
Motors		58 CEP	Other	Under Air #4	EEM RI	4,252	18,055	78	1,957	20,090	15,838	4.72	3.3
Motors		5	Food Sales	Refrig	EEM RI	1,116	4,162	0	1,019	5,181	4,065	4.64	3.4
Motors		14	Office	CTwr Fan	VSD to Existing RI	2,838	13,431	156	201	13,074	10,236	4.61	3.4
Motors		25	Office	Cond Pump	VSD to Existing RI	2,838	13,431	156	201	13,074	10,236	4.61	3.4
Motors		29	Other	Circ Pump	EEM RI	954	3,896	0	572	4,378	3,424	4.59	3.4
Motors		43	Other	HTW Pump	EEM RI	954	3,896	0	572	4,378	3,424	4.59	3.4
Motors		33 CEP	Other	CWtr Pump	VSD & EEM RI	224,451	1,080,215	156	12,885	1,092,934	868,483	4.51	3.5
Motors		45 CEP	Other	HTW Pump	EEM RI	5,125	18,366	0	4,682	22,988	17,863	4.49	3.5
Motors		44 CEP	Other	HTW Pump	EEM RI	4,252	15,156	0	3,884	19,040	14,788	4.48	3.5
Motors		6	Health Care	AHU	EEM RI	1,116	4,055	0	927	4,981	3,865	4.46	3.5
Motors		5 WELL	Water Well	P-4524	EEM RI	4,252	16,890	0	1,677	18,567	14,315	4.37	3.6
Motors		17	Warehouse	Refrig	EEM RI	434	1,491	0	396	1,888	1,454	4.35	3.6
Motors		6	Food Sales	Refrig	EEM RI	1,546	5,230	0	1,412	6,642	5,096	4.30	3.6
Motors		4	Health Care	AHU	EEM RI	607	1,994	0	555	2,549	1,942	4.20	3.7
Motors		16	Education	CTwr Fan	VSD to Existing RI	5,280	22,564	312	241	21,950	16,670	4.16	3.8
Motors		26	Education	Cond Pump	VSD to Existing RI	5,280	22,564	312	241	21,950	16,670	4.16	3.8
Motors		27	Education	Refrig	EEM RI	705	2,228	0	644	2,872	2,167	4.07	3.8
Motors		55 CEP	Other	CWtr Pump	EEM RI	1,546	5,256	0	1,041	6,298	4,752	4.07	3.8
Transportation	Conversion Ambulance		Vehicles	Modular, 4x2	CNG Vehicle ROF	36,822	51,852	82,515	9,718	124,649	99,827	4.04	3.9
Motors		5	Health Care	AHU	EEM RI	1,410	4,819	0	845	5,664	4,254	4.02	3.9
Motors		13	Health Care	Vac. Sys	EEM RI	607	2,379	0	30	2,409	1,802	3.97	3.9
Motors		18	Other	CTwr Fan	VSD to Existing RI	2,795	11,224	156	262	10,818	8,010	3.87	4.0
Motors		38	Other	Cond Pump	VSD to Existing RI	2,795	11,224	156	262	10,818	8,010	3.87	4.0
Motors		52 CEP	Other	Makeup Pmp	EEM RI	1,116	3,736	0	514	4,249	3,133	3.81	4.1
Transportation	Conversion Bus		Vehicles	Bus, Intercity, 41-51 pasg, 4x2	CNG Vehicle ROF	72,769	144,907	159,537	29,044	275,401	202,692	3.79	4.1
Motors		15	Education	CTwr Fan	VSD to Existing RI	4,469	17,211	312	179	16,720	12,251	3.74	4.2
Motors		25	Education	Cond Pump	VSD to Existing RI	4,469	17,211	312	179	16,720	12,251	3.74	4.2
Motors		2 WELL	Water Well	P-456	EEM RI	5,125	16,969	0	2,022	18,990	13,865	3.71	4.2
Motors		16	Other	Air Comp	EEM RI	2,246	6,215	0	2,052	8,267	6,021	3.68	4.2
Motors		4 WELL	Water Well	T-9961	EEM RI	5,125	16,647	0	2,022	18,669	13,544	3.64	4.3
Motors		3 WELL	Water Well	P-1345	EEM RI	5,125	16,035	0	2,022	18,026	12,901	3.52	4.4
Transportation	Conversion Bus		Vehicles	Bus, School, 42-45 pasg	CNG Vehicle ROF	21,278	18,036	60,305	4,222	74,090	52,812	3.48	4.5
Motors		17	Assembly	CTwr Fan	VSD to Existing RI	5,280	18,566	312	241	18,012	12,732	3.41	4.6
Motors		31	Assembly	Cond Pump	VSD to Existing RI	5,280	18,566	312	241	18,012	12,732	3.41	4.6
Motors		23 CEP	Other	CWtr Pump	VSD to Existing RI	185,427	684,631	312	61,305	623,013	437,587	3.36	4.6
Motors		26 CEP	Other	CWtr Pump	VSD to Existing RI	219,938	807,142	156	70,167	736,818	516,880	3.35	4.7
Motors		47	Other	Oil Pump	EEM RI	2,246	5,435	0	2,052	7,487	5,241	3.33	4.7
Motors		27 CEP	Other	CWtr Pump	VSD to Existing RI	261,986	846,154	156	83,222	862,776	602,690	3.32	4.7
Motors		1 WELL	Water Well	P-933	EEM RI	9,174	26,790	0	3,619	30,409	21,235	3.31	4.7
Motors		11	Food Service	AHU	EEM RI	2,246	5,551	0	1,865	7,416	5,170	3.30	4.7
Motors		24	Office	Cond Fan	EEM RI	1,214	2,881	0	1,109	3,990	2,776	3.29	4.8
Motors		2	Food Sales	AHU	EEM RI	2,252	5,257	0	2,039	7,296	5,044	3.27	4.8
Motors		23	Food Service	Refrig	EEM RI	756	1,792	0	694	2,486	1,726	3.27	4.8
Motors		3	Health Care	AHU	EEM RI	756	1,792	0	694	2,486	1,726	3.27	4.8
Motors		11	Health Care	Cond Fan	EEM RI	398	896	0	347	1,243	863	3.27	4.8
Motors		12	Office	AHU	EEM RI	1,345	3,396	0	1,412	3,398	2,462	3.24	4.8
Motors		4	Food Sales	Cond Fan	EEM RI	2,241	5,151	0	2,066	7,217	4,971	3.21	4.9

Table 3.8b

Non-Building EEO's Constituting the Minimum Life-Cycle Cost Efficiency Resource: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1995 $)	Present Value of Energy & Demand Savings (1995 $)	Present Value of O&M Savings (1995 $)	Present Value of Replacement Savings (1995 $)	Present Value of Total Savings (1995 $)	Net Present Value (1995 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		9 B	Office	AHU	EEM RI	3,055	7,467	0	2,277	9,744	6,789	3.21	4.9
Motors		9 A	Office	AHU	EEM RI	2,428	5,973	0	1,822	7,795	5,367	3.21	4.9
Motors		13	Food Service	Air Comp	EEM RI	617	1,386	0	555	1,940	1,333	3.20	4.9
Motors		20	Food Service	Cond. Fan	EEM RI	617	1,386	0	555	1,940	1,333	3.20	4.9
Motors		10 A	Office	AHU	EEM RI	2,115	4,827	0	1,932	6,759	4,644	3.20	4.9
Motors		10 B	Office	AHU	EEM RI	2,820	6,436	0	2,576	9,013	6,193	3.20	4.9
Motors		13	Office	Air Comp	EEM RI	2,820	6,436	0	2,576	9,013	6,193	3.20	4.9
Motors		14	Food Service	Air Comp	EEM RI	1,546	3,458	0	1,412	4,871	3,325	3.15	5.0
Motors		9	Food Service	AHU	EEM RI	765	1,548	0	644	2,192	1,447	3.11	5.0
Motors		1	Food Sales	AHU	EEM RI	617	1,326	0	555	1,880	1,273	3.10	5.0
Motors		4	Public Order	AHU	EEM RI	617	1,702	0	164	1,866	1,259	3.07	5.1
Motors		16	Assembly	C'Twr Fan	VSD to Existing RI	4,434	14,161	312	236	13,613	9,179	3.07	5.1
Motors		36	Assembly	Cond. Pump	VSD to Existing RI	4,434	14,161	312	236	13,613	9,179	3.07	5.1
Transportation	Conversion Truck		Vehicles	Carryall, 4x4, 7,500 GVW	CNG Vehicle ROF	28,239	56,744	59,988	30,570	86,162	57,953	3.05	5.1
Motors		10	Education	AHU	EEM RI	2,232	4,779	0	2,059	6,817	4,585	3.05	5.1
Motors		13	Education	Air Comp	EEM RI	1,116	2,389	0	1,019	3,409	2,293	3.05	5.1
Motors		8	Lodging	AHU	EEM RI	617	1,293	0	555	1,849	1,232	3.05	5.1
Motors		15	Other	Air Comp	EEM RI	2,246	4,695	0	2,052	6,743	4,494	3.00	5.2
Transportation	Conversion Truck		Vehicles	Carryall, 4x2, Conv., 15 pagr., 7,300 GVW	CNG Vehicle ROF	33,902	92,775	53,361	38,907	107,228	71,327	2.99	5.2
Motors		11	Office	AHU	EEM RI	1,908	3,992	0	1,743	5,675	3,767	2.97	5.3
Motors		8 B	Office	AHU	EEM RI	6,944	14,652	0	5,766	20,418	13,474	2.94	5.3
Motors		8 A	Office	AHU	EEM RI	4,774	10,073	0	3,964	14,038	9,264	2.94	5.3
Motors		23	Office	Cond. Fan	EEM RI	6,076	12,821	0	5,045	17,866	11,790	2.94	5.3
Motors		8	Warehouse	AHU	EEM RI	765	1,487	0	644	2,051	1,346	2.91	5.4
Motors		8 B	Food Service	AHU	EEM RI	868	1,726	0	793	2,519	1,651	2.90	5.4
Motors		12	Food Service	Air Comp	EEM RI	434	863	0	396	1,260	826	2.90	5.4
Motors		19	Food Service	Cond. Fan	EEM RI	434	863	0	396	1,260	826	2.90	5.4
Motors		22	Food Service	HW Circ	EEM RI	434	863	0	396	1,260	826	2.90	5.4
Motors		8 A	Food Service	AHU	EEM RI	434	863	0	396	1,260	826	2.90	5.4
Motors		10	Food Service	AHU	EEM RI	934	1,891	0	871	2,763	1,889	2.90	5.4
Motors		24	Education	Cond. Fan	EEM RI	617	1,205	0	555	1,757	1,150	2.90	5.4
Motors		7	Service	AHU	EEM RI	2,246	4,436	0	2,052	6,488	4,242	2.89	5.4
Motors		14	Other	Air Comp	EEM RI	3,092	6,012	0	2,825	8,837	5,745	2.86	5.5
Motors		11	Education	AHU	EEM RI	3,092	6,032	0	2,825	8,827	5,735	2.85	5.5
Motors		14	Education	Air Comp	EEM RI	1,546	3,001	0	1,412	4,413	2,867	2.85	5.5
Motors		13	Other	Air Comp	EEM RI	1,410	2,691	0	1,288	3,979	2,569	2.82	5.5
Motors		17 A	Education	C'Wtr Pump	EEM RI	1,410	2,687	0	1,288	3,975	2,565	2.82	5.5
Motors		8	Education	AHU	EEM RI	765	1,343	0	644	1,987	1,282	2.82	5.5
Motors		3	Food Sales	Cond. Fan	EEM RI	434	826	0	396	1,222	788	2.82	5.5
Motors		10	Other	AHU	EEM RI	1,546	3,166	0	1,160	4,326	2,780	2.80	5.6
Motors		7	Lodging	AHU	EEM RI	868	1,613	0	793	2,406	1,538	2.77	5.6
Motors		9	Lodging	Air Comp	EEM RI	3,098	5,645	0	2,775	8,420	5,382	2.77	5.6
Motors		24 CEP	Other	C'Wtr Pump	VSD to Existing RI	44,520	138,737	156	15,497	123,084	78,564	2.76	5.7
Motors		3	Public Order	AHU	EEM RI	434	1,074	0	117	1,191	757	2.75	5.7
Motors		8	Public Order	Cond. Fan	EEM RI	434	1,074	0	117	1,191	757	2.75	5.7
Motors		8 B	Other	AHU	EEM RI	1,214	2,579	0	728	3,307	2,093	2.72	5.7
Motors		8 A	Other	AHU	EEM RI	617	1,289	0	364	1,653	1,046	2.72	5.7
Motors		16	Warehouse	Cond. Fan	EEM RI	434	785	0	396	1,181	747	2.72	5.7
Motors		24	Food Service	Refrig	EEM RI	1,272	2,281	0	1,162	3,443	2,171	2.71	5.8
Motors		2	Health Care	AHU	EEM RI	636	1,140	0	581	1,721	1,085	2.71	5.8
Motors		12	Assembly	AHU	EEM RI	3,348	5,886	0	3,058	8,944	5,596	2.67	5.8
Motors		12	Education	Air Comp	EEM RI	868	1,498	0	793	2,291	1,423	2.64	5.9
Motors		23	Education	Cond. Fan	EEM RI	868	1,498	0	793	2,291	1,423	2.64	5.9
Motors		14	Assembly	AHU	EEM RI	1,918	3,294	0	1,752	5,046	3,128	2.63	5.9
Motors		12	Other	Air Comp	EEM RI	389	763	0	228	991	611	2.61	6.0
Motors		9	Education	AHU	EEM RI	2,862	5,049	0	2,376	7,426	4,564	2.59	6.0
Motors		9	Warehouse	AHU	EEM RI	934	1,884	0	572	2,456	1,522	2.57	6.1
Motors		22	Office	Cond. Fan	EEM RI	3,889	6,587	0	3,155	9,742	5,942	2.56	6.1
Motors		7 A	Office	AHU	EEM RI	3,889	6,587	0	3,155	9,742	5,942	2.56	6.1
Motors		7 B	Office	AHU	EEM RI	6,989	10,338	0	5,549	15,587	9,507	2.56	6.1
Motors		7 WELL	Water Well	S 19222	EEM RI	765	1,527	0	278	1,805	1,040	2.56	6.1
Motors		7 A	Food Service	AHU	EEM RI	1,140	1,868	0	1,041	2,909	1,769	2.55	6.1
Motors		7 B	Food Service	AHU	EEM RI	1,940	3,113	0	1,736	4,849	2,949	2.55	6.1
Motors		18	Food Service	Cond. Fan	EEM RI	760	1,245	0	694	1,940	1,180	2.55	6.1
Motors		7 A	Other	AHU	EEM RI	3,058	5,463	0	2,280	7,743	4,707	2.55	6.1
Motors		7 B	Other	AHU	EEM RI	4,774	8,588	0	3,582	12,170	7,396	2.55	6.1
Motors		6	Service	AHU	EEM RI	434	766	0	396	1,196	672	2.55	6.1
Motors		28	Assembly	Cond. Fan	EEM RI	1,214	1,977	0	1,103	3,080	1,871	2.54	6.1
Motors		18	Assembly	C'Wtr Pump	EEM RI	617	958	0	555	1,543	936	2.54	6.1
Motors		9	Assembly	AHU	EEM RI	617	958	0	555	1,543	936	2.54	6.1
Motors		13	Assembly	AHU	EEM RI	1,546	2,464	0	1,412	3,876	2,330	2.51	6.2
Motors		9	Other	AHU	EEM RI	1,908	3,003	0	1,744	4,747	2,839	2.49	6.3
Motors		10 A	Assembly	AHU	EEM RI	1,416	2,204	0	1,288	3,494	2,084	2.48	6.3
Motors		10 B	Assembly	AHU	EEM RI	1,416	2,204	0	1,288	3,494	2,084	2.48	6.3

Table 3.8b

Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resource: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1995 $)	Present Value of Energy & Demand Savings (1995 $)	Present Value of O&M Savings (1995 $)	Present Value of Replacement Savings (1995 $)	Present Value of Total Savings (1995 $)	Net Present Value (1995 $)	Savings to Investment Ratio	Discounted Payback Period
Motors	15		Assembly	Air Comp	EEM RI	705	1,105	0	644	1,747	1,042	2.48	6.3
Motors	29		Assembly	Cond Fan	EEM RI	705	1,105	0	644	1,747	1,042	2.48	6.3
Motors	2		Public Order	AHU	EEM RI	380	713	0	228	941	561	2.48	6.3
Motors	37		Other	Cond Fan	EEM RI	434	816	0	260	1,069	635	2.46	6.3
Motors	16		Lodging	Cond Fan	EEM RI	760	1,164	0	694	1,858	1,098	2.44	6.4
Motors	19		Assembly	CWtr Pump	EEM RI	1,410	2,255	0	1,171	3,426	2,016	2.43	6.4
Motors	7 B		Warehouse	AHU	EEM RI	1,140	1,698	0	1,041	2,740	1,600	2.40	6.5
Motors	7 A		Warehouse	AHU	EEM RI	760	1,132	0	694	1,826	1,066	[illegible]	6.5
Motors	6 A		Lodging	AHU	EEM RI	1,900	2,960	0	1,578	4,538	2,638	2.39	6.5
Motors	6 B		Lodging	AHU	EEM RI	3,040	4,736	0	2,524	7,260	4,220	2.39	6.5
Motors	8		Health Care	CWtr Pump	VSD to Existing RI	8,716	23,430	156	2,622	20,652	11,935	2.37	6.6
Motors	8		Service	Air Comp	EEM RI	9,174	13,211	0	8,381	21,592	12,418	2.35	6.6
Transportation	Conversion Truck		Vehicles	Stake, 4x2, 7,000 GVW	CNG Vehicle ROF	228,233	464,105	271,345	262,402	533,048	304,815	2.34	6.7
Motors	27		Assembly	Cond Fan	EEM RI	1,736	2,461	0	1,586	4,047	2,311	2.33	6.7
Motors	10		Health Care	Cond Fan	EEM RI	275	389	0	251	640	365	2.33	6.7
Motors	11		Assembly	AHU	EEM RI	1,908	2,695	0	1,743	4,438	2,530	2.33	6.7
Motors	20		Assembly	CWtr Pump	EEM RI	954	1,347	0	871	2,219	1,265	2.33	6.7
Motors	17		Other	Air Comp	EEM RI	7,286	11,955	0	4,907	16,862	9,576	2.31	6.8
Motors	28		FH Detached	AHU	EEM RI	380	526	0	347	873	495	2.30	6.8
Transportation	Conversion Sedan		Vehicles	Sedan	CNG Vehicle ROF	110,236	206,912	199,903	155,178	251,717	141,482	2.28	6.8
Motors	7 A		Education	AHU	EEM RI	2,280	3,300	0	1,895	5,195	2,915	2.28	6.9
Motors	7 B		Education	AHU	EEM RI	3,800	5,500	0	3,155	8,655	4,855	2.28	6.9
Motors	7		Public Order	Cond Fan	EEM RI	380	759	0	103	862	482	2.27	6.9
Motors	16		Service	HTW Pump	EEM RI	760	1,024	0	694	1,718	958	2.26	6.9
Motors	5 B		Service	AHU	EEM RI	760	1,024	0	694	1,718	958	2.26	6.9
Motors	14		Service	Cond Fan	EEM RI	380	512	0	347	859	479	2.26	6.9
Motors	5 A		Service	AHU	EEM RI	380	512	0	347	859	479	2.26	6.9
Transportation	Conversion Truck		Vehicles	Tractor, 4x2, 24,000-44,500 GVW	CNG Vehicle ROF	9,863	14,877	12,806	5,438	22,245	12,382	2.26	6.9
Motors	1		Public Order	AHU	EEM RI	636	851	0	581	1,432	796	2.25	6.9
Motors	23		Other	CWtr Pump	VSD to Existing RI	30,919	79,773	156	10,358	69,258	38,340	2.24	7.0
Motors	6 WELL		Water Well	T 7732	EEM RI	1,918	3,515	0	757	4,271	2,353	2.23	7.0
Motors	6 B		Other	AHU	EEM RI	2,280	3,360	0	1,711	5,071	2,791	2.22	7.0
Motors	6 A		Other	AHU	EEM RI	1,520	2,240	0	1,141	3,381	1,861	2.22	7.0
Motors	28		Other	Circ. Pump	EEM RI	380	560	0	285	845	465	2.22	7.0
Motors	8 A		Assembly	AHU	EEM RI	868	1,304	0	585	1,889	1,021	2.18	7.2
Motors	8 B		Assembly	AHU	EEM RI	868	1,304	0	585	1,889	1,021	2.18	7.2
Motors	36		Other	Cond Fan	EEM RI	3,800	5,688	0	2,559	8,247	4,447	2.17	7.2
Motors	6 WELL		Water Well	T 15005	EEM RI	1,546	2,743	0	610	3,353	1,807	2.17	7.2
Motors	17		Food Service	Cond Fan	EEM RI	1,272	1,585	0	1,162	2,747	1,475	2.16	7.2
Motors	6 A		Office	AHU	EEM RI	4,452	5,880	0	3,697	9,577	5,125	2.15	7.3
Motors	6 B		Office	AHU	EEM RI	6,996	9,240	0	5,809	15,049	8,053	2.15	7.3
Motors	21		Office	Cond Fan	EEM RI	4,134	5,460	0	3,433	8,893	4,759	2.15	7.3
Motors	46		Other	Makeup Pump	EEM RI	380	577	0	228	805	425	2.12	7.4
Motors	15		Lodging	Cond Fan	EEM RI	3,816	4,442	0	3,486	7,928	4,112	2.08	7.5
Motors	5		Lodging	AHU	EEM RI	318	370	0	290	661	343	2.08	7.5
Motors	15		Warehouse	Cond Fan	EEM RI	954	1,080	0	871	1,952	998	2.05	7.6
Motors	6		Public Order	Cond Fan	EEM RI	318	457	0	191	648	330	2.04	7.7
Motors	9		Health Care	Cond Fan	EEM ROF	458	475	0	458	932	475	2.04	7.7
Motors	1		Health Care	AHU	EEM ROF	229	237	0	229	466	237	2.04	7.7
Motors	22		Education	Cond Fan	EEM ROF	917	949	0	917	1,866	949	2.03	7.7
Motors	27		FH Detached	AHU	EEM ROF	1,835	1,845	0	1,835	3,680	1,845	2.01	7.8
Motors	5		FH 2 to 4	AHU	EEM ROF	8,562	8,612	0	8,562	17,173	8,612	2.01	7.8
Motors	32		FH Detached	Cond Fan	EEM ROF	306	308	0	306	613	308	2.01	7.8
Motors	6 A		Education	Ahu	EEM RI	1,908	2,003	0	1,743	3,806	1,898	1.99	7.8
Motors	6 B		Education	AHU	EEM RI	4,452	4,814	0	4,067	8,881	4,429	1.99	7.8
Motors	6 A		Warehouse	AHU	EEM RI	4,452	5,142	0	3,697	8,838	4,386	1.99	7.9
Motors	6 B		Warehouse	AHU	EEM RI	6,360	7,345	0	5,281	12,626	6,266	1.99	7.9
Motors	20		Office	Cond Fan	EEM ROF	3,173	3,115	0	3,173	6,288	3,115	1.98	7.9
Motors	19		FH Attached	AHU	EEM ROF	6,468	6,345	0	6,468	12,813	6,345	1.98	7.9
Motors	13		Service	Cond Fan	EEM ROF	917	898	0	917	1,816	898	1.98	7.9
Motors	4 A		Service	AHU	EEM ROF	612	599	0	612	1,210	599	1.98	7.9
Motors	4 B		Service	AHU	EEM ROF	612	599	0	612	1,210	599	1.98	7.9
Motors	5 A		Office	AHU	EEM ROF	1,017	974	0	1,017	1,991	974	1.96	8.0
Motors	5 B		Office	AHU	EEM ROF	1,271	1,217	0	1,271	2,488	1,217	1.96	8.0
Motors	6		Food Service	AHU	EEM RI	636	851	0	381	1,232	596	1.94	8.1
Motors	5 A		Other	AHU	EEM RI	1,540	1,756	0	1,320	3,077	1,487	1.93	8.1
Motors	5 B		Other	AHU	EEM RI	2,544	2,810	0	2,112	4,922	2,378	1.93	8.1
Motors	5		Food Service	AHU	EEM ROF	369	408	0	369	777	468	1.92	8.1
Transportation	Conversion Truck		Vehicles	Panel Truck, 4x2, 6,999 GVW & under	CNG Vehicle ROF	25,256	43,766	46,543	36,570	53,742	25,533	1.91	8.2
Motors	7 A		Assembly	AHU	EEM RI	760	933	0	512	1,445	685	1.90	8.2
Motors	7 B		Assembly	AHU	EEM RI	760	933	0	512	1,445	685	1.90	8.2
Motors	4 A		Lodging	AHU	EEM ROF	1,058	933	0	1,058	1,991	933	1.88	8.3
Motors	14		Lodging	Cond Fan	EEM ROF	264	233	0	264	498	233	1.88	8.3
Motors	4 B		Lodging	AHU	EEM ROF	1,322	1,167	0	1,322	2,489	1,167	1.88	8.3

Table 3.8b

Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resource: Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1995 $)	Present Value of Energy & Demand Savings (1995 $)	Present Value of O&M Savings (1995 $)	Present Value of Replacement Savings (1995 $)	Present Value of Total Savings (1995 $)	Net Present Value (1995 $)	Savings to Investment Ratio	Discounted Payback Period
Transportation	Conversion	Truck	Vehicles	Carryall, 4x2, 6,999 GVW & under	CNG Vehicle ROF	69,239	134,761	70,414	75,086	130,140	61,901	1.88	8.3
Motors	35		Other	Cond. Fan	EEM RI	3,498	3,956	0	2,615	6,561	3,063	1.88	8.3
Motors	14		Warehouse	Cond. Fan	EEM ROF	795	681	0	795	1,474	681	1.86	8.4
Motors	26		Assembly	Cond. Fan	EEM ROF	917	779	0	917	1,696	779	1.85	8.4
Motors	5 A		Warehouse	AHU	EEM ROF	1,271	1,064	0	1,271	2,336	1,064	1.84	8.5
Motors	5 B		Warehouse	AHU	EEM ROF	1,780	1,490	0	1,780	3,270	1,490	1.84	8.5
Motors	34		Other	Cond. Fan	EEM ROF	795	651	0	795	1,445	651	1.82	8.6
Motors	11		Other	Air Comp	EEM ROF	264	217	0	264	482	217	1.82	8.6
Motors	21		Education	Cond. Fan	EEM ROF	2,380	1,951	0	2,380	4,330	1,951	1.82	8.6
Motors	6 A		Assembly	AHU	EEM ROF	1,414	1,139	0	1,414	2,553	1,139	1.81	8.6
Motors	6 B		Assembly	AHU	EEM ROF	1,979	1,595	0	1,979	3,574	1,595	1.81	8.6
Motors	26		FH Detached	AHU	EEM ROF	4,231	3,373	0	4,231	7,605	3,373	1.80	8.7
Motors	4 B		Other	AHU	EEM ROF	733	572	0	733	1,305	572	1.78	8.8
Motors	4 A		Other	AHU	EEM ROF	489	381	0	489	870	381	1.78	8.8
Motors	5 A		Education	AHU	EEM ROF	1,956	1,522	0	1,956	3,478	1,522	1.78	8.8
Motors	5 B		Education	AHU	EEM ROF	3,178	2,473	0	3,178	5,652	2,473	1.78	8.8
Motors	4		FH 2 to 4	AHU	EEM ROF	169,332	131,644	0	169,332	300,976	131,644	1.78	8.8
Motors	5		Public Order	Cond. Fan	EEM ROF	458	354	0	458	812	354	1.77	8.8
Motors	18		FH Attached	AHU	EEM ROF	23,470	17,764	0	23,470	41,233	17,764	1.76	8.9
Motors	3 B		Service	AHU	EEM ROF	509	385	0	509	895	385	1.76	8.9
Motors	3 A		Service	AHU	EEM ROF	254	192	0	254	447	192	1.76	8.9
Motors	16		Food Service	CWtr Pump	VSD to Existing RI	15,432	31,896	136	4,812	26,838	11,406	1.74	9.0
Motors	4		Food Service	AHU	EEM ROF	12,815	9,231	0	12,815	22,046	9,231	1.72	9.1
Motors	19		Office	Cond. Fan	EEM ROF	3,597	2,558	0	3,597	6,155	2,558	1.71	9.1
Motors	4		Office	AHU	EEM ROF	846	602	0	846	1,448	602	1.71	9.1
Motors	12		FH 5 or More	AHU	EEM ROF	7,389	5,113	0	7,389	12,502	5,113	1.69	9.2
Motors	25		Assembly	Cond. Fan	EEM ROF	264	178	0	264	442	178	1.67	9.3
Motors	3		Lodging	AHU	EEM ROF	1,831	1,232	0	1,831	3,063	1,232	1.67	9.3
Motors	5 B		Assembly	AHU	EEM ROF	1,271	835	0	1,271	2,106	835	1.66	9.4
Motors	5 A		Assembly	AHU	EEM ROF	1,017	668	0	1,017	1,685	668	1.66	9.4
Motors	13		Warehouse	Cond. Fan	EEM ROF	1,602	1,049	0	1,602	2,651	1,049	1.65	9.4
Motors	15		Office	CWtr Pump	VSD to Existing RI	8,738	17,018	136	2,591	14,271	5,533	1.63	9.6
Motors	20		Education	Cond. Fan	EEM ROF	1,144	715	0	1,144	1,860	715	1.63	9.6
Transportation	Conversion	Truck	Vehicles	Stake, 4x2, 10,000 GVW	CNG Vehicle ROF	39,453	53,377	36,750	26,653	63,675	24,223	1.61	9.7
Motors	3		Other	AHU	EEM ROF	3,521	2,150	0	3,521	5,671	2,150	1.61	9.7
Motors	9		FH 2 to 4	Cond. Fan	EEM ROF	3,662	2,226	0	3,662	5,888	2,226	1.61	9.7
Motors	23		FH Attached	Cond. Fan	EEM ROF	4,577	2,783	0	4,577	7,360	2,783	1.61	9.7
Motors	31		FH Detached	Cond. Fan	EEM ROF	1,373	835	0	1,373	2,208	835	1.61	9.7
Motors	4		Warehouse	AHU	EEM ROF	1,628	984	0	1,628	2,612	984	1.60	9.7
Motors	33		Other	Cond. Fan	EEM ROF	2,116	1,258	0	2,116	3,374	1,258	1.59	9.8
Motors	3		FH 2 to 4	AHU	EEM ROF	194,519	115,335	0	194,519	309,854	115,335	1.59	9.8
Motors	12		Service	Cond. Fan	EEM ROF	687	406	0	687	1,093	406	1.59	9.8
Motors	17		FH Attached	AHU	EEM ROF	79,555	45,921	0	79,555	125,476	45,921	1.58	9.9
Motors	2		Service	AHU	EEM ROF	440	254	0	440	694	254	1.58	9.9
Motors	4		Education	AHU	EEM ROF	782	438	0	782	1,221	438	1.56	10.0
Motors	17		Office	Cond. Fan	EEM ROF	800	444	0	800	1,244	444	1.55	10.1
Motors	2		Office	AHU	EEM ROF	200	111	0	200	311	111	1.55	10.1
Motors	11		FH 5 or More	AHU	EEM ROF	8,216	4,477	0	8,216	12,695	4,477	1.54	10.1
Motors	25		FH Detached	AHU	EEM ROF	2,821	1,489	0	2,821	4,310	1,489	1.53	10.2
Motors	23		Food Service	Refrig	EEM ROF	218	113	0	218	331	113	1.52	10.3
Motors	24		Assembly	Cond. Fan	EEM ROF	1,373	705	0	1,373	2,078	705	1.51	10.3
Motors	4		Assembly	AHU	EEM ROF	687	352	0	687	1,039	352	1.51	10.3
Motors	1		Office	AHU	EEM ROF	15,344	7,695	0	15,344	23,039	7,695	1.50	10.4
Motors	16		Office	Cond. Fan	EEM ROF	3,302	1,656	0	3,302	4,958	1,656	1.50	10.4
Motors	12		Lodging	Cond. Fan	EEM ROF	400	199	0	400	599	199	1.50	10.4
Motors	1		Lodging	AHU	EEM ROF	200	100	0	200	300	100	1.50	10.4
Motors	11		Warehouse	Cond. Fan	EEM ROF	400	194	0	400	594	194	1.48	10.5
Motors	1		Food Service	AHU	EEM ROF	388	187	0	388	576	187	1.48	10.5
Motors	10		Lodging	CWtr Pump	VSD to Existing RI	6,559	11,667	136	1,841	9,670	3,112	1.47	10.6
Motors	2		Warehouse	AHU	EEM ROF	2,500	1,182	0	2,500	3,682	1,182	1.47	10.6
Motors	2		Food Service	AHU	EEM ROF	329	152	0	329	481	152	1.46	10.7
Motors	2		Education	AHU	EEM ROF	600	278	0	600	878	278	1.46	10.7
Motors	31		Other	Cond. Fan	EEM ROF	1,731	783	0	1,731	2,513	783	1.45	10.8
Motors	15		Lodging	Cond. Fan	EEM ROF	388	175	0	388	564	175	1.45	10.8
Motors	7		FH 2 to 4	Cond. Fan	EEM ROF	75,400	33,947	0	75,400	109,347	33,947	1.45	10.8
Motors	1		FH 2 to 4	AHU	EEM ROF	200	90	0	200	290	90	1.45	10.8
Motors	21		FH Attached	Cond. Fan	EEM ROF	10,769	4,728	0	10,769	15,498	4,728	1.44	10.9
Motors	1		Warehouse	AHU	EEM ROF	777	341	0	777	1,118	341	1.44	10.9
Motors	10		Warehouse	Cond. Fan	EEM ROF	2,241	956	0	2,241	3,200	956	1.43	10.9
Motors	18		Education	Cond. Fan	EEM ROF	533	228	0	533	761	228	1.43	10.9
Motors	30		Other	Cond. Fan	EEM ROF	1,942	815	0	1,942	2,757	815	1.42	11.0
Motors	1		Education	AHU	EEM ROF	388	163	0	388	551	163	1.42	11.0
Motors	1		Other	AHU	EEM ROF	513	213	0	513	726	213	1.42	11.0
Motors	14		FH 5 or More	Cond. Fan	EEM ROF	7,100	2,896	0	7,100	10,078	2,896	1.40	11.1

Table 3.8b

Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resource, Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Present Value of Installed Cost (1995 $)	Present Value of Energy & Demand Savings (1995 $)	Present Value of O&M Savings (1995 $)	Present Value of Replacement Savings (1995 $)	Present Value of Total Savings (1995 $)	Net Present Value (1995 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		29	FH Detached	Cond. Fan	EEM ROF	1,197	488	0	1,197	1,685	488	1.40	11.1
Motors		6	FH 2 to 4	Cond. Fan	EEM ROF	19,753	7,638	0	19,753	27,392	7,638	1.39	11.3
Motors		2	Assembly	AHU	EEM ROF	400	152	0	400	552	152	1.38	11.3
Motors		22	Assembly	Cond. Fan	EEM ROF	200	76	0	200	276	76	1.38	11.3
Motors		3	Office	AHU	EEM ROF	10,074	3,664	0	10,074	13,738	3,664	1.36	11.5
Motors		18	Office	Cond. Fan	EEM ROF	1,679	611	0	1,679	2,290	611	1.36	11.5
Motors		3	Food Service	AHU	EEM ROF	3,492	1,252	0	3,492	4,745	1,252	1.36	11.5
Motors		17 B	Education	CWtr Pump	VSD to Existing RI	17,980	28,515	312	5,921	29,182	6,391	1.36	11.5
Motors		13	FH 5 or More	Cond. Fan	EEM ROF	4,600	1,637	0	4,600	6,266	1,637	1.35	11.5
Motors		1	Assembly	AHU	EEM ROF	1,165	401	0	1,165	1,566	401	1.34	11.6
Motors		21	Assembly	Cond. Fan	EEM ROF	934	313	0	934	1,247	313	1.34	11.7
Motors		13	Lodging	Cond. Fan	EEM ROF	1,528	512	0	1,528	2,040	512	1.34	11.7
Motors		2	Lodging	AHU	EEM ROF	46,273	15,569	0	46,273	61,776	15,569	1.34	11.7
Motors		20	FH Attached	Cond. Fan	EEM ROF	1,328	437	0	1,328	1,765	437	1.33	11.8
Motors		12	Warehouse	Cond. Fan	EEM ROF	1,964	646	0	1,964	2,610	646	1.33	11.8
Motors		22	Other	CWtr Pump	VSD to Existing RI	8,695	14,253	156	2,652	11,457	2,762	1.32	11.9
Motors		2	Other	AHU	EEM ROF	4,802	1,497	0	4,802	6,299	1,497	1.31	11.9
Motors		32	Other	Cond. Fan	EEM ROF	1,259	389	0	1,259	1,648	389	1.30	12.0
Motors		19	Education	Cond. Fan	EEM ROF	3,988	1,210	0	3,988	5,198	1,210	1.30	12.0
Motors		3	Warehouse	AHU	EEM ROF	6,209	1,869	0	6,209	8,078	1,869	1.30	12.0
Motors		3	Education	AHU	EEM ROF	2,422	715	0	2,422	3,137	715	1.30	12.1
Motors		8	FH 2 to 4	Cond. Fan	EEM ROF	241,565	71,287	0	241,565	312,852	71,287	1.30	12.1
Motors		1	Service	AHU	EEM ROF	218	64	0	218	283	64	1.29	12.1
Motors		11	Service	Cond. Fan	EEM ROF	218	64	0	218	283	64	1.29	12.1
Motors		2	FH 2 to 4	AHU	EEM ROF	21,996	6,319	0	21,996	28,316	6,319	1.29	12.1
Motors		30	FH Detached	Cond. Fan	EEM ROF	4,843	1,391	0	4,843	6,235	1,391	1.29	12.1
Motors		22	FH Attached	Cond. Fan	EEM ROF	83,950	24,117	0	83,950	108,067	24,117	1.29	12.1
Motors		24	FH Detached	AHU	EEM ROF	388	108	0	388	497	108	1.28	12.2
Motors		15	FH 5 or More	Cond. Fan	EEM ROF	6,100	1,602	0	6,100	7,701	1,602	1.26	12.4
Motors		10	FH 5 or More	AHU	EEM ROF	5,205	1,366	0	5,205	6,566	1,366	1.26	12.4
Motors		23	Assembly	Cond. Fan	EEM ROF	2,188	558	0	2,188	2,746	558	1.26	12.4
Motors		3	Assembly	AHU	EEM ROF	2,728	680	0	2,728	3,408	680	1.25	12.5
Motors		10	Service	CWtr Pump	VSD to Existing RI	13,269	20,579	312	3,743	16,524	3,254	1.25	12.5
Motors		16	FH Attached	AHU	EEM ROF	1,495	364	0	1,495	1,857	364	1.24	12.6
Transportation	Conversion Bus		Vehicles	Bus, School, 28/29 pass	CNG Vehicle ROF	12,159	6,818	8,458	2,413	12,863	705	1.06	14.8

Table 3.9a

Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annualized Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Annualized Installed Cost (1993 $)	Annualized Energy & Demand Savings (1993 $)	Annualized Replacement Savings (1993 $)	Annualized Total Savings (1993 $)	Annualized Net Savings (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Hot Water	14	Assembly-05	Assembly	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	16	1,106	0	1,106	1,090	70.31	0.2
Hot Water	25	Education-18	Education	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	9	654	0	654	645	70.46	0.2
Hot Water	57	Food Service-15	Food Service	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	29	2,014	0	2,014	1,985	68.56	0.2
Hot Water	152	Service-08	Mercantile & Service	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	20	1,353	0	1,353	1,333	67.35	0.2
Hot Water	96	Office-22	Office	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	4	291	0	291	287	65.96	0.2
Hot Water	95	Office-21	Office	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	6	409	0	409	403	65.19	0.2
Hot Water	4	Assembly-16	Assembly	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	33	2,044	0	2,044	2,012	62.62	0.2
Hot Water	98	Office-28	Office	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	3	199	0	199	195	59.69	0.3
Hot Water	21	Education-14	Education	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	4	261	0	261	257	58.29	0.3
Hot Water	100	Office-03	Office	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	16	887	0	887	871	57.00	0.3
Hot Water	20	Education-12	Education	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	8	433	0	433	425	56.34	0.3
Hot Water	134	Other-41	Other	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	11	607	0	607	596	55.80	0.3
Hot Water	1	Assembly-10	Assembly	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	6	269	0	269	263	48.80	0.3
Hot Water	32	Education-07	Education	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	21	1,040	0	1,040	1,018	48.50	0.3
Hot Water	58	Food Service-17	Food Service	gas central boiler	Gas Wrap Tank w Insulation, LFSHs, Aerators	168	7,977	0	7,977	7,809	47.57	0.3
Hot Water	124	Other-26	Other	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	2	95	0	95	93	41.19	0.4
Hot Water	90	Office-17	Office	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	4	155	0	155	151	40.92	0.4
Hot Water	171	Warehouse-05	Warehouse & Storage	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	1	25	0	25	24	38.90	0.4
Hot Water	12	Assembly-03	Assembly	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	32	1,219	0	1,219	1,187	38.40	0.4
Hot Water	109	Office-08	Office	oil central boiler	Oil Wrap Tank w Insulation, LFSHs, Aerators	20	741	0	741	721	37.10	0.4
Hot Water	131	Other-36	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	25	579	0	579	554	23.48	0.7
Hot Water	78	Lodging-02	Lodging	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	108	2,510	0	2,510	2,402	23.33	0.7
Hot Water	137	Other-07	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	18	402	0	402	384	22.04	0.7
Hot Water	125	Other-27	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	22	451	0	451	430	20.86	0.7
Hot Water	130	Other-32	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	67	1,347	0	1,347	1,280	20.25	0.8
Hot Water	73	Lodging-12	Lodging	hot water central htr	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	261	5,284	0	5,284	5,023	20.25	0.8
Hot Water	38	FH-2 to 4-03	2 to 4 Unit Buildings	electric shw heater	0.85 Gas WH (RES), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	18	359	0	359	341	19.94	0.8
Heating	109	Office-08	Office	oil conv boiler	Add Automatic Electric Damper	9	170	0	170	161	18.22	0.9
Hot Water	105	Office-37	Office	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	39	675	0	675	636	17.42	0.9
Hot Water	107	Office-04	Office	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	25	385	0	385	361	15.68	1.0
Hot Water	33	Education-08	Education	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	30	440	0	440	410	14.69	1.1
Hot Water	43	FH-Detached-01	Single Family Detached	electric shw heater	0.85 Gas WH (RES), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	8	109	0	109	101	14.36	1.1
Hot Water	168	Warehouse-03	Warehouse & Storage	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	16	229	0	229	213	14.14	1.1
Heating	30	Education-24	Education	gas conv boiler	Add Automatic Electric Damper	11	153	0	153	142	13.90	1.1
Heating	25	Education-18	Education	oil conv boiler	Add Automatic Electric Damper	7	97	0	97	89	13.24	1.2
Hot Water	82	Office-01	Office	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	177	2,314	0	2,314	2,137	13.08	1.2
Hot Water	36	FH-2 to 4-10	2 to 4 Unit Buildings	electric shw heater	0.85 Gas WH (RES), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	86	1,058	0	1,058	973	12.33	1.3
Hot Water	131	Other-36	Other	hot water central htr	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	49	593	0	593	544	12.01	1.3
Roof	48	FH-attached-01	Single Family Attached	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	14,452	172,351	0	172,351	157,899	11.93	1.3
Heating	96	Office-22	Office	oil conv boiler	Add Automatic Electric Damper	7	77	0	77	71	11.52	1.4
Hot Water	76	Lodging-16	Lodging	gas central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	175	2,008	0	2,008	1,833	11.47	1.4
Hot Water	35	FH-2 to 4-01	2 to 4 Unit Buildings	electric shw heater	0.85 Gas WH (RES), Ins Pipe, LFSHs, Aerators, Lower Tank Temp	175	2,002	0	2,002	1,827	11.44	1.4
Hot Water	147	Service-03	Mercantile & Service	hot water central htr	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	141	1,595	0	1,595	1,454	11.28	1.4
Heating	8	Assembly-20	Assembly	gas conv boiler	Add Automatic Electric Damper	11	125	0	125	114	11.14	1.4
Heating	28	Education-22	Education	other conv furn	Conventional Gas Furnace	35	385	0	385	350	11.13	1.4
Heating	12	Assembly-03	Assembly	oil conv boiler	Add Automatic Electric Damper	17	184	0	184	168	10.95	1.4
Hot Water	5	Assembly-18	Assembly	hot water central htr	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	227	2,479	0	2,479	2,251	10.90	1.4
Hot Water	77	Lodging-19	Lodging	hot water central htr	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	876	9,525	0	9,525	8,649	10.87	1.4
Hot Water	127	Other-03	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	16	178	0	178	161	10.81	1.4
Hot Water	97	Office-26	Office	hot water central htr	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	166	1,788	0	1,788	1,622	10.79	1.4
Heating	4	Assembly-16	Assembly	oil conv boiler	Add Automatic Electric Damper	21	226	0	226	204	10.55	1.5
Heating	90	Office-17	Office	oil conv boiler	Add Automatic Electric Damper	7	76	0	76	68	10.39	1.5
Hot Water	105	Office-37	Office	hot water central htr	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	78	804	0	804	727	10.38	1.5
Heating	76	Lodging-16	Lodging	gas conv boiler	Add Automatic Electric Damper	17	170	0	170	153	10.23	1.5
Heating	33	Education-08	Education	other conv furn	Conventional Gas Furnace	370	3,777	0	3,777	3,407	10.22	1.5
Heating	20	Education-12	Education	oil conv boiler	Add Automatic Electric Damper	7	76	0	76	69	10.10	1.5
Hot Water	69	Health Care-07	Health Care	hot water central htr	Conventional Gas Boiler, Wrap Tank w Insulation, LFSHs, Aerators	6,686	67,035	0	67,035	60,349	10.03	1.6
Hot Water	54	Food Service-11	Food Service	hot water central htr	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	1,434	14,235	0	14,235	12,801	9.93	1.6
Heating	14	Assembly-05	Assembly	oil conv boiler	Add Automatic Electric Damper	7	74	0	74	66	9.82	1.6
Hot Water	130	Other-32	Other	hot water central htr	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	155	1,525	0	1,525	1,370	9.81	1.6
Heating	95	Office-21	Office	oil conv boiler	Add Automatic Electric Damper	13	122	0	122	109	9.31	1.7
Lights	153	Other-38	Other	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	14,337	85,044	47,194	132,838	118,501	9.27	1.7
Hot Water	24	Education-17	Education	hot water central htr	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	110	964	0	964	854	8.76	1.8
Heating	84	Office-10	Office	other conv furn	Conventional Gas Furnace	64	523	0	523	458	8.15	1.9
Hot Water	67	Health Care-04	Health Care	hot water central htr	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	110	893	0	893	782	8.10	1.9
Hot Water	82	Office-01	Office	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer., Lower Tank Temp	5	38	0	38	34	8.09	1.9
Hot Water	37	FH-2 to 4-12	2 to 4 Unit Buildings	electric shw heater	Better Elec WH (RES), Ins Pipe, LFSHs, Aer., Lower Tank Temp	790	6,428	0	6,428	5,638	8.07	1.9
Hot Water	32	Education-07	Education	other shw heater	Wrap Old LPG Tank, Ins Pipe, LFSHs, Aer., Lower Tank Temp	5	41	0	41	36	8.04	1.9
Heating	5	Assembly-18	Assembly	other conv furn	Conventional Gas Furnace	170	[illegible]	0	[illegible]	820	7.89	2.0
Hot Water	139	Other-09	Other	oil central boiler	Gas Pulse Cond Boiler, Wrap Tank w Insulation, LFSHs, Aerators	3	[illegible]	0	[illegible]	23	7.87	2.0

Table 3.9a
Building ERUs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annualized Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Annualized Installed Cost (1993 $)	Annualized Energy & Demand Savings (1993 $)	Annualized Replacement Savings (1993 $)	Annualized Total Savings (1993 $)	Annualized Net Savings (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Heating	134	Other-41	Other	oil conv boiler	Add Automatic Electric Damper	12	93	0	93	81	7.98	2.1
Lights	46	FH-Detached-05	Single Family Detached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	10	52	24	76	66	7.58	2.1
Hot Water	68	Health Care-06	Health Care	hot water central heater	Gas Pulse Cond. Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	312	2,312	0	2,312	2,001	7.41	2.1
Heating	31	Education-04	Education	gas conv boiler	Add Automatic Electric Damper	14	105	0	105	91	7.32	2.1
Lights	45	FH-Detached-04	Single Family Detached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	21	102	52	154	133	7.19	2.2
Lights	37	FH-2 to 4-12	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	144	674	348	1,023	878	7.09	2.2
Hot Water	102	Office-31	Office	hot water central heater	Gas Pulse Cond. Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	48	342	0	342	294	7.08	2.2
Heating	1	Assembly-10	Assembly	oil conv boiler	Add Automatic Electric Damper	7	46	0	46	39	6.99	2.2
Lights	47	FH-Detached-07	Single Family Detached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	3	12	6	18	15	6.88	2.3
Hot Water	84	Office-10	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp.	3	21	0	21	18	6.81	2.3
Hot Water	163	Warehouse-23	Warehouse & Storage	oil central boiler	Gas Pulse Cond. Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	18	123	0	123	105	6.78	2.3
Lights	36	FH-2 to 4-10	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	97	462	192	654	557	6.75	2.3
Heating	75	Lodging-15	Lodging	gas conv boiler	Add Automatic Electric Damper	7	48	0	48	41	6.70	2.3
Hot Water	87	Office-15	Office	oil central boiler	Gas Pulse Cond. Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	98	658	0	658	559	6.69	2.3
Roof	78	Lodging-02	Lodging	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-19	787	5,209	0	5,209	4,422	6.62	2.4
Heating	100	Office-03	Office	oil conv boiler	Add Automatic Electric Damper	34	226	0	226	191	6.59	2.4
Lights	50	FH-attached-04	Single Family Attached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	10	41	24	65	55	6.58	2.4
Lights	35	FH-2 to 4-01	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	183	760	441	1,201	1,018	6.58	2.4
Lights	69	Health Care-07	Health Care	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	38,582	186,877	66,758	253,635	215,053	6.57	2.4
Cooling	25	Education-18	Education	single conv chiller	Air-Cooled Reciprocating Chiller (20 to 75 tons cooling)	641	4,201	0	4,201	3,560	6.55	2.4
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	93	383	224	607	514	6.54	2.4
Heating	135	Other-42	Other	gas conv boiler	Add Automatic Electric Damper	10	68	0	68	58	6.52	2.4
Lights	8	Assembly-20	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	3,516	16,057	6,796	22,853	19,337	6.50	2.4
Roof	7	Assembly-02	Assembly	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-30	160	1,039	0	1,039	879	6.49	2.4
Lights	49	FH-attached-03	Single Family Attached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	65	263	157	419	354	6.47	2.4
Lights	43	FH-Detached-01	Single Family Detached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	5	22	13	35	30	6.47	2.4
Heating	107	Office-04	Office	other conv furn	Conventional Gas Furnace	131	844	0	844	714	6.46	2.4
Lights	36	FH-2 to 4-10	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	929	3,632	2,244	5,876	4,947	6.32	2.5
Lights	40	FH-2 to 4-07	2 to 4 Unit Buildings	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	1,678	6,473	4,052	10,524	8,846	6.27	2.5
Hot Water	39	FH-2 to 4-06	2 to 4 Unit Buildings	electric shw heater	Better Elec. WH (RES), Ins. Pipe, LFSHs, Aer., Lower Tank Temp.	324	2,010	0	2,010	1,686	6.21	2.5
Hot Water	117	Other-17ng	Other	oil shw heater	0.80 Oil WH (COM), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp.	1,708	10,541	0	10,541	8,833	6.17	2.5
Hot Water	18	Education-01	Education	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp.	25	152	0	152	127	6.10	2.6
Lights	44	FH-Detached-03	Single Family Detached	IN8 INC 75 CEIL	FL175 CFL 27 INTEGRAL UNIT	2	5	4	9	8	6.08	2.6
Hot Water	1	Assembly-10	Assembly	electric shw heater	Wrap Old Electric Tank w/ Ins., Ins. Pipe, LFSHs, Aerators	10	61	0	61	51	6.04	2.6
Lights	40	FH-2 to 4-07	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	167	473	531	1,004	837	6.02	2.6
Roof	27	Education-02	Education	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-19	379	2,277	0	2,277	1,898	6.00	2.6
Lights	39	FH-2 to 4-06	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	279	1,082	538	1,620	1,341	5.81	2.7
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	149	566	295	861	712	5.78	2.7
Heating	78	Lodging-02	Lodging	other conv furn	Conventional Gas Furnace	33	184	0	184	151	5.63	2.8
Lights	6	Assembly-19	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	2,029	7,665	3,431	11,096	9,066	5.47	2.9
Lights	41	FH-2 to 4-09	2 to 4 Unit Buildings	IN20 INC 2-40 WALL	FL174 CFL 18 GLOBE UNIT	65	220	128	348	283	5.38	2.9
Cooling	32	Education-07	Education	package unit	Single Zone Packaged AC Unit (5.4167 to 11.25 tons cooling)	262	1,397	0	1,397	1,135	5.33	2.9
Hot Water	51	FH-attached-05	Single Family Attached	electric shw heater	Wrap Old Electric Tank w/ Ins., Ins. Pipe, LFSHs, Aerators	1,001	5,250	0	5,250	4,250	5.25	3.0
Lights	65	Health Care-02	Health Care	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	215	884	241	1,125	910	5.24	3.0
Hot Water	100	Office-03	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp.	5	23	0	23	19	5.13	3.0
Hot Water	19	Education-11	Education	hot water central heater	Gas Pulse Cond. Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	23	117	0	117	94	5.12	3.1
Lights	14	Assembly-05	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	825	2,861	1,335	4,196	3,370	5.08	3.1
Lights	124	Other-26	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	248	968	269	1,237	990	5.00	3.1
Lights	76	Lodging-16	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	78	286	98	384	306	4.95	3.2
Lights	76	Lodging-16	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	73	265	92	357	284	4.88	3.2
Hot Water	48	FH-attached-01	Single Family Attached	electric shw heater	0.76 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp.	936	4,564	0	4,564	3,628	4.88	3.2
Lights	121	Other-20	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	218	790	237	1,028	809	4.70	3.3
Lights	78	Lodging-02	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	30	101	37	138	109	4.68	3.3
Hot Water	107	Office-04	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp.	7	33	0	33	26	4.68	3.3
Lights	134	Other-41	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	1,392	4,999	1,512	6,512	5,120	4.68	3.3
Lights	74	Lodging-13	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	168	574	210	784	616	4.67	3.3
Lights	78	Lodging-02	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	28	95	35	130	102	4.66	3.4
Lights	4	Assembly-16	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	3,067	10,268	3,959	14,228	11,161	4.64	3.4
Lights	74	Lodging-13	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	158	534	198	732	574	4.62	3.4
Lights	144	Public Order-04	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	34	109	46	155	121	4.56	3.4
Lights	67	Health Care-04	Health Care	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	2,205	7,437	2,441	9,878	7,774	4.55	3.5
Heating	137	Other-07	Other	oil conv boiler	Add Automatic Electric Damper	8	34	0	34	27	4.50	3.5
Lights	141	Public Order-01	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	76	232	109	341	265	4.49	3.5
Hot Water	89	Office-16	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp.	8	35	0	35	28	4.47	3.5
Lights	145	Public Order-05	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	117	352	168	520	403	4.45	3.5
Hot Water	79	Lodging-05	Lodging	hot water central heater	Gas Pulse Cond. Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	251	1,046	0	1,046	805	4.42	3.5
Lights	66	Health Care-03	Health Care	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	419	1,264	588	1,852	1,433	4.42	3.5
Hot Water	116	Other-17	Other	oil central boiler	Gas Pulse Cond. Boiler, Wrap Tank w/ Insulation, LFSHs, Aerators	30	134		134	103	4.40	3.6
Roof	141	Public Order-01	Public Order Safety	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-19	230	1,012		1,012	782	4.39	3.6
Lights	139	Other-09	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	265	867	288	1,155	890	4.35	3.6

Table 3.9a
Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annualized Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Annualized Installed Cost (1993 $)	Annualized Energy & Demand Savings (1993 $)	Annualized Replacement Savings (1993 $)	Annualized Total Savings (1993 $)	Annualized Net Savings (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	73	Lodging-12	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	127	593	160	553	425	4.36	3.6
Lights	77	Lodging-19	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	235	723	293	1,016	781	4.32	3.6
Lights	142	Public Order-02	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	42	122	61	182	140	4.32	3.6
Lights	116	Other-17	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	24	77	26	102	79	4.31	3.6
Hot Water	62	Food Service-08	Food Service	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	736	3,158	0	3,158	2,422	4.29	3.6
Hot Water	63	Food Service-09	Food Service	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	73	313	0	313	240	4.28	3.6
Hot Water	88	Office-15ng	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	66	282	0	282	216	4.28	3.7
Lights	5	Assembly-18	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	3,783	11,280	4,884	16,164	12,381	4.27	3.7
Lights	77	Lodging-19	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	222	671	277	948	726	4.27	3.7
Lights	129	Other-31	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	28	89	31	120	92	4.26	3.7
Lights	69	Health Care-07	Health Care	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	31,699	98,910	34,410	133,319	101,620	4.21	3.7
Lights	112	Other-01g	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	266	780	336	1,116	851	4.20	3.7
Lights	123	Other-24	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	399	1,239	433	1,672	1,274	4.19	3.7
Hot Water	59	Food Service-02	Food Service	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	127	530	0	530	403	4.18	3.7
Hot Water	53	Food Service-01	Food Service	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	58	243	0	243	185	4.18	3.7
Hot Water	60	Food Service-04	Food Service	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	898	3,751	0	3,751	2,853	4.18	3.7
Roof	147	Service-03	Mercantile & Service	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	1,081	4,506	0	4,506	3,424	4.17	3.7
Lights	68	Health Care-06	Health Care	IN5 INC 60 CEIL	FL181 CFL 13 + BLST UNIT	2,178	6,339	2,726	9,065	6,886	4.16	3.8
Lights	138	Other-08	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	983	3,005	1,069	4,075	3,090	4.14	3.8
Lights	127	Other-03	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	38	117	42	158	120	4.13	3.8
Hot Water	0	Assembly-01	Assembly	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	61	250	0	250	189	4.11	3.8
Lights	72	Lodging-11	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	1,067	3,048	1,338	4,386	3,319	4.11	3.8
Lights	12	Assembly-03	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	2,215	6,379	2,721	9,100	6,885	4.11	3.8
Lights	11	Assembly-24	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	1,303	3,761	1,584	5,345	4,041	4.10	3.8
Hot Water	86	Office-14	Office	hot water central heater	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	59	235	0	235	176	4.00	3.9
Lights	117	Other-17ng	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	79	223	89	312	233	3.94	4.0
Hot Water	22	Education-15	Education	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	4	16	0	16	12	3.94	4.0
Lights	79	Lodging-05	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	177	475	222	697	520	3.93	4.0
Lights	52	Food Sales-01	Food Sales	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	2,788	[illegible]	1,093	10,967	8,179	3.93	4.0
Hot Water	33	Education-08	Education	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	11	44	0	44	33	3.93	4.0
Lights	140	Other-09g	Other	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	40	112	45	157	117	3.92	4.0
Lights	1	Assembly-10	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	1,041	2,689	1,344	4,033	2,992	3.87	4.0
Roof	0	Assembly-01	Assembly	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	1,644	6,349	0	6,349	4,705	3.86	4.0
Lights	143	Public Order-03	Public Order Safety	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	24	57	34	91	68	3.86	4.0
Hot Water	78	Lodging-02	Lodging	gas shw heater	Wrap Old Gas Tank w/ Ins., Ins. Pipe, LFSHs, Aerators	34	132	0	132	97	3.86	4.0
Hot Water	129	Other-31	Other	hot water central heater	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aerators	19	72	0	72	53	3.83	4.1
Lights	72	Lodging-11	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	1,067	2,587	1,263	3,850	2,843	3.82	4.1
Roof	70	Lodging-01	Lodging	roof insulation R-value 0.00	Attic Ceiling Increase insulation by R-19	249	989	0	989	740	3.81	4.1
Lights	79	Lodging-05	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	188	476	235	712	524	3.79	4.1
Hot Water	27	Education-02	Education	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	15	58	0	58	42	3.78	4.1
Lights	103	Office-34	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	118	286	158	444	326	3.75	4.2
Roof	84	Office-10	Office	roof insulation R-value 5.00	Suspended Ceiling Increase insulation by R-19	568	2,127	0	2,127	1,559	3.74	4.2
Lights	55	Food Service-12	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	27	64	36	100	73	3.73	4.2
Hot Water	5	Assembly-18	Assembly	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	32	118	0	118	86	3.70	4.2
Heating	21	Education-14	Education	other conv furn	Conventional Oil Furnace	34	124	0	124	91	3.70	4.2
Heating	139	Other-09	Other	other conv furn	Conventional Gas Furnace	121	445	0	445	324	3.69	4.2
Lights	149	Service-05	Mercantile & Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	209	559	210	769	559	3.67	4.3
Hot Water	31	Education-04	Education	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	26	96	0	96	70	3.67	4.3
Lights	57	Food Service-15	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	118	275	157	432	314	3.66	4.3
Heating	148	Service-04	Mercantile & Service	other conv furn	Conventional Gas Furnace	27	100	0	100	72	3.63	4.3
Heating	111	Other-01	Other	other conv furn	Conventional Gas Furnace	135	490	0	490	355	3.63	4.3
Cooling	33	Education-08	Education	package unit	Single Zone Packaged AC Unit (5.4167 to 11.25 tons cooling)	1,053	3,818	0	3,818	2,765	3.62	4.3
Lights	106	Office-38	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	355	806	473	1,280	925	3.61	4.3
Lights	153	Service-09	Mercantile & Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	181	471	181	653	471	3.60	4.3
Lights	153	Service-09	Mercantile & Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	12	28	16	44	32	3.59	4.4
Lights	109	Office-08	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	414	930	552	1,482	1,068	3.58	4.4
Lights	36	FH-2 to 4-10	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	3,204	8,323	3,140	11,462	8,258	3.58	4.4
Roof	35	FH-2 to 4-01	2 to 4 Unit Buildings	roof insulation R-value 5.00	Attic Ceiling Increase insulation by R-19	7,720	27,590	0	27,590	19,870	3.57	4.4
Heating	67	Health Care-04	Health Care	other conv boiler	Gas Pulse Condensing Boiler	444	1,581	0	1,581	1,136	3.56	4.4
Hot Water	92	Office-02	Office	oil shw heater	Wrap Old Oil Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	8	27	0	27	20	3.55	4.4
Hot Water	82	Office-01	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	5	17	0	17	12	3.54	4.4
Hot Water	83	Office-01g	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	13	45	0	45	32	3.54	4.4
Heating	121	Other-20	Other	other conv furn	Conventional Gas Furnace	107	376	0	376	269	3.52	4.4
Lights	61	Food Service-07	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	56	144	88	232	166	3.52	4.4
Lights	149	Service-05	Mercantile & Service	IN39 INC 150 FLD	HS31 HPS 70 FLD	1,934	2,860	3,929	6,789	4,861	3.52	4.4
Lights	40	FH-2 to 4-07	2 to 4 Unit Buildings	IN5 INC 60 CEIL	FL174 CFL 18 GLOBE UNIT	2,444	6,183	2,395	8,578	6,134	3.51	4.5
Lights	148	Service-04	Mercantile & Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	260	650	261	911	651	3.50	4.5
Lights	150	Service-06	Mercantile & Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	40	85	53	138	98	3.49	4.5
Lights	144	Public Order-04	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	4	86	49	129	92	3.49	4.5
Lights	54	Food Service-11	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	558	844	517	1,356	[illegible]	3.46	4.5

Table 3.9a
Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annualized Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Annualized Installed Cost (1993 $)	Annualized Energy & Demand Savings (1993 $)	Annualized Replacement Savings (1993 $)	Annualized Total Savings (1993 $)	Annualized Net Savings (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	8	Assembly-20	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	999	1,286	799	2,086	1,487	3.48	4.5
Lights	152	Service-08	Mercantile & Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	208	443	277	719	512	3.47	4.5
Lights	108	Office-07	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	121	257	161	418	297	3.46	4.5
Lights	145	Public Order-05	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	128	272	170	442	314	3.46	4.5
Lights	9	Assembly-22	Assembly	IN6 INC 2-60 CEIL	FL1I2 CFL 2-13 + BLST UNIT	2,029	4,528	2,493	7,020	4,991	3.46	4.5
Hot Water	42	FH-5 or More-01	5 or More Unit Buildings	electric shw heater	Boiler Elec WH (RES), Ins. Pipe, LFSHs, Aer., Lower Tank Temp	376	1,298	0	1,298	923	3.46	4.5
Lights	133	Service-09	Mercantile & Service	IN39 INC 150 FLD	HS31 HPS 70 FLD	1,675	2,373	3,402	5,776	4,102	3.45	4.5
Lights	110	Office-09	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	89	189	119	308	219	3.44	4.5
Lights	105	Office-37	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	372	1,200	763	1,963	1,592	3.43	4.5
Roof	82	Office-01	Office	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-19	1,926	6,597	0	6,597	4,672	3.43	4.6
Lights	141	Public Order-01	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	83	174	111	284	201	3.43	4.6
Lights	2	Assembly-13	Assembly	IN6 INC 2-60 CEIL	FL1I2 CFL 2-13 + BLST UNIT	967	2,141	1,170	3,311	2,344	3.42	4.6
Lights	69	Health Care-07	Health Care	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,566	3,262	2,089	5,351	3,785	3.42	4.6
Lights	148	Service-04	Mercantile & Service	IN39 INC 150 FLD	HS31 HPS 70 FLD	2,405	3,301	4,885	8,186	5,781	3.40	4.6
Heating	32	Education-07	Education	other conv furn	Conventional Oil Furnace	100	340	0	340	240	3.40	4.6
Hot Water	75	Lodging-15	Lodging	gas central boiler	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aeration	132	449	0	449	316	3.39	4.6
Lights	100	Office-03	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	347	712	462	1,175	826	3.39	4.6
Lights	149	Service-05	Mercantile & Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	14	29	19	48	34	3.39	4.6
Lights	67	Health Care-04	Health Care	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	89	184	119	303	214	3.39	4.6
Hot Water	112	Other-01g	Other	oil shw heater	0.80 Oil WH (COM), Ins. Pipe, LFSHs, Aeration, Lower Tank Temp	962	3,253	0	3,253	2,291	3.38	4.6
Lights	84	Office-10	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	71	145	94	239	168	3.38	4.6
Lights	82	Office-01	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	286	583	382	964	678	3.37	4.6
Heating	110	Office-09	Office	other conv furn	Conventional Gas Furnace	28	94	0	94	66	3.37	4.6
Lights	95	Office-21	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	239	483	319	802	563	3.36	4.7
Lights	94	Office-20	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	201	406	268	674	473	3.35	4.7
Lights	124	Other-26	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	163	329	218	546	383	3.35	4.7
Lights	99	Office-29	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	56	114	75	189	133	3.35	4.7
Lights	52	Food Sales-01	Food Sales	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	104	209	139	348	244	3.35	4.7
Lights	152	Service-08	Mercantile & Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	3,076	7,201	3,080	10,281	7,206	3.34	4.7
Lights	148	Service-04	Mercantile & Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	18	35	23	58	41	3.33	4.7
Lights	146	Service-01	Mercantile & Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	779	1,811	780	2,591	1,813	3.33	4.7
Lights	146	Service-01	Mercantile & Service	IN39 INC 150 FLD	HS31 HPS 70 FLD	7,197	9,261	14,618	23,899	16,703	3.32	4.7
Lights	58	Food Service-17	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	300	596	400	996	696	3.32	4.7
Lights	132	Service-08	Mercantile & Service	IN39 INC 150 FLD	HS31 HPS 70 FLD	28,418	46,542	47,726	94,268	65,850	3.32	4.7
Hot Water	110	Office-09	Office	oil shw heater	Wrap Old Oil Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	5	16	0	16	11	3.30	4.7
Lights	90	Office-17	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	64	125	85	210	146	3.30	4.7
Heating	31	Education-04	Education	other conv boiler	Gas Pulse Condensing Boiler	966	3,186	0	3,186	2,219	3.30	4.7
Lights	4	Assembly-16	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	522	1,024	697	1,721	1,199	3.29	4.7
Lights	68	Health Care-06	Health Care	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	88	173	118	290	202	3.29	4.8
Lights	131	Other-36	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	595	1,158	794	1,951	1,356	3.28	4.8
Lights	14	Assembly-05	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	141	272	188	460	319	3.27	4.8
Lights	107	Office-04	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	171	330	227	557	387	3.27	4.8
Lights	128	Other-30	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	564	1,078	752	1,830	1,266	3.25	4.8
Lights	8	Assembly-20	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	679	1,603	598	2,202	1,523	3.24	4.8
Lights	136	Other-05	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	59	113	79	192	133	3.24	4.8
Lights	137	Other-07	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	316	603	422	1,025	709	3.24	4.8
Hot Water	38	FH 2 to 4-03	2 to 4 Unit Buildings	gas shw heater	Wrap Old Gas Tank w. Ins., Ins. Pipe, LFSHs, Aeration	827	2,681	0	2,681	1,854	3.24	4.8
Lights	78	Lodging-02	Lodging	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	207	394	276	670	464	3.24	4.8
Lights	104	Office-35	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	1,014	1,930	1,353	3,283	2,269	3.24	4.8
Lights	85	Office-13	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	57	108	76	184	127	3.24	4.8
Lights	151	Service-07	Mercantile & Service	IN39 INC 150 FLD	HS31 HPS 70 FLD	4,292	5,173	8,719	13,892	9,600	3.24	4.8
Lights	11	Assembly-24	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	222	422	296	719	497	3.24	4.8
Lights	142	Public Order-02	Public Order Safety	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	46	87	62	149	103	3.23	4.8
Lights	86	Office-14	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	565	1,063	753	1,816	1,251	3.22	4.9
Lights	96	Office-22	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	4,130	7,760	5,509	13,269	9,140	3.21	4.9
Lights	87	Office-15	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	153	288	204	492	339	3.21	4.9
Lights	147	Service-03	Mercantile & Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	104	195	138	333	229	3.21	4.9
Roof	92	Office-02	Office	roof insulation R-value 0.00	Attic Ceiling - Increase insulation by R-19	1,705	5,464	0	5,464	3,759	3.21	4.9
Lights	17	Assembly-09	Assembly	IN6 INC 2-60 CEIL	FL1I2 CFL 2-13 + BLST UNIT	1,518	3,175	1,685	4,860	3,342	3.20	4.9
Lights	51	FH-attached-05	Single Family Attached	IN6 INC 2-60 CEIL	FL1I2 CFL 2-13 + BLST UNIT	2,044	4,253	2,294	6,547	4,498	3.19	4.9
Lights	7	Assembly-02	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	31	57	41	98	67	3.18	4.9
Lights	31	Education-04	Education	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	422	783	563	1,346	924	3.19	4.9
Hot Water	85	Office-13	Office	hot water central heater	Gas Pulse Cond. Boiler, Wrap Tank w. Insulation, LFSHs, Aeration	12	38	0	38	26	3.19	4.9
Lights	151	Service-07	Mercantile & Service	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	465	1,011	465	1,477	1,012	3.18	4.9
Roof	142	Public Order-02	Public Order Safety	roof insulation R-value 0.00	Suspended Ceiling - Increase insulation by R-19	153	485	0	485	332	3.18	4.9
Lights	97	Office-26	Office	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	865	1,585	1,154	2,739	1,884	3.18	4.9
Lights	6	Assembly-19	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	346	632	461	1,093	747	3.16	4.9
Lights	59	Food Service-02	Food Service	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	110	201	147	348	238	3.16	4.9
Lights	5	Assembly-18	Assembly	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	645	1,172	860	2,032	1,387	3.15	5.0
Lights	119	Other-19	Other	EX1 EXIT - INC (2x20)	EX6 EXIT - LED	255	463	340	803	548	3.15	5.0

Table 3.9a
Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annualized Values of Costs and Savings

End Use	Bldg Set No.	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Annualized Installed Cost (1993 $)	Annualized Energy & Demand Savings (1993 $)	Annualized Replacement Savings (1993 $)	Annualized Total Savings (1993 $)	Annualized Net Savings (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Cooling	82	Office-01	Office	package unit	Single Zone Packaged AC Unit (5 4167 to 11 25 tons cooling)	362	1,138	0	1,138	776	3 14	5.0
Lights	65	Health Care-02	Health Care	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	20	35	26	61	42	3 13	5.0
Lights	57	Food Service-15	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	430	956	388	1,344	915	3 13	5.0
Lights	91	Office-18	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	67	121	90	211	144	3 13	5.0
Lights	151	Service-07	Mercantile & Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	31	56	42	98	67	3 12	5.0
Lights	146	Service-01	Mercantile & Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	53	94	70	164	111	3 12	5.0
Lights	47	FH-Detached-07	Single Family Detached	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	21	42	24	66	45	3 11	5.0
Lights	55	Food Service-12	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	97	215	88	303	206	3 11	5.0
Lights	62	Food Service-08	Food Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	630	1,117	840	1,957	1,328	3 11	5.0
Lights	102	Office-31	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	96	176	128	297	202	3 10	5.0
Lights	72	Lodging-11	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	7,487	13,218	9,988	23,205	15,719	3 10	5.0
Lights	75	Lodging-15	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	171	301	228	529	358	3 10	5.0
Lights	134	Other-41	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	916	1,614	1,222	2,836	1,920	3 10	5.0
Lights	115	Other-16	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	258	453	345	798	539	3.09	5 1
Lights	12	Assembly-03	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	377	661	504	1,165	788	3.09	5 1
Lights	162	Warehouse-21	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	69	122	93	214	145	3.09	5 1
Lights	76	Lodging-16	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	544	945	725	1,671	1,127	3 07	5 1
Lights	27	Education-02	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	105	183	140	323	218	3 07	5.1
Lights	50	FH-attached-04	Single Family Attached	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	40	78	45	123	83	3 07	5 1
Lights	101	Office-30	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	371	642	495	1,136	766	3 06	5 1
Lights	66	Health Care-03	Health Care	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	17	29	23	52	35	3 06	5 1
Lights	73	Lodging-12	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	946	1,636	1,262	2,898	1,952	3 06	5 1
Lights	53	Food Service-01	Food Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	50	87	67	154	104	3 06	5 1
Lights	74	Lodging-13	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,176	2,031	1,569	3,600	2,424	3 06	5 1
Lights	83	Office-01g	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	127	219	169	388	261	3 06	5 1
Lights	56	Food Service-13	Food Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	25	43	33	76	51	3 06	5 1
Heating	87	Office-15	Office	other conv furn	Conventional Gas Furnace	120	367	0	367	247	3 05	5 1
Lights	121	Other-20	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	408	696	544	1,240	833	3.04	5 1
Lights	45	FH-Detached-04	Single Family Detached	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	173	333	194	527	354	3 04	5 1
Lights	111	Other-01	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	287	490	383	874	586	3 04	5 1
Lights	49	FH-attached-03	Single Family Attached	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	323	1,004	585	1,589	1,066	3 04	5 1
Lights	33	Education-08	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	600	1,023	801	1,824	1,224	3 04	5 1
Lights	92	Office-02	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	253	431	338	769	515	3 04	5 1
Lights	126	Other-29	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	287	487	383	870	583	3 03	5 2
Lights	114	Other-15	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	278	469	370	839	562	3 02	5 2
Lights	169	Warehouse-30	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	343	580	458	1,038	694	3 02	5 2
Lights	122	Other-23	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	199	337	266	603	404	3 02	5 2
Lights	125	Other-27	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	110	186	147	334	223	3 02	5 2
Lights	174	Warehouse-09	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	69	117	93	210	140	3 02	5 2
Lights	161	Warehouse-02	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	13	22	18	40	27	3.02	5.2
Lights	77	Lodging-19	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,649	2,776	2,200	4,977	3,327	3 02	5 2
Lights	163	Warehouse-23	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	430	723	573	1,296	866	3 02	5 2
Lights	130	Other-32	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,311	2,203	1,748	3,951	2,641	3 02	5.2
Lights	155	Warehouse-11	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	281	473	375	848	567	3 01	5.2
Heating	105	Office-37	Office	oil conv boiler	Add Automatic Electric Damper	5	16	0	16	11	3 01	5 2
Lights	160	Warehouse-19	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	117	196	156	353	236	3 01	5 2
Lights	113	Other-10	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	339	569	453	1,021	682	3 01	5 2
Lights	167	Warehouse-29	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	45	76	60	136	91	3 01	5 2
Lights	98	Office-28	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	192	322	257	578	386	3 01	5 2
Lights	157	Warehouse-15	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	85	142	114	256	170	3 00	5 2
Hot Water	41	FH-2 to 4-09	2 to 4 Unit Buildings	electric shw heater	Better Elec WH (RES), Ins Pipe, LFSHs, Aer , Lower Tank Temp	60	179	0	179	120	2 99	5 2
Lights	154	Warehouse-01	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	179	297	239	536	357	2 99	5 2
Lights	139	Other-09	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	332	549	443	992	660	2 99	5.2
Lights	88	Office-15ug	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	620	1,021	827	1,848	1,229	2 98	5 2
Lights	20	Education-12	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	125	205	166	371	247	2 98	5 2
Hot Water	84	Office-10	Office	gas shw heater	Wrap Old Gas Tank, Ins Pipe, LFSHs, Aer , Lower Tank Temp	3	9	0	9	6	2 98	5 2
Lights	10	Assembly-23	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	97	159	129	288	191	2 98	5 2
Lights	168	Warehouse-03	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,179	1,937	1,572	3,509	2,331	2 98	5.2
Heating	141	Public Order-01	Public Order Safety	oil conv furn	Conventional Gas Furnace	36	108	0	108	72	2 98	5 2
Lights	13	Assembly-04	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	238	390	317	707	469	2 97	5 3
Lights	43	FH-Detached-01	Single Family Detached	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	44	82	49	131	87	2 97	5 3
Lights	172	Warehouse-07	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	69	113	92	205	136	2 97	5 3
Lights	3	Assembly-15	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	86	140	114	254	168	2 97	5 3
Lights	67	Health Care-04	Health Care	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	1,811	3,712	1,658	5,370	3,558	2 96	5 3
Lights	37	FH-2 to 4-12	2 to 4 Unit Buildings	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	5,425	9,961	6,069	16,031	10,696	2 96	5 3
Lights	80	Lodging-07	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	3,639	5,886	4,854	10,740	7,101	2 95	5 3
Lights	129	Other-31	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	18	30	25	55	36	2 95	5 3
Lights	25	Education-18	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	901	1,457	1,202	2,658	1,758	2 95	5 3
Lights	120	Other-02	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	436	694	574	1,268	838	2 95	5 3
Lights	165	Warehouse-25	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	334	539	446	984	650	2 95	5 3

Table 3.9a
Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resources: Annualized Values of Costs and Savings

End Use	Bldg Set No.	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Annualized Installed Cost (1993 $)	Annualized Energy & Demand Savings (1993 $)	Annualized Replacement Savings (1993 $)	Annualized Total Savings (1993 $)	Annualized Net Savings (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	63	Food Service-09	Food Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	62	101	83	184	121	2.94	5.3
Lights	26	Education-19	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	623	1,000	831	1,831	1,208	2.94	5.3
Lights	81	Lodging-08	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	151	241	201	442	292	2.93	5.3
Lights	143	Public Order-03	Public Order Safety	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	26	41	35	76	50	2.93	5.3
Lights	35	FH-2 to 4-01	2 to 4 Unit Buildings	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	1,473	2,669	1,648	4,318	2,844	2.93	5.3
Lights	58	Food Service-17	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	1,093	2,202	999	3,201	2,108	2.93	5.3
Lights	29	Education-23	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	123	197	164	361	238	2.93	5.3
Lights	164	Warehouse-24	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	12	18	16	34	22	2.92	5.3
Lights	116	Other-17	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	163	258	218	476	313	2.92	5.4
Lights	60	Food Service-04	Food Service	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	772	1,222	1,030	2,252	1,480	2.92	5.4
Lights	2	Assembly-13	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	165	261	220	481	316	2.92	5.4
Lights	23	Education-16	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	22	35	30	65	43	2.91	5.4
Lights	34	Education-09	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	102	161	137	297	195	2.90	5.4
Lights	42	FH-5 or More-01	5 or More Unit Buildings	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	2,072	3,671	2,318	5,989	3,917	2.89	5.4
Lights	46	FH-Detached-05	Single Family Detached	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	82	145	91	236	154	2.89	5.4
Roof	143	Public Order-03	Public Order Safety	roof insulation R-value 0.00	Attic Ceiling: Increase insulation by R-19	72	207	0	207	135	2.88	5.4
Lights	114	Other-15	Other	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	948	1,930	799	2,729	1,781	2.88	5.4
Lights	117	Other-17ng	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	545	842	727	1,570	1,024	2.88	5.4
Lights	150	Service-06	Mercantile & Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	584	1,156	525	1,681	1,097	2.88	5.4
Lights	79	Lodging-05	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	1,317	2,032	1,757	3,789	2,472	2.88	5.4
Lights	138	Other-08	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	647	998	864	1,862	1,214	2.88	5.4
Roof	64	Health Care-01	Health Care	roof insulation R-value 0.00	Suspended Ceiling: Increase insulation by R-30	31	89	0	89	58	2.87	5.4
Lights	159	Warehouse-18	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	39	60	52	113	74	2.87	5.4
Lights	23	Other-24	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	302	464	402	867	565	2.87	5.4
Lights	16	Assembly-08	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	70	108	94	201	131	2.87	5.4
Lights	171	Warehouse-05	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	34	52	46	98	64	2.87	5.4
Lights	21	Education-14	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	82	126	110	235	153	2.87	5.4
Lights	173	Warehouse-08	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	83	126	110	236	154	2.87	5.5
Lights	66	Health Care-03	Health Care	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	344	677	309	986	642	2.86	5.5
Lights	19	Education-11	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	61	94	82	176	114	2.86	5.5
Lights	75	Lodging-15	Lodging	IN15: INC 60 TABLE LAMP	FL181: CFL 13 + BLST UNIT	55	104	52	156	101	2.85	5.5
Lights	158	Warehouse-16	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	65	98	86	184	119	2.85	5.5
Lights	32	Education-07	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	220	333	294	627	407	2.85	5.5
Lights	166	Warehouse-26	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	12	19	17	36	23	2.85	5.5
Lights	17	Assembly-09	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	259	391	345	736	477	2.85	5.5
Lights	36	FH-2 to 4-10	2 to 4 Unit Buildings	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	3,856	6,653	4,314	10,966	7,111	2.84	5.5
Lights	1	Assembly-10	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	177	266	237	503	326	2.84	5.5
Lights	170	Warehouse-04	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	189	283	252	535	346	2.83	5.5
Lights	64	Health Care-01	Health Care	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	55	91	66	157	102	2.83	5.5
Lights	127	Other-03	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	25	38	34	72	46	2.83	5.5
Lights	44	FH-Detached-03	Single Family Detached	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	12	21	14	35	23	2.83	5.5
Lights	150	Service-06	Mercantile & Service	IN39: INC 150 FLD	HS31: HPS 70 FLD	5,398	5,977	9,260	15,237	9,839	2.82	5.5
Heating	92	Office-02	Office	other conv furn	Conventional Gas Furnace	111	314	0	314	203	2.82	5.5
Lights	131	Other-36	Other	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	2,032	4,019	1,712	5,731	3,699	2.82	5.5
Lights	135	Other-42	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	913	1,355	1,218	2,574	1,660	2.82	5.5
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	2,288	3,887	2,560	6,447	4,159	2.82	5.5
Lights	68	Health Care-06	Health Care	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	1,790	3,386	1,654	5,040	3,250	2.82	5.5
Lights	9	Assembly-22	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	346	512	461	973	628	2.82	5.5
Lights	118	Other-18	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	8	12	10	22	14	2.81	5.6
Lights	132	Other-37	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	57	84	76	159	103	2.81	5.6
Lights	40	FH-2 to 4-07	2 to 4 Unit Buildings	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	7,151	12,087	8,001	20,088	12,937	2.81	5.6
Lights	89	Office-16	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	76	112	101	213	137	2.81	5.6
Lights	22	Education-15	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	30	44	40	84	54	2.81	5.6
Lights	24	Education-17	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	268	395	357	752	484	2.81	5.6
Lights	39	FH-2 to 4-06	2 to 4 Unit Buildings	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	2,871	4,879	3,177	8,057	5,185	2.81	5.6
Lights	156	Warehouse-12	Warehouse & Storage	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	52	77	70	147	95	2.81	5.6
Hot Water	146	Service-01	Mercantile & Service	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	6	16	0	16	10	2.80	5.6
Lights	41	FH-2 to 4-09	2 to 4 Unit Buildings	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	666	1,121	745	1,866	1,200	2.80	5.6
Lights	93	Office-02g	Office	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	78	114	104	218	140	2.80	5.6
Wall	64	Health Care-01	Health Care	wall insulation R-value 0.00	Blow-in Insulation: Increase Insulation by R-13	91	256	0	256	164	2.80	5.6
Lights	28	Education-22	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	222	325	297	622	399	2.79	5.6
Heating	122	Other-23	Other	other conv furn	Conventional Gas Furnace	10	29	0	29	19	2.79	5.6
Heating	16	Assembly-08	Assembly	other conv furn	Conventional Gas Furnace	20	55	0	55	35	2.79	5.6
Lights	48	FH-attached-01	Single Family Attached	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	8,496	14,172	9,505	23,677	15,181	2.79	5.6
Lights	140	Other-09g	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	50	73	67	139	89	2.78	5.6
Lights	119	Other-19	Other	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	872	1,684	734	2,419	1,547	2.77	5.6
Lights	30	Education-24	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	772	1,112	1,030	2,142	1,370	2.77	5.6
Lights	128	Other-30	Other	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	1,703	3,269	1,434	4,703	3,001	2.76	5.7
Heating	170	Warehouse-04	Warehouse & Storage	other conv furn	Conventional Gas Furnace	153	422	0	422	269	2.76	5.7
Lights	75	Lodging-15	Lodging	IN23: INC 60 WALL	FL181: CFL 13 + BLST UNIT	52	93	49	142	91	2.75	5.7

Table 3.9a
Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annualized Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Annualized Installed Cost (1993 $)	Annualized Energy & Demand Savings (1993 $)	Annualized Replacement Savings (1993 $)	Annualized Total Savings (1993 $)	Annualized Net Savings (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	73	Lodging-01	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	66	92	87	180	114	2.75	5.7
Hot Water	106	Office-38	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	14	38	0	38	24	2.73	5.7
Lights	10	Assembly-23	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	568	927	617	1,544	976	2.72	5.7
Lights	0	Assembly-01	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	455	628	608	1,236	781	2.71	5.8
Lights	71	Lodging-10	Lodging	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	2,206	3,038	2,944	5,981	3,775	2.71	5.8
Lights	112	Other-01g	Other	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	365	493	488	981	615	2.68	5.8
Hot Water	33	Education-08	Education	other shw heater	0.76 Gas WH (COM), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	295	792	0	792	497	2.68	5.8
Lights	128	Other-30	Other	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	24	53	12	65	41	2.68	5.8
Hot Water	113	Other-10	Other	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	8	20	0	20	13	2.68	5.8
Lights	106	Office-38	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	1,753	3,282	1,370	4,651	2,899	2.65	5.9
Hot Water	36	FH-2 to 4-10	2 to 4 Unit Buildings	gas shw heater	Wrap Old Gas Tank w. Ins., Ins. Pipe, LFSHs, Aerators	1,885	4,998	0	4,998	3,113	2.65	5.9
Roof	18	Education-01	Education	roof insulation R-value 0.00	Attic Ceiling: Increase insulation by R-19	646	1,711	0	1,711	1,065	2.65	5.9
Heating	146	Service-01	Mercantile & Service	other conv furn	Conventional Gas Furnace	31	81	0	81	50	2.64	5.9
Heating	82	Office-01	Office	other conv furn	Conventional Gas Furnace	87	229	0	229	142	2.63	5.9
Lights	15	Assembly-07	Assembly	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	15	19	20	39	24	2.63	5.9
Roof	146	Service-01	Mercantile & Service	roof insulation R-value 0.00	Attic Ceiling: Increase insulation by R-19	635	1,667	0	1,667	1,031	2.62	6.0
Hot Water	6	Assembly-19	Assembly	oil shw heater	Wrap Old Oil Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	51	132	0	132	81	2.61	6.0
Lights	54	Food Service-11	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	1,412	2,549	1,103	3,653	2,241	2.59	6.0
Lights	130	Other-32	Other	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	4,112	7,143	3,464	10,608	6,496	2.58	6.1
Lights	113	Other-10	Other	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	1,145	1,979	964	2,943	1,799	2.57	6.1
Lights	6	Assembly-19	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	392	698	308	1,006	614	2.57	6.1
Lights	111	Other-01	Other	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	470	801	396	1,197	727	2.55	6.1
Lights	120	Other-02	Other	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	271	461	228	689	419	2.55	6.1
Lights	56	Food Service-13	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	91	149	81	230	140	2.54	6.2
Lights	122	Other-23	Other	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	390	653	329	982	592	2.52	6.2
Lights	126	Other-29	Other	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	643	1,074	542	1,615	972	2.51	6.2
Lights	18	Education-01	Education	EX1: EXIT - INC (2x20)	EX6: EXIT - LED	179	211	239	449	270	2.51	6.2
Lights	14	Assembly-05	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	159	272	126	398	239	2.50	6.2
Heating	100	Office-03	Office	other conv furn	Conventional Oil Furnace	118	295	0	295	177	2.49	6.3
Lights	94	Office-20	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	145	333	27	360	215	2.49	6.3
Lights	133	Other-38	Other	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	9,048	17,379	5,050	22,429	13,381	2.48	6.3
Lights	109	Office-08	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	3,783	7,849	1,479	9,328	5,545	2.47	6.3
Lights	81	Lodging-08	Lodging	IN23: INC 60 WALL	FL174: CFL 18 GLOBE UNIT	20	37	13	50	30	2.46	6.3
Heating	116	Other-17	Other	other conv furn	Conventional Gas Furnace	44	108	0	108	64	2.44	6.4
Lights	81	Lodging-08	Lodging	IN15: INC 60 TABLE LAMP	FL174: CFL 18 GLOBE UNIT	22	39	14	52	31	2.43	6.4
Lights	4	Assembly-16	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	592	942	494	1,436	844	2.43	6.4
Lights	15	Assembly-07	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	87	110	100	210	123	2.42	6.5
Hot Water	31	Education-04	Education	other shw heater	0.76 Gas WH (COM), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	141	340	0	340	199	2.41	6.5
Lights	7	Assembly-02	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	181	266	166	432	252	2.39	6.5
Lights	37	FH-2 to 4-12	2 to 4 Unit Buildings	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	849	1,306	726	2,031	1,182	2.39	6.5
Roof	127	Other-03	Other	roof insulation R-value 0.00	Attic Ceiling: Increase insulation by R-11	77	184	0	184	107	2.38	6.6
Lights	73	Lodging-12	Lodging	IN15: INC 60 TABLE LAMP	FL181: CFL 13 + BLST UNIT	303	468	251	719	416	2.37	6.6
Lights	106	Office-38	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	428	869	146	1,015	587	2.37	6.6
Lights	110	Office-09	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	487	1,050	90	1,140	653	2.34	6.7
Lights	46	FH-Detached-05	Single Family Detached	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	37	63	24	86	49	2.34	6.7
Lights	69	Health Care-07	Health Care	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	8,201	14,279	4,897	19,177	10,976	2.34	6.7
Roof	53	Food Service-01	Food Service	roof insulation R-value 0.00	Attic Ceiling: Increase Insulation by R-8	175	407	0	407	232	2.32	6.7
Lights	91	Office-18	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	368	787	66	853	485	2.32	6.7
Roof	12	Assembly-03	Assembly	roof insulation R-value 0.00	Suspended Ceiling: Increase insulation by R-19	1,624	3,766	0	3,766	2,142	2.32	6.7
Lights	50	FH-attached-04	Single Family Attached	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	157	230	134	364	207	2.32	6.7
Lights	5	Assembly-18	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	730	1,072	610	1,681	951	2.30	6.8
Lights	104	Office-35	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	729	1,528	140	1,669	940	2.29	6.8
Lights	51	FH-attached-05	Single Family Attached	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	1,854	3,039	1,199	4,238	2,385	2.29	6.8
Hot Water	7	Assembly-02	Assembly	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	4	10	0	10	6	2.29	6.8
Hot Water	17	Assembly-09	Assembly	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	35	78	0	78	44	2.26	6.9
Hot Water	44	FH-Detached-03	Single Family Detached	other shw heater	0.85 LPG WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	4	9	0	9	5	2.26	6.9
Lights	52	Food Sales-01	Food Sales	FL62: FL 1X8 2F96T12 STD2	FL131: FL 1X8 2F96T12ES ELC2 REF	6,707	14,021	1,070	15,091	8,384	2.25	6.9
Roof	59	Food Service-02	Food Service	roof insulation R-value 0.00	Attic Ceiling: Increase Insulation by R-8	382	858	0	858	476	2.25	6.9
Lights	47	FH-Detached-07	Single Family Detached	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	10	15	6	22	12	2.25	7.0
Lights	12	Assembly-03	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	428	608	353	961	533	2.25	7.0
Lights	45	FH-Detached-04	Single Family Detached	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	78	125	51	175	97	2.24	7.0
Lights	111	Other-01	Other	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	266	465	129	594	329	2.24	7.0
Lights	61	Food Service-07	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	240	419	115	534	294	2.22	7.0
Lights	122	Other-23	Other	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	111	192	54	247	136	2.22	7.0
Lights	107	Office-04	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	929	1,891	172	2,062	1,134	2.22	7.0
Lights	126	Other-29	Other	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	96	166	47	213	117	2.21	7.1
Roof	45	FH-Detached-04	Single Family Detached	roof insulation R-value 5.00	Attic Ceiling: Increase Insulation by R-8	489	1,083	0	1,083	594	2.21	7.1
Hot Water	92	Office-02	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	10	23	0	23	12	2.21	7.1
Lights	92	Office-02	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	1,371	2,785	255	3,040	1,661	2.20	7.1
Lights	162	Warehouse-21	Warehouse & Storage	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	25	43	13	56	31	2.20	7.1

Table 3.9a
Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resources: Annualized Values of Costs and Savings

End Use	Bldg Set No.	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Annualized Installed Cost (1993 $)	Annualized Energy & Demand Savings (1993 $)	Annualized Replacement Savings (1993 $)	Annualized Total Savings (1993 $)	Annualized Net Savings (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Roof	100	Office-03	Office	roof insulation R-value 6.00	Attic Ceiling: Increase insulation by R-11	1,615	3,553	0	3,553	1,938	2.20	7.1
Lights	139	Other-09	Other	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	216	367	105	472	256	2.19	7.1
Lights	102	Office-31	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	69	138	13	151	82	2.19	7.1
Lights	109	Office-08	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	111	191	51	242	131	2.19	7.1
Lights	111	Other-01	Other	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	18	29	10	39	21	2.18	7.2
Roof	72	Lodging-11	Lodging	roof insulation R-value 8.90	Suspended Ceiling: Increase Insulation by R-8	6,208	13,542	0	13,542	7,334	2.18	7.2
Lights	11	Assembly-24	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	252	338	207	546	294	2.17	7.2
Hot Water	52	Food Sales-01	Food Sales	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	72	156	0	156	84	2.17	7.2
Lights	101	Office-30	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	267	527	49	576	310	2.16	7.2
Lights	0	Assembly-01	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	2,673	3,330	2,426	5,777	3,103	2.16	7.2
Lights	116	Other-17	Other	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	4	6	2	8	4	2.16	7.2
Lights	103	Office-34	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	584	985	275	1,260	676	2.16	7.2
Lights	116	Other-17	Other	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	298	497	145	642	344	2.15	7.3
Lights	42	FH-5 or More-01	5 or More Unit Buildings	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	892	1,158	762	1,920	1,028	2.15	7.3
Lights	39	FH-2 to 4-06	2 to 4 Unit Buildings	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	3,760	4,879	3,177	8,056	4,296	2.14	7.3
Heating	130	Other-32	Other	oil conv boiler	Add Automatic Electric Damper	19	41	0	41	22	2.14	7.3
Lights	41	FH-2 to 4-09	2 to 4 Unit Buildings	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	872	1,121	745	1,866	994	2.14	7.3
Lights	1	Assembly-10	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	201	260	168	428	227	2.13	7.3
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	2,005	2,551	1,712	4,264	2,259	2.13	7.3
Lights	98	Office-28	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	138	268	26	294	156	2.13	7.4
Lights	37	FH-2 to 4-12	2 to 4 Unit Buildings	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	2,363	3,487	1,529	5,016	2,653	2.12	7.4
Roof	136	Other-05	Other	roof insulation R-value 0.00	Attic Ceiling: Increase insulation by R-11	182	385	0	385	203	2.12	7.4
Lights	156	Warehouse-12	Warehouse & Storage	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	19	32	8	41	21	2.11	7.4
Lights	95	Office-21	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	1,180	1,901	577	2,478	1,298	2.10	7.4
Hot Water	108	Office-07	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	9	20	0	20	10	2.10	7.5
Lights	125	Other-27	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	51	77	29	106	55	2.09	7.5
Heating	78	Lodging-02	Lodging	oil conv furn	Conventional Gas Furnace	98	203	0	203	105	2.07	7.5
Lights	64	Health Care-01	Health Care	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	46	53	41	94	49	2.07	7.5
Lights	112	Other-01g	Other	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	338	518	179	697	359	2.06	7.6
Lights	120	Other-02	Other	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	125	188	70	258	133	2.06	7.6
Lights	94	Office-20	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	993	1,576	467	2,043	1,050	2.06	7.6
Hot Water	107	Office-04	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	4	7	0	7	4	2.05	7.6
Roof	120	Other-02	Other	roof insulation R-value 0.00	Attic Ceiling: Increase insulation by R-11	1,280	2,627	0	2,627	1,347	2.05	7.6
Lights	99	Office-29	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	279	440	131	571	293	2.05	7.6
Hot Water	43	FH-Detached-01	Single Family Detached	gas shw heater	0.85 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	8	15	0	15	8	2.04	7.6
Lights	160	Warehouse-19	Warehouse & Storage	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	43	66	21	88	45	2.04	7.7
Lights	155	Warehouse-11	Warehouse & Storage	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	103	166	44	210	107	2.04	7.7
Lights	86	Office-14	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	5,161	8,720	1,759	10,480	5,318	2.03	7.7
Roof	79	Lodging-05	Lodging	roof insulation R-value 8.90	Suspended Ceiling: Increase insulation by R-19	1,992	4,034	0	4,034	2,042	2.03	7.7
Lights	35	FH-2 to 4-01	2 to 4 Unit Buildings	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	666	915	431	1,346	680	2.02	7.7
Lights	169	Warehouse-30	Warehouse & Storage	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	126	191	63	254	128	2.02	7.7
Hot Water	87	Office-15	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	9	19	0	19	9	2.01	7.8
Lights	161	Warehouse-02	Warehouse & Storage	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	5	7	2	10	5	2.01	7.8
Lights	174	Warehouse-09	Warehouse & Storage	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	25	38	13	51	26	2.01	7.8
Lights	163	Warehouse-23	Warehouse & Storage	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	157	238	78	316	159	2.01	7.8
Lights	42	FH-5 or More-01	5 or More Unit Buildings	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	1,050	1,432	680	2,112	1,061	2.01	7.8
Lights	157	Warehouse-15	Warehouse & Storage	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	31	47	16	63	32	2.01	7.8
Lights	105	Office-37	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	2,824	4,349	1,328	5,677	2,853	2.01	7.8
Lights	65	Health Care-02	Health Care	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	396	519	276	795	399	2.01	7.8
Lights	115	Other-16	Other	IN5: INC 60 CEIL	FL181: CFL 13 + BLST UNIT	882	1,140	629	1,769	887	2.00	7.8
Lights	43	FH-Detached-01	Single Family Detached	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	20	27	13	40	20	2.00	7.8
Lights	97	Office-26	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	4,272	6,506	2,041	8,547	4,275	2.00	7.8
Lights	167	Warehouse-29	Warehouse & Storage	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	17	25	8	33	17	2.00	7.8
Lights	171	Warehouse-05	Warehouse & Storage	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	12	19	6	25	12	2.00	7.8
Lights	103	Office-34	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	143	259	26	285	142	1.99	7.8
Lights	168	Warehouse-03	Warehouse & Storage	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	431	644	215	859	427	1.99	7.8
Lights	108	Office-07	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	1,103	1,986	208	2,193	1,090	1.99	7.9
Lights	170	Warehouse-04	Warehouse & Storage	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	69	103	34	137	68	1.99	7.9
Lights	118	Other-18	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	4	5	2	7	4	1.98	7.9
Lights	20	Education-12	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	628	809	435	1,244	616	1.98	7.9
Lights	49	FH-attached-03	Single Family Attached	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	237	316	153	469	232	1.98	7.9
Lights	158	Warehouse-16	Warehouse & Storage	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	24	35	12	46	23	1.97	7.9
Lights	104	Office-35	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	5,008	7,392	2,449	9,841	4,833	1.97	8.0
Lights	154	Warehouse-01	Warehouse & Storage	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	66	101	28	129	63	1.96	8.0
Lights	48	FH-attached-01	Single Family Attached	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	2,561	3,349	1,658	5,007	2,445	1.95	8.0
Lights	44	FH-Detached-03	Single Family Detached	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	6	7	4	11	5	1.95	8.0
Lights	100	Office-03	Office	FL1: FL 2X4 4F40T12 STD2	FL237: FL 2X4 3F32T8 ELC3 REF	3,169	5,583	597	6,180	3,011	1.95	8.0
Lights	96	Office-22	Office	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	20,398	29,788	9,976	39,764	19,366	1.95	8.0
Cooling	96	Office-22	Office	package unit	Multizone Packaged AC Unit (20 to 150 tons cooling)	2,460	4,794	0	4,794	2,335	1.95	8.0
Lights	173	Warehouse-08	Warehouse & Storage	IN11: INC 100 CEIL	FL189: CFL 2-15 CEIL FIXT	30	44	15	59	29	1.95	8.0

Table 3.9a
Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resources Annualized Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Annualized Installed Cost (1993 $)	Annualized Energy & Demand Savings (1993 $)	Annualized Replacement Savings (1993 $)	Annualized Total Savings (1993 $)	Annualized Net Savings (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	164	Warehouse-24	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	4	6	2	8	4	1.94	8.1
Lights	117	Other-17ng	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	996	1,462	471	1,933	937	1.94	8.1
Lights	140	Other-09g	Other	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	33	48	15	63	30	1.93	8.1
Lights	39	FH-2 to 4-06	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	866	1,128	546	1,674	808	1.93	8.1
Lights	16	Assembly-08	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	412	432	364	795	384	1.93	8.1
Lights	31	Education-04	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	2,127	2,649	1,443	4,091	1,964	1.92	8.1
Lights	38	FH-2 to 4-03	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	801	1,015	519	1,534	732	1.91	8.2
Lights	9	Assembly-22	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	392	426	323	749	357	1.91	8.2
Hot Water	119	Other-19	Other	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	5	9	0	9	4	1.90	8.2
Hot Water	120	Other-02	Other	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	8	15	0	15	7	1.90	8.2
Lights	166	Warehouse-26	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	5	6	2	9	4	1.90	8.2
Lights	40	FH-2 to 4-07	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	1,369	1,642	847	2,489	1,180	1.90	8.2
Lights	112	Other-01g	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	23	33	10	43	20	1.90	8.2
Heating	120	Other-02	Other	oil conv furn	Conventional Gas Furnace	31	58	0	58	27	1.90	8.2
Lights	90	Office-17	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	581	992	110	1,102	520	1.89	8.2
Lights	172	Warehouse-07	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	25	35	13	48	23	1.89	8.2
Lights	95	Office-21	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	288	491	54	545	257	1.89	8.3
Lights	80	Lodging-07	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	490	618	305	923	434	1.89	8.3
Lights	8	Assembly-20	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	848	1,126	473	1,599	751	1.89	8.3
Hot Water	145	Public Order-05	Public Order Safety	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	22	42	0	42	20	1.88	8.3
Lights	27	Education-02	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	530	641	355	997	467	1.88	8.3
Lights	17	Assembly-09	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	293	312	235	547	254	1.87	8.4
Lights	85	Office-13	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	520	873	98	971	451	1.87	8.4
Heating	69	Health Care-07	Health Care	hot water fan coil	New Conventional Individual Building Gas Boiler	331	618	0	618	287	1.87	8.4
Lights	82	Office-01	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	2,615	4,398	474	4,871	2,257	1.86	8.4
Lights	36	FH-2 to 4-10	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	1,702	2,057	1,102	3,159	1,457	1.86	8.4
Hot Water	24	Education-17	Education	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	13	24	0	24	11	1.85	8.4
Lights	80	Lodging-07	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	519	634	323	957	439	1.85	8.5
Lights	99	Office-29	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	68	113	12	126	58	1.84	8.5
Lights	21	Education-14	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	414	476	287	763	349	1.84	8.5
Lights	84	Office-10	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	647	1,074	117	1,191	544	1.84	8.5
Lights	87	Office-15	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	1,401	2,312	264	2,575	1,175	1.84	8.5
Lights	102	Office-31	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	473	644	223	867	393	1.83	8.5
Lights	2	Assembly-13	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	187	212	129	342	155	1.83	8.5
Lights	159	Warehouse-18	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	14	19	7	26	12	1.83	8.6
Lights	3	Assembly-15	Assembly	IN6 INC 2-60 CEIL	FL182 CFL 2-13 + BLST UNIT	502	549	367	916	414	1.82	8.6
Lights	41	FH-2 to 4-09	2 to 4 Unit Buildings	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	201	236	130	366	165	1.82	8.6
Lights	98	Office-28	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	959	1,283	447	1,729	780	1.82	8.6
Lights	29	Education-23	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	621	696	431	1,127	506	1.81	8.6
Lights	101	Office-30	Office	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	1,832	2,461	861	3,322	1,490	1.81	8.6
Lights	105	Office-37	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	690	1,126	125	1,251	561	1.81	8.6
Lights	117	Other-17ng	Other	FL1 FL 2X4 4F40T12 STD2	FL244 FL 2X4 4F32T8 ELC4	12	17	5	22	10	1.81	8.6
Lights	34	Education-09	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	516	573	358	931	414	1.80	8.7
Lights	97	Office-26	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	1,044	1,688	190	1,878	835	1.80	8.7
Wall	45	FH-Detached-04	Single Family Detached	wall insulation R-value 0.00	Blow-in Insulation Increase Insulation by R-6.5	1,465	2,630	0	2,630	1,165	1.80	8.7
Roof	77	Lodging-19	Lodging	roof insulation R-value 8.90	Suspended Ceiling Increase Insulation by R-8	1,368	2,455	0	2,455	1,087	1.79	8.7
Lights	32	Education-07	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	1,111	1,242	745	1,987	876	1.79	8.7
Lights	22	Education-15	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	151	170	99	269	118	1.78	8.8
Lights	33	Education-08	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	3,027	3,339	2,030	5,369	2,342	1.77	8.8
Lights	86	Office-14	Office	FL3 FL 2X4 2F40T12 STD2	FL51 FL 2X4 2F32T8 ELC2	151	208	60	268	117	1.77	8.8
Lights	96	Office-22	Office	FL1 FL 2X4 4F40T12 STD2	FL237 FL 2X4 3F32T8 ELC3 REF	4,983	7,875	938	8,813	3,830	1.77	8.8
Heating	98	Office-28	Office	electric forced air furnace	Conventional Oil Furnace	30	52	0	52	22	1.74	9.0
Roof	8	Assembly-20	Assembly	roof insulation R-value 8.90	Suspended Ceiling Increase Insulation by R-8	1,414	2,465	0	2,465	1,052	1.74	9.0
Roof	121	Other-20	Other	roof insulation R-value 5.00	Attic Ceiling Increase Insulation by R-8	972	1,683	0	1,683	711	1.73	9.0
Lights	23	Education-16	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	113	121	74	195	82	1.73	9.0
Hot Water	168	Warehouse-03	Warehouse & Storage	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	15	26	0	26	11	1.73	9.0
Cooling	33	Education-08	Education	single conv chiller	Air-Cooled Reciprocating Chiller (20 to 75 tons cooling)	3,871	6,681	0	6,681	2,810	1.73	9.1
Roof	74	Lodging-13	Lodging	roof insulation R-value 8.90	Suspended Ceiling Increase Insulation by R-8	975	1,678	0	1,678	702	1.72	9.1
Heating	127	Other-03	Other	oil conv boiler	Add Automatic Electric Damper	5	9	0	9	4	1.72	9.1
Lights	52	Food Sales-01	Food Sales	HS17 HPS 250 PEND	LS5 LPS 135 PEND	2,052	3,950	-437	3,513	1,461	1.71	9.1
Lights	28	Education-22	Education	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	1,121	1,156	752	1,908	787	1.70	9.2
Lights	67	Health Care-04	Health Care	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	469	545	251	796	328	1.70	9.2
Lights	66	Health Care-03	Health Care	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	89	100	51	151	62	1.70	9.2
Hot Water	26	Education-19	Education	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	77	130	0	130	53	1.69	9.2
Lights	70	Lodging-01	Lodging	IN15 INC 60 TABLE LAMP	FL174 CFL 18 GLOBE UNIT	9	10	6	16	6	1.69	9.2
Lights	55	Food Service-12	Food Service	FL81 FL 2X4 2F40T12ES STD2	FL105 FL 2X4 2F40T12ES ELC2	57	65	31	97	39	1.69	9.3
Hot Water	92	Office-02	Office	other shw heater	Wrap Old LPG Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	5	9	0	9	4	1.69	9.3
Lights	165	Warehouse-25	Warehouse & Storage	IN11 INC 100 CEIL	FL189 CFL 2-15 CEIL FIXT	122	145	61	206	84	1.68	9.3
Hot Water	35	FH-2 to 4-01	2 to 4 Unit Buildings	gas shw heater	0.85 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	5	9	0	9	4	1.68	9.3
Lights	70	Lodging-01	Lodging	IN23 INC 60 WALL	FL174 CFL 18 GLOBE UNIT	9	9	6	15	6	1.67	9.3

Table 3.9a
Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resources Annualized Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Annualized Installed Cost (1993 $)	Annualized Energy & Demand Savings (1993 $)	Annualized Replacement Savings (1993 $)	Annualized Total Savings (1993 $)	Annualized Net Savings (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	57	Food Service-15	Food Service	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	252	281	137	418	166	1.66	9.4
Lights	25	Education-18	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	4,541	4,532	2,979	7,511	2,970	1.65	9.4
Lights	110	Office-09	Office	FL3: FL 2X4 2F40T12 STD2	[illegible]1: FL 2X4 2F32T8 ELC2	24	36	4	39	16	1.65	9.5
Lights	130	Other-32	Other	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	159	129	132	262	102	1.64	9.5
Lights	58	Food Service-17	Food Service	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	642	706	347	1,053	411	1.64	9.5
Roof	65	Health Care-02	Health Care	roof insulation R-value 0.00	Suspended Ceiling: Increase insulation by R-19	186	305	0	305	119	1.64	9.5
Lights	106	Office-38	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	77	103	23	125	49	1.63	9.6
Hot Water	67	Health Care-04	Health Care	other shw heater	0.76 Gas WH (COM), Insulate Pipe, Low Flow SHs, Aerators	163	266	0	266	103	1.63	9.6
Lights	24	Education-17	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	1,350	1,286	916	2,202	851	1.63	9.6
Roof	93	Office-02g	Office	roof insulation R-value 0.00	Attic Ceiling: Increase insulation by R-11	364	593	0	593	229	1.63	9.6
Hot Water	30	Education-24	Education	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	88	143	0	143	55	1.62	9.6
Lights	19	Education-11	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	310	298	203	502	192	1.62	9.7
Roof	15	Assembly-07	Assembly	roof insulation R-value 0.00	Suspended Ceiling: Increase insulation by R-11	44	71	0	71	27	1.61	9.7
Roof	99	Office-29	Office	roof insulation R-value 8.90	Suspended Ceiling: Increase Insulation by R-8	117	188	0	188	72	1.61	9.7
Lights	68	Health Care-06	Health Care	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	463	487	257	744	281	1.61	9.7
Lights	84	Office-10	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	19	28	3	30	11	1.60	9.7
Cooling	100	Office-03	Office	package unit	Single Zone Packaged AC Unit (11.25 to 20 tons cooling)	900	1,435	0	1,435	535	1.60	9.8
Hot Water	123	Other-24	Other	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	5	9	0	9	3	1.58	9.9
Roof	32	Education-07	Education	roof insulation R-value 11.00	Attic Ceiling: Increase insulation by R-11	551	868	0	868	317	1.58	9.9
Lights	71	Lodging-10	Lodging	IN15: INC 60 TABLE LAMP	FL174: CFL 18 GLOBE UNIT	315	296	196	492	177	1.56	10.0
Lights	100	Office-03	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	93	130	15	144	52	1.56	10.0
Lights	71	Lodging-10	Lodging	IN23: INC 60 WALL	FL174: CFL 18 GLOBE UNIT	297	274	185	459	163	1.55	10.1
Lights	90	Office-17	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	17	24	3	26	9	1.54	10.1
Cooling	92	Office-02	Office	package unit	Single Zone Packaged AC Unit (5.4167 to 11.25 tons cooling)	534	819	0	819	284	1.53	10.2
Lights	109	Office-08	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	1,532	1,878	454	2,332	800	1.52	10.3
Lights	54	Food Service-11	Food Service	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	829	822	434	1,257	427	1.52	10.3
Hot Water	9	Assembly-22	Assembly	electric shw heater	Wrap Old Electric Tank w/ Ins., Ins. Pipe, LFSHs, Aerators	7	10	0	10	3	1.51	10.3
Lights	6	Assembly-19	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	490	483	256	739	249	1.51	10.3
Lights	13	Assembly-04	Assembly	IN6: INC 2-60 CEIL	FL182: CFL 2-13 + BLST UNIT	1,396	1,119	962	2,082	686	1.49	10.5
Roof	39	FH-2 to 4-06	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling: Increase Insulation by R-8	4,868	7,219	0	7,219	2,351	1.48	10.5
Lights	4	Assembly-16	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	740	667	429	1,096	357	1.48	10.5
Lights	14	Assembly-05	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	199	187	108	294	95	1.48	10.6
Lights	10	Assembly-23	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	110	89	73	162	52	1.48	10.6
Roof	40	FH-2 to 4-07	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling: Increase insulation by R-11	18,675	27,586	0	27,586	8,911	1.48	10.6
Lights	82	Office-01	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	77	102	12	113	37	1.48	10.6
Roof	38	FH-2 to 4-03	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling: Increase insulation by R-11	6,063	8,921	0	8,921	2,858	1.47	10.6
Lights	108	Office-07	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	32	42	5	47	15	1.47	10.7
Lights	103	Office-34	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	6	8	1	9	3	1.46	10.7
Heating	150	Service-06	Mercantile & Service	other conv furn	Conventional Gas Furnace	16	23	0	23	7	1.46	10.7
Lights	56	Food Service-13	Food Service	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	53	48	29	77	24	1.45	10.8
Lights	59	Food Service-02	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	400	323	258	581	181	1.45	10.8
Lights	53	Food Service-01	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	184	147	119	266	83	1.45	10.8
Heating	139	Other-09	Other	oil conv furn	Conventional Gas Furnace	30	44	0	44	14	1.45	10.8
Lights	106	Office-38	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	19	18	10	28	9	1.45	10.8
Lights	91	Office-18	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	18	23	3	26	8	1.44	10.8
Lights	85	Office-13	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	15	20	2	22	7	1.44	10.9
Roof	44	FH-Detached-03	Single Family Detached	roof insulation R-value 11.00	Attic Ceiling: Increase Insulation by R-8	35	50	0	50	15	1.43	10.9
Roof	37	FH-2 to 4-12	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling: Increase Insulation by R-8	7,628	10,876	0	10,876	3,247	1.43	11.0
Lights	128	Other-30	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	30	25	17	42	13	1.42	11.0
Lights	5	Assembly-18	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	912	768	529	1,297	385	1.42	11.0
Lights	88	Office-15ug	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	3,376	3,174	1,611	4,785	1,409	1.42	11.0
Lights	83	Office-01g	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	690	665	309	974	284	1.41	11.1
Heating	154	Warehouse-01	Warehouse & Storage	other conv furn	Conventional Gas Furnace	279	394	0	394	115	1.41	11.1
Lights	87	Office-15	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	41	51	6	58	17	1.41	11.1
Roof	33	Education-08	Education	roof insulation R-value 13.00	Suspended Ceiling: Increase insulation by R-11	1,791	2,318	0	2,318	727	1.41	11.1
Roof	42	FH-5 or More-01	5 or More Unit Buildings	roof insulation R-value 11.00	Attic Ceiling: Increase Insulation by R-8	2,292	3,210	0	3,210	918	1.40	11.2
Lights	121	Other-20	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	121	99	70	170	48	1.40	11.2
Hot Water	40	FH-2 to 4-07	2 to 4 Unit Buildings	gas shw heater	0.85 Gas WH (RES), Ins. Pipe, LFSHs, Aerators, Lower Tank Temp	619	866	0	866	247	1.40	11.2
Lights	60	Food Service-04	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	2,810	2,113	1,811	3,925	1,114	1.40	11.2
Lights	93	Office-02g	Office	FL1: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	425	387	205	592	168	1.39	11.2
Lights	63	Food Service-09	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	227	169	148	317	89	1.39	11.2
Heating	168	Warehouse-03	Warehouse & Storage	other conv furn	Conventional Gas Furnace	68	94	0	94	26	1.39	11.2
Hot Water	55	Food Service-12	Food Service	oil shw heater	Wrap Old Oil Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	31	43	0	43	12	1.39	11.3
Roof	90	Office-17	Office	roof insulation R-value 11.00	Attic Ceiling: Increase insulation by R-11	148	206	0	206	57	1.39	11.3
Lights	62	Food Service-08	Food Service	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	2,293	1,688	1,488	3,176	883	1.39	11.3
Roof	41	FH-2 to 4-09	2 to 4 Unit Buildings	roof insulation R-value 11.00	Attic Ceiling: Increase Insulation by R-8	1,129	1,569	0	1,569	431	1.38	11.3
Lights	89	Office-16	Office	FL3: FL 2X4 4F40T12 STD2	FL244: FL 2X4 4F32T8 ELC4	414	373	192	568	154	1.37	11.4
Heating	111	Other-01	Other	oil conv furn	Conventional Gas Furnace	54	74	0	74	20	1.37	11.4
Lights	92	Office-02	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	68	82	10	92	23	1.36	11.5
Lights	12	Assembly-03	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	534	417	310	727	193	1.36	11.5

Table 3.9a
Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resources: Annualized Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Annualized Installed Cost (1993 $)	Annualized Energy & Demand Savings (1993 $)	Annualized Replacement Savings (1993 $)	Annualized Total Savings (1993 $)	Annualized Net savings (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	103	Office-34	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	26	33	2	35	9	1.36	11.5
Lights	137	Other-07	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	57	44	33	77	20	1.35	11.6
Roof	31	Education-04	Education	roof insulation R-value 11.00	Attic Ceiling: Increase Insulation by R-8	820	1,107	0	1,107	288	1.35	11.6
Lights	51	FH-attached-05	Single Family Attached	FL4: FL 1X4 2F40T12 STD2	FL52: FL 1X4 2F32T8 ELC2	657	887	300	887	230	1.35	11.6
Heating	92	Office-02	Office	oil conv boiler	Add Automatic Electric Damper	29	40	0	40	10	1.35	11.6
Heating	33	Education-08	Education	oil conv boiler	Gas Pulse Condensing Boiler	272	365	0	365	93	1.34	11.7
Cooling	58	Food Service-17	Food Service	single conv chiller	Centrifugal Liquid (Water) Chiller (200 to 500 tons cooling)	3,006	4,010	0	4,010	1,004	1.33	11.7
Roof	19	Education-11	Education	roof insulation R-value 13.00	Suspended Ceiling: Increase insulation by R-11	183	244	0	244	61	1.33	11.7
Heating	57	Food Service-15	Food Service	oil conv boiler	Add Automatic Electric Damper	7	10	0	10	2	1.32	11.8
Roof	83	Office-01g	Office	roof insulation R-value 0.00	Attic Ceiling: Increase insulation by R-11	591	782	0	782	191	1.32	11.8
Lights	86	Office-14	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	2,090	2,146	620	2,766	676	1.32	11.8
Lights	15	Assembly-07	Assembly	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	17	11	11	22	5	1.32	11.8
Heating	124	Other-26	Other	oil conv boiler	Add Automatic Electric Damper	7	9	0	9	2	1.31	11.9
Roof	34	Education-09	Education	roof insulation R-value 13.00	Suspended Ceiling: Increase Insulation by R-8	242	318	0	318	76	1.31	11.9
Roof	81	Lodging-08	Lodging	roof insulation R-value 8.00	Attic Ceiling: Increase Insulation by R-8	309	405	0	405	96	1.31	11.9
Lights	123	Other-24	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	18	13	10	23	5	1.30	12.0
Lights	26	Education-19	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	3,140	2,201	1,894	4,096	956	1.30	12.0
Cooling	14	Assembly-05	Assembly	single conv chiller	Air-Cooled Reciprocating Chiller (20 to 75 tons cooling)	1,243	1,614	0	1,614	371	1.30	12.0
Hot Water	65	Health Care-02	Health Care	other shw heater	0.76 Gas WH (COM), Insulate Pipe, Low Flow SHs, Aerators	76	98	0	98	22	1.29	12.1
Lights	1	Assembly-10	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	251	178	146	323	72	1.29	12.1
Lights	105	Office-37	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	124	150	9	159	35	1.29	12.1
Lights	107	Office-04	Office	FL3: FL 2X4 2F40T12 STD2	FL51: FL 2X4 2F32T8 ELC2	46	52	7	59	13	1.28	12.2
Lights	11	Assembly-24	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	314	219	182	401	87	1.28	12.2
Lights	65	Health Care-02	Health Care	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	103	73	57	131	28	1.27	12.3
Lights	162	Warehouse-21	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	166	140	71	211	45	1.27	12.3
Lights	113	Other-10	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	2	1	1	2	1	1.27	12.3
Roof	171	Warehouse-03	Warehouse & Storage	roof insulation R-value 0.00	Attic Ceiling: Increase Insulation by R-8	155	196	0	196	41	1.27	12.3
Lights	93	Office-21	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	52	61	4	65	14	1.26	12.4
Hot Water	94	Office-20	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	9	11	0	11	2	1.26	12.4
Heating	107	Office-04	Office	oil conv boiler	Gas Pulse Condensing Boiler	292	366	0	366	74	1.25	12.5
Heating	110	Office-09	Office	oil conv furn	Conventional Gas Furnace	112	139	0	139	27	1.24	12.6
Lights	155	Warehouse-11	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	671	534	297	832	161	1.24	12.6
Lights	61	Food Service-07	Food Service	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	141	144	29	173	32	1.23	12.7
Lights	154	Warehouse-01	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	428	333	190	522	95	1.22	12.8
Lights	136	Other-05	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	27	17	16	33	6	1.22	12.8
Lights	139	Other-09	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	68	44	40	83	15	1.22	12.8
Lights	37	FH-2 to 4-12	2 to 4 Unit Buildings	FL4: FL 1X4 2F40T12 STD2	FL52: FL 1X4 2F32T8 ELC2	1,068	808	488	1,296	228	1.21	12.9
Lights	111	Other-01	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	60	38	35	73	13	1.21	12.9
Lights	97	Office-26	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	187	216	11	227	40	1.21	12.9
Lights	122	Other-23	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	22	14	13	26	5	1.21	12.9
Lights	126	Other-29	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	43	27	25	52	9	1.21	12.9
Lights	130	Other-32	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	30	18	17	36	6	1.21	12.9
Lights	122	Other-23	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	15	10	9	19	3	1.21	12.9
Lights	30	Education-24	Education	FL79: FL 2X4 4F40T12ES STD2	FL232: FL 2X4 3F40T12 ELC3	3,893	2,235	2,442	4,677	784	1.20	13.0
Lights	96	Office-22	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	893	1,002	66	1,068	175	1.20	13.1
Lights	95	Office-21	Office	FL82: FL 1X4 2F40T12ES ST.	FL106: FL 1X4 2F40T12ES ELC2	13	13	3	15	2	1.19	13.1
Lights	116	Other-17	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	62	38	36	74	12	1.19	13.1
Lights	64	Health Care-01	Health Care	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	12	8	6	14	2	1.19	13.1
Lights	160	Warehouse-19	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	280	213	119	332	53	1.19	13.1
Heating	157	Warehouse-15	Warehouse & Storage	other conv furn	Conventional Gas Furnace	21	25	0	25	4	1.18	13.2
Lights	102	Office-31	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	21	23	1	25	4	1.18	13.2
Lights	161	Warehouse-02	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	31	23	13	37	6	1.18	13.3
Lights	105	Office-37	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	31	30	7	36	5	1.18	13.3
Lights	9	Assembly-22	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	489	291	284	575	86	1.18	13.3
Lights	174	Warehouse-09	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	166	124	71	195	29	1.17	13.3
Lights	163	Warehouse-23	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	1,025	768	437	1,205	179	1.17	13.3
Lights	169	Warehouse-30	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	819	613	349	962	143	1.17	13.3
Lights	120	Other-02	Other	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	112	66	65	131	19	1.17	13.3
Lights	42	FH-5 or More-01	5 or More Unit Buildings	FL4: FL 1X4 2F40T12 STD2	FL52: FL 1X4 2F32T8 ELC2	810	575	370	946	136	1.17	13.4
Lights	157	Warehouse-15	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	203	151	87	237	34	1.17	13.4
Lights	108	Office-07	Office	FL116: FL 1X8 2F96T12ES STD2	FL128: FL 1X8 2F96T12ES ELC2	447	488	33	521	75	1.17	13.4
Hot Water	103	Office-34	Office	gas shw heater	Wrap Old Gas Tank, Ins. Pipe, LFSHs, Aer., Lower Tank Temp	5	5	0	5	1	1.17	13.4
Lights	97	Office-26	Office	FL82: FL 1X4 2F40T12ES STD2	FL106: FL 1X4 2F40T12ES ELC2	47	43	10	54	7	1.16	13.5
Lights	167	Warehouse-29	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	108	79	46	125	17	1.16	13.5
Lights	2	Assembly-13	Assembly	FL81: FL 2X4 2F40T12ES STD2	FL105: FL 2X4 2F40T12ES ELC2	233	140	130	270	37	1.16	13.5
Lights	156	Warehouse-12	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	125	89	55	145	20	1.16	13.5
Roof	112	Other-01g	Other	roof insulation R-value 0.00	Attic Ceiling: Increase Insulation by R-8	843	974	0	974	131	1.15	13.5
Lights	172	Warehouse-07	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	152	120	70	190	25	1.15	13.6
Lights	104	Office-35	Office	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	219	235	16	251	32	1.15	13.6
Lights	165	Warehouse-25	Warehouse & Storage	FL62: FL 1X8 2F96T12 STD2	FL74: FL 1X8 2F96T12 ELC2	797	574	340	914	116	1.15	13.6

Table 3.9a

Building ERUs Constituting the Minimum Life-Cycle Cost Efficiency Resources: Annualized Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Annualized Installed Cost (1993 $)	Annualized Energy & Demand Savings (1993 $)	Annualized Replacement Savings (1993 $)	Annualized Total Savings (1993 $)	Annualized Net Savings (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Lights	162	Warehouse-21	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	151	108	64	173	22	1.14	13.6
Lights	7	Assembly-02	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	35	23	16	40	5	1.14	13.7
Lights	164	Warehouse-24	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	28	20	12	32	4	1.14	13.7
Lights	173	Warehouse-08	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	197	140	84	224	28	1.14	13.7
Lights	17	Assembly-09	Assembly	FL81 FL 2X4 2F40T12ES STD2	FL103 FL 2X4 2F40T12ES ELC2	366	213	204	417	51	1.14	13.7
Lights	171	Warehouse-05	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	81	58	35	93	11	1.14	13.8
Lights	168	Warehouse-03	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	2,813	1,985	1,199	3,184	371	1.13	13.8
Heating	13	Assembly-04	Assembly	other conv furn	Conventional Oil Furnace	229	259	0	259	30	1.13	13.8
Lights	159	Warehouse-18	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	94	66	40	106	12	1.13	13.9
Heating	87	Office-15	Office	oil conv furn	Conventional Gas Furnace	217	243	0	243	27	1.12	13.9
Lights	135	Warehouse-11	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	610	415	271	685	75	1.12	13.9
Lights	135	Other-42	Other	FL81 FL 2X4 2F40T12ES STD2	FL103 FL 2X4 2F40T12ES ELC2	419	227	243	470	51	1.12	13.9
Lights	112	Other-01g	Other	FL81 FL 2X4 2F40T12ES STD2	FL103 FL 2X4 2F40T12ES ELC2	77	43	43	86	9	1.12	14.0
Lights	90	Office-17	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	235	246	17	263	28	1.12	14.0
Lights	154	Warehouse-01	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	389	261	172	434	45	1.12	14.0
Lights	100	Office-03	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	1,283	1,335	95	1,429	146	1.11	14.0
Lights	166	Warehouse-26	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	30	20	13	33	3	1.11	14.1
Hot Water	13	Assembly-04	Assembly	other shw heater	Better Elec WH (COM), Ins Pipe, LFSHs, Aer , Lower Tank Temp	169	188	0	188	19	1.11	14.1
Heating	80	Lodging-07	Lodging	other conv furn	Conventional Oil Furnace	3,439	6,032	0	6,032	593	1.11	14.1
Lights	158	Warehouse-16	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	154	103	66	170	16	1.11	14.1
Heating	83	Office-01g	Office	other conv furn	Conventional Oil Furnace	39	44	0	44	4	1.11	14.1
Hot Water	93	Office-02g	Office	other shw heater	Better Elec WH (COM), Ins Pipe, LFSHs, Aer , Lower Tank Temp	35	39	0	39	4	1.10	14.2
Lights	94	Office-20	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	11	10	2	12	1	1.09	14.3
Lights	98	Office-28	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	42	43	3	45	4	1.09	14.3
Roof	119	Other-19	Other	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-11	934	1,022	0	1,022	87	1.09	14.3
Roof	168	Warehouse-03	Warehouse & Storage	roof insulation R-value 0.00	Attic Ceiling Increase Insulation by R-8	5,338	5,814	0	5,814	476	1.09	14.3
Lights	96	Office-22	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	224	194	50	243	20	1.09	14.3
Lights	87	Office-15	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	567	570	42	612	45	1.08	14.5
Lights	101	Office-30	Office	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	80	81	6	86	6	1.08	14.5
Roof	156	Warehouse-12	Warehouse & Storage	roof insulation R-value 0.00	Attic Ceiling Increase Insulation by R-8	237	255	0	255	18	1.08	14.5
Lights	75	Lodging-15	Lodging	FL5 FL 1X4 1F40T12 STD1	FL29 FL 1X4 1F40T12 ELC1	133	74	68	143	10	1.08	14.5
Lights	84	Office-10	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	262	262	19	281	19	1.07	14.6
Lights	110	Office-09	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	331	331	23	355	24	1.07	14.6
Lights	117	Other-17ug	Other	FL81 FL 2X4 2F40T12ES STD2	FL103 FL 2X4 2F40T12ES ELC2	206	110	111	221	15	1.07	14.6
Lights	85	Office-13	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	210	210	15	226	15	1.07	14.6
Lights	170	Warehouse-04	Warehouse & Storage	FL62 FL 1X8 2F96T12 STD2	FL74 FL 1X8 2F96T12 ELC2	451	291	192	483	32	1.07	14.6
Lights	160	Warehouse-19	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	254	164	108	272	18	1.07	14.6
Lights	140	Other-09g	Other	FL81 FL 2X4 2F40T12ES STD2	FL103 FL 2X4 2F40T12ES ELC2	10	6	6	11	1	1.07	14.6
Lights	82	Office-01	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	1,059	1,055	75	1,130	71	1.07	14.6
Wall	15	Assembly-07	Assembly	wall insulation R-value 0.00	Blow-in Insulation Increase Insulation by R-13	259	276	0	276	17	1.07	14.6
Lights	169	Warehouse-30	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	745	476	317	794	49	1.07	14.7
Lights	174	Warehouse-09	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	151	96	64	161	10	1.07	14.7
Lights	161	Warehouse-02	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	28	18	12	30	2	1.07	14.7
Lights	163	Warehouse-23	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	933	595	398	993	60	1.06	14.7
Roof	118	Other-18	Other	roof insulation R-value 0.00	Suspended Ceiling Increase insulation by R-11	29	31	0	31	2	1.06	14.7
Lights	167	Warehouse-29	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	98	62	42	104	6	1.06	14.7
Lights	156	Warehouse-12	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	114	76	50	121	7	1.06	14.7
Lights	157	Warehouse-13	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	185	117	79	196	11	1.06	14.8
Lights	168	Warehouse-03	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	2,558	1,611	1,089	2,701	143	1.06	14.8
Lights	93	Office-02g	Office	FL3 FL 2X4 2F40T12 STD2	FL31 FL 2X4 2F32T8 ELC2	21	13	9	22	1	1.06	14.8
Roof	172	Warehouse-07	Warehouse & Storage	roof insulation R-value 0.00	Attic Ceiling Increase Insulation by R-8	313	330	0	330	17	1.05	14.8
Roof	80	Lodging-07	Lodging	roof insulation R-value 8.00	Attic Ceiling Increase Insulation by R-8	7,454	7,767	0	7,767	313	1.04	15.0
Lights	0	Assembly-01	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	516	293	245	537	21	1.04	15.0
Heating	22	Education-15	Education	other conv furn	High Efficiency LPG Furnace	72	75	0	75	3	1.04	15.0
Heating	122	Other-23	Other	oil conv furn	Conventional Gas Furnace	31	33	0	33	1	1.04	15.1
Hot Water	46	FH-Detached-03	Single Family Detached	gas shw heater	Wrap Old Gas Tank w/ Ins , Ins Pipe, LFSHs, Aeration	29	30	0	30	1	1.04	15.1
Lights	171	Warehouse-05	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	74	45	32	76	2	1.03	15.1
Lights	170	Warehouse-04	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	410	248	175	423	13	1.03	15.1
Lights	158	Warehouse-16	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	140	85	60	144	4	1.03	15.1
Lights	159	Warehouse-18	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	85	51	36	88	2	1.03	15.2
Heating	123	Other-24	Other	oil conv furn	Conventional Gas Furnace	14	15	0	15	0	1.03	15.2
Lights	16	Assembly-08	Assembly	FL79 FL 2X4 4F40T12ES STD2	FL232 FL 2X4 3F40T12 ELC3	79	44	37	81	2	1.02	15.3
Lights	91	Office-18	Office	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	240	241	14	255	5	1.02	15.3
Lights	164	Warehouse-24	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	25	15	11	26	1	1.02	15.3
Wall	143	Public Order-03	Public Order Safety	wall insulation R-value 0.00	Blow-in Insulation Increase Insulation by R-13	246	256	0	256	4	1.02	15.4
Lights	104	Office-35	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	55	43	12	56	1	1.01	15.4
Roof	95	Office-21	Office	roof insulation R-value 13.00	Suspended Ceiling Increase insulation by R-8	495	501	0	501	6	1.01	15.4
Lights	166	Warehouse-26	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	27	15	12	27	0	1.00	15.6
Lights	163	Warehouse-23	Warehouse & Storage	FL116 FL 1X8 2F96T12ES STD2	FL128 FL 1X8 2F96T12ES ELC2	725	415	306	726	1	1.00	15.6
Lights	99	Office-29	Office	FL82 FL 1X4 2F40T12ES STD2	FL106 FL 1X4 2F40T12ES ELC2	3	2	1	3	0	1.00	15.6

Table 3.9b

Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annualized Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Annualized Installed Cost (1993 $)	Annualized Energy & Demand Savings (1993 $)	Annualized O&M Savings (1993 $)	Annualized Replacement Savings (1993 $)	Annualized Total Savings (1993 $)	Annualized Net Savings (1993 $)	Savings to Investment Ratio	Discounted Payback Period
T&D		Substation	Substation	Sub Transformers	Conservation Voltage Reduction RI	26	52,951	0	0	52,951	52,925	2,068.01	0.0
Lights		Ext Lighting	8 Ball Fields	Lighting Controls	Lighting Controls RI	2,560	59,771	0	1,037	58,733	56,173	22.94	0.7
Motors		54 CEP	Other	Cond Pump	VSD & EEM RI	874	16,320	10	195	16,515	15,631	18.88	0.8
Transportation	Conversion	Truck	Vehicles	Tractor, 6x4, 24,000-44,500 GVW	CNG Vehicle ROF	364	646	4,266	121	4,791	4,487	15.78	1.0
Motors		41 CEP	Other	Cond Pump	VSD to Existing RI	2,281	28,192	20	40	28,132	25,852	12.34	1.3
Motors		50	Other	Pumps	VSD to Existing RI	569	7,043	10	37	6,996	6,427	12.31	1.3
Motors		49	Other	Pumps	VSD to Existing RI	463	5,669	10	23	5,636	5,173	12.16	1.3
Motors		48	Other	Pumps	VSD to Existing RI	355	4,287	10	11	4,267	3,911	12.01	1.3
Motors		42 CEP	Other	Cond Pump	VSD to Existing RI	1,795	20,898	10	62	20,950	19,155	11.67	1.3
Motors		21 CEP	Other	CTwr Fan	VSD to Existing RI	569	6,638	10	37	6,591	6,023	11.59	1.3
Motors		20 CEP	Other	CTwr Fan	VSD to Existing RI	1,706	16,595	30	130	16,455	14,749	9.65	1.6
T&D		Substation	Substation	Capacitor Bank	Power Factor Correction to .95 RI	899	7,079	3	0	7,077	6,178	7.87	2.0
Motors		40	Other	Cond Pump	VSD to Existing RI	355	2,701	10	11	2,680	2,325	7.55	2.1
Motors		57 CEP	Other	FD Fan #4	EEM RI	144	878	1	66	945	801	6.57	2.4
Cooling		Hag fam 1	Hag fam 1	AC and Heat Source	Shade Screen RI	371	2,763	0	343	2,420	2,049	6.53	2.4
Motors		12	Health Care	Cond Pump	VSD to Existing RI	137	984	10	6	888	751	6.48	2.4
Motors		7	Health Care	CTwr Fan	VSD to Existing RI	137	984	10	6	888	751	6.48	2.4
Cooling		Hag fam 2	Hag fam 2	AC and Heat Source	Shade Screen RI	594	4,334	0	550	3,884	3,290	6.40	2.4
Motors		15	Service	Cond Pump	VSD to Existing RI	228	1,323	10	4	1,317	1,089	5.77	2.7
Motors		9	Service	CTwr Fan	VSD to Existing RI	228	1,323	10	4	1,317	1,089	5.77	2.7
Motors		15	Food Service	CTwr Fan	VSD to Existing RI	212	1,197	10	7	1,180	969	5.58	2.8
Motors		21	Food Service	Cond Pump	VSD to Existing RI	212	1,197	10	7	1,180	969	5.58	2.8
Motors		51 CEP	Other	HTW Pump	EEM RI	144	731	0	66	798	654	5.55	2.8
Motors		19	Other	CTwr Fan	VSD to Existing RI	338	1,940	20	15	1,865	1,527	5.52	2.8
Motors		18	Warehouse	Refrig	EEM RI	144	598	0	131	729	585	5.07	3.1
Motors		56 CEP	Other	CWtr Pump	EEM RI	144	629	0	76	705	561	4.91	3.2
Motors		39	Other	Cond Pump	VSD to Existing RI	213	1,045	10	4	1,051	838	4.85	3.2
Motors		58 CEP	Other	Under Air #4	EEM RI	272	1,156	5	125	1,286	1,014	4.72	3.3
Motors		5	Food Sales	Refrig	EEM RI	71	266	0	65	332	261	4.64	3.4
Motors		14	Office	CTwr Fan	VSD to Existing RI	182	869	10	13	837	655	4.61	3.4
Motors		25	Office	Cond Pump	VSD to Existing RI	182	869	10	13	837	655	4.61	3.4
Motors		29	Other	Circ Pump	EEM RI	61	244	0	37	280	219	4.59	3.4
Motors		43	Other	HTW Pump	EEM RI	61	244	0	37	280	219	4.59	3.4
Motors		53 CEP	Other	CWtr Pump	VSD & EEM RI	14,368	64,025	10	825	64,840	50,472	4.51	3.5
Motors		45 CEP	Other	HTW Pump	EEM RI	328	1,172	0	300	1,472	1,143	4.49	3.5
Motors		44 CEP	Other	HTW Pump	EEM RI	272	970	0	249	1,219	947	4.48	3.5
Motors		6	Health Care	AHU	EEM RI	71	260	0	59	319	247	4.46	3.5
Motors		5 WELL	Water Well	P-4524	EEM RI	272	1,081	0	107	1,189	916	4.37	3.6
Motors		17	Warehouse	Refrig	EEM RI	28	95	0	25	121	95	4.35	3.6
Motors		6	Food Sales	Refrig	EEM RI	99	335	0	90	425	326	4.30	3.6
Motors		4	Health Care	AHU	EEM RI	39	128	0	35	163	124	4.20	3.7
Motors		16	Education	CTwr Fan	VSD to Existing RI	338	1,441	20	15	1,465	1,067	4.16	3.8
Motors		26	Education	Cond Pump	VSD to Existing RI	338	1,441	20	15	1,465	1,067	4.16	3.8
Motors		27	Education	Refrig	EEM RI	45	143	0	41	184	139	4.07	3.8
Motors		55 CEP	Other	CWtr Pump	EEM RI	99	336	0	67	403	304	4.07	3.8
Transportation	Conversion	Ambulance	Vehicles	Modular, 4x2	CNG Vehicle ROF	1,973	3,319	5,282	622	7,979	6,006	4.04	3.9
Motors		5	Health Care	AHU	EEM RI	90	308	0	54	363	272	4.02	3.9
Motors		13	Health Care	Vac Sys	EEM RI	39	152	0	2	154	115	3.97	3.9
Motors		18	Other	CTwr Fan	VSD to Existing RI	179	718	10	17	692	513	3.87	4.0
Motors		38	Other	Cond Pump	VSD to Existing RI	179	718	10	17	692	513	3.87	4.0
Motors		52 CEP	Other	Makeup Pump	EEM RI	71	239	0	33	272	201	3.81	4.1
Transportation	Conversion	Bus	Vehicles	Bus, Intercity, 41-51 pasg, 4x2	CNG Vehicle ROF	4,634	9,276	10,212	1,859	17,629	12,995	3.79	4.1
Motors		15	Education	CTwr Fan	VSD to Existing RI	286	1,102	20	11	1,070	784	3.74	4.2
Motors		25	Education	Cond Pump	VSD to Existing RI	286	1,102	20	11	1,070	784	3.74	4.2
Motors		2 WELL	Water Well	P-456	EEM RI	328	1,086	0	129	1,216	888	3.71	4.2
Motors		16	Other	Air Comp	EEM RI	144	398	0	131	529	385	3.68	4.2
Motors		4 WELL	Water Well	T-9961	EEM RI	328	1,066	0	129	1,195	867	3.64	4.3
Motors		3 WELL	Water Well	P-1345	EEM RI	328	1,024	0	129	1,154	826	3.52	4.4
Transportation	Conversion	Bus	Vehicles	Bus, School, 42-45 pasg	CNG Vehicle ROF	1,362	1,153	3,060	270	4,743	3,381	3.48	4.5
Motors		17	Assembly	CTwr Fan	VSD to Existing RI	338	1,188	20	15	1,153	815	3.41	4.6
Motors		31	Assembly	Cond Pump	VSD to Existing RI	338	1,188	20	15	1,153	815	3.41	4.6
Motors		25 CEP	Other	CWtr Pump	VSD to Existing RI	11,870	43,825	20	3,924	39,880	28,011	3.36	4.6
Motors		26 CEP	Other	CWtr Pump	VSD to Existing RI	14,079	51,667	10	4,492	47,165	33,086	3.35	4.7
Motors		47	Other	Oil Pump	EEM RI	144	348	0	131	479	335	3.33	4.7
Motors		27 CEP	Other	CWtr Pump	VSD to Existing RI	16,649	60,503	10	5,327	55,228	38,579	3.32	4.7
Motors		1 WELL	Water Well	P-953	EEM RI	587	1,719	0	232	1,947	1,359	3.31	4.7
Motors		11	Food Service	AHU	EEM RI	144	355	0	119	475	331	3.30	4.7
Motors		24	Office	Cond Fan	EEM RI	78	184	0	71	255	178	3.29	4.8
Motors		2	Food Sales	AHU	EEM RI	143	337	0	131	468	325	3.27	4.8
Motors		25	Food Service	Refrig	EEM RI	49	115	0	44	159	111	3.27	4.8
Motors		3	Health Care	AHU	EEM RI	49	115	0	44	159	111	3.27	4.8
Motors		11	Health Care	Cond Fan	EEM RI	24	57	0	22	80	55	3.27	4.8
Motors		12	Office	AHU	EEM RI	96	226	0	96	321	222	3.24	4.8
Motors		4	Food Sales	Cond Fan	EEM RI	144	331	0	131	462	318	3.21	4.9

Table 3.9b

Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annualized Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Annualized Installed Cost (1995 $)	Annualized Energy & Demand Savings (1995 $)	Annualized O&M Savings (1995 $)	Annualized Replacement Savings (1995 $)	Annualized Total Savings (1995 $)	Annualized Net Savings (1995 $)	Savings to Investment Ratio	Discounted Payback Period
Motors	9	B	Office	AHU	EEM RI	194	478	0	146	624	429	3.21	4.9
Motors	9	A	Office	AHU	EEM RI	155	382	0	117	499	344	3.21	4.9
Motors	13		Food Service	Air Comp	EEM RI	39	89	0	35	124	85	3.20	4.9
Motors	20		Food Service	Cond Fan	EEM RI	39	89	0	35	124	85	3.20	4.9
Motors	10	A	Office	AHU	EEM RI	135	309	0	124	433	297	3.20	4.9
Motors	10	B	Office	AHU	EEM RI	181	412	0	165	577	396	3.20	4.9
Motors	13		Office	Air Comp	EEM RI	181	412	0	165	577	396	3.20	4.9
Motors	14		Food Service	Air Comp	EEM RI	99	221	0	90	312	213	3.15	5.0
Motors	9		Food Service	AHU	EEM RI	45	99	0	41	140	95	3.11	5.0
Motors	1		Food Sales	AHU	EEM RI	39	85	0	35	120	82	3.10	5.0
Motors	4		Public Order	AHU	EEM RI	39	109	0	11	119	81	3.07	5.1
Motors	16		Assembly	CTwr Fan	VSD to Existing RI	284	846	20	15	871	588	3.07	5.1
Motors	30		Assembly	Cond Pump	VSD to Existing RI	284	846	20	15	871	588	3.07	5.1
Transportation	Conversion	Truck	Vehicles	Carryall, 4x4, 7,500 GVW	CNG Vehicle ROF	1,896	3,632	3,840	1,957	5,515	3,710	3.05	5.1
Motors	10		Education	AHU	EEM RI	143	396	0	131	436	294	3.05	5.1
Motors	13		Education	Air Comp	EEM RI	71	153	0	65	218	147	3.05	5.1
Motors	8		Lodging	AHU	EEM RI	39	83	0	35	118	80	3.05	5.1
Motors	15		Other	Air Comp	EEM RI	144	300	0	131	432	288	3.00	5.2
Transportation	Conversion	Truck	Vehicles	Carryall, 4x2, Conv, 15 pass, 7,700 GVW	CNG Vehicle ROF	2,298	5,939	3,416	2,491	6,864	4,566	2.99	5.2
Motors	11		Office	AHU	EEM RI	122	252	0	112	363	241	2.97	5.3
Motors	8	B	Office	AHU	EEM RI	444	938	0	369	1,307	863	2.94	5.3
Motors	8	A	Office	AHU	EEM RI	396	645	0	254	899	595	2.94	5.3
Motors	23		Office	Cond Fan	EEM RI	389	821	0	323	1,144	755	2.94	5.3
Motors	8		Warehouse	AHU	EEM RI	45	90	0	41	131	86	2.91	5.4
Motors	8	B	Food Service	AHU	EEM RI	56	110	0	51	161	106	2.90	5.4
Motors	12		Food Service	Air Comp	EEM RI	28	55	0	25	81	53	2.90	5.4
Motors	19		Food Service	Cond Fan	EEM RI	28	55	0	25	81	53	2.90	5.4
Motors	22		Food Service	HW Circ	EEM RI	28	55	0	25	81	53	2.90	5.4
Motors	8	A	Food Service	AHU	EEM RI	28	55	0	25	81	53	2.90	5.4
Motors	10		Food Service	AHU	EEM RI	61	121	0	56	177	116	2.90	5.4
Motors	24		Education	Cond Fan	EEM RI	39	77	0	35	112	74	2.90	5.4
Motors	7		Service	AHU	EEM RI	144	284	0	131	415	272	2.89	5.4
Motors	14		Other	Air Comp	EEM RI	198	385	0	181	566	368	2.86	5.5
Motors	11		Education	AHU	EEM RI	198	384	0	181	565	367	2.85	5.5
Motors	14		Education	Air Comp	EEM RI	99	192	0	90	283	184	2.85	5.5
Motors	13		Other	Air Comp	EEM RI	90	172	0	82	255	164	2.82	5.5
Motors	17	A	Education	CWtr Pump	EEM RI	90	172	0	82	254	164	2.82	5.5
Motors	8		Education	AHU	EEM RI	45	86	0	41	127	82	2.82	5.5
Motors	3		Food Sales	Cond Fan	EEM RI	28	53	0	25	78	50	2.82	5.5
Motors	10		Other	AHU	EEM RI	99	203	0	74	277	178	2.80	5.6
Motors	7		Lodging	AHU	EEM RI	56	108	0	51	154	98	2.77	5.6
Motors	9		Lodging	Air Comp	EEM RI	194	361	0	178	539	345	2.77	5.6
Motors	24	CEP	Other	CWtr Pump	VSD to Existing RI	2,850	8,881	10	992	7,879	5,029	2.76	5.7
Motors	3		Public Order	AHU	EEM RI	28	69	0	8	76	48	2.75	5.7
Motors	8		Public Order	Cond Fan	EEM RI	28	69	0	8	76	48	2.75	5.7
Motors	8	B	Other	AHU	EEM RI	78	163	0	47	212	134	2.72	5.7
Motors	8	A	Other	AHU	EEM RI	39	83	0	23	106	67	2.72	5.7
Motors	16		Warehouse	Cond Fan	EEM RI	28	50	0	23	76	48	2.72	5.7
Motors	24		Food Service	Refrig	EEM RI	81	146	0	74	220	139	2.71	5.8
Motors	2		Health Care	AHU	EEM RI	41	73	0	37	110	69	2.71	5.8
Motors	12		Assembly	AHU	EEM RI	214	377	0	196	573	358	2.67	5.8
Motors	12		Education	Air Comp	EEM RI	56	96	0	51	147	91	2.64	5.9
Motors	23		Education	Cond Fan	EEM RI	56	96	0	51	147	91	2.64	5.9
Motors	14		Assembly	AHU	EEM RI	123	211	0	112	323	200	2.63	5.9
Motors	12		Other	Air Comp	EEM RI	24	40	0	15	63	39	2.61	6.0
Motors	9		Education	AHU	EEM RI	183	323	0	152	475	292	2.59	6.0
Motors	9		Warehouse	AHU	EEM RI	61	121	0	37	157	96	2.57	6.1
Motors	22		Office	Cond Fan	EEM RI	243	422	0	202	624	380	2.56	6.1
Motors	7	A	Office	AHU	EEM RI	243	422	0	202	624	380	2.56	6.1
Motors	7	B	Office	AHU	EEM RI	389	675	0	323	998	609	2.56	6.1
Motors	7	WELL	Water Well	S 19222	EEM RI	45	98	0	18	116	70	2.56	6.1
Motors	7	A	Food Service	AHU	EEM RI	78	120	0	67	186	113	2.55	6.1
Motors	7	B	Food Service	AHU	EEM RI	122	199	0	111	310	189	2.55	6.1
Motors	18		Food Service	Cond Fan	EEM RI	49	80	0	44	124	76	2.55	6.1
Motors	7	A	Other	AHU	EEM RI	194	316	0	146	496	301	2.55	6.1
Motors	7	B	Other	AHU	EEM RI	369	600	0	229	779	473	2.55	6.1
Motors	6		Service	AHU	EEM RI	28	43	0	28	71	43	2.55	6.1
Motors	28		Assembly	Cond Fan	EEM RI	78	126	0	71	197	120	2.54	6.1
Motors	18		Assembly	CWtr Pump	EEM RI	39	63	0	35	99	60	2.54	6.1
Motors	9		Assembly	AHU	EEM RI	39	63	0	35	99	60	2.54	6.1
Motors	13		Assembly	AHU	EEM RI	99	158	0	90	248	149	2.51	6.2
Motors	9		Other	AHU	EEM RI	122	251	0	74	324	182	2.49	6.3
Motors	10	A	Assembly	AHU	EEM RI	89	141	0	82	224	133	2.48	6.3
Motors	10	B	Assembly	AHU	EEM RI	89	141	0	82	224	133	2.48	6.3

Table 3.9b

Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annualized Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Annualized Installed Cost (1995 $)	Annualized Energy & Demand Savings (1995 $)	Annualized O&M Savings (1995 $)	Annualized Replacement Savings (1995 $)	Annualized Total Savings (1995 $)	Annualized Net Savings (1995 $)	Savings to Investment Ratio	Discounted Payback Period
Motors	15		Assembly	Air Comp	EEM RI	45	71	0	41	112	67	2.48	6.3
Motors	29		Assembly	Cond Fan	EEM RI	45	71	0	41	112	67	2.48	6.3
Motors	2		Public Order	AHU	EEM RI	24	46	0	15	60	36	2.48	6.3
Motors	37		Other	Cond Fan	EEM RI	28	52	0	17	68	41	2.46	6.3
Motors	16		Lodging	Cond Fan	EEM RI	49	74	0	44	119	70	2.44	6.4
Motors	19		Assembly	CWtr Pump	EEM RI	96	144	0	75	219	129	2.43	6.4
Motors	7 B		Warehouse	AHU	EEM RI	73	106	0	67	175	102	2.40	6.5
Motors	7 A		Warehouse	AHU	EEM RI	49	72	0	44	117	68	2.40	6.5
Motors	6 A		Lodging	AHU	EEM RI	122	189	0	101	290	169	2.39	6.5
Motors	6 B		Lodging	AHU	EEM RI	195	308	0	162	465	270	2.39	6.5
Motors	8		Health Care	CWtr Pump	VSD to Existing RI	558	1,596	10	168	1,322	764	2.37	6.6
Motors	8		Service	Air Comp	EEM RI	587	846	0	536	1,382	795	2.35	6.6
Transportation	Conventional	Truck	Vehicles	Stake, 4x2, 7,000 GVW	CNG Vehicle ROF	14,610	29,798	17,369	12,956	34,121	19,512	2.34	6.7
Motors	27		Assembly	Cond Fan	EEM RI	111	158	0	102	259	148	2.33	6.7
Motors	10		Health Care	Cond Fan	EEM RI	18	25	0	16	41	23	2.33	6.7
Motors	11		Assembly	AHU	EEM RI	122	173	0	112	284	162	2.33	6.7
Motors	20		Assembly	CWtr Pump	EEM RI	61	86	0	56	142	81	2.33	6.7
Motors	17		Other	Air Comp	EEM RI	466	765	0	314	1,079	613	2.31	6.8
Motors	28		FH Detached	AHU	EEM RI	24	34	0	22	56	32	2.30	6.8
Transportation	Conventional	Sedan	Vehicles	Sedan	CNG Vehicle ROF	7,756	13,245	12,401	9,953	16,113	9,957	2.28	6.8
Motors	7 A		Education	AHU	EEM RI	146	211	0	121	332	186	2.28	6.9
Motors	7 B		Education	AHU	EEM RI	243	352	0	202	554	311	2.28	6.9
Motors	7		Public Order	Cond Fan	EEM RI	24	39	0	7	55	31	2.27	6.9
Motors	16		Service	HTW Pump	EEM RI	49	66	0	44	110	61	2.26	6.9
Motors	5 B		Service	AHU	EEM RI	49	66	0	44	110	61	2.26	6.9
Motors	14		Service	Cond Fan	EEM RI	24	33	0	22	55	31	2.26	6.9
Motors	5 A		Service	AHU	EEM RI	24	33	0	22	55	31	2.26	6.9
Transportation	Conventional	Truck	Vehicles	Tractor, 4x2, 24,000-44,500 GVW	CNG Vehicle ROF	631	952	820	348	1,424	795	2.26	6.9
Motors	1		Public Order	AHU	EEM RI	41	54	0	37	92	51	2.25	6.9
Motors	23		Other	CWtr Pump	VSD to Existing RI	1,979	5,106	10	663	4,433	2,454	2.24	7.0
Motors	6 WELL		Water Well	T 7752	EEM RI	123	225	0	48	273	151	2.23	7.0
Motors	6 B		Other	AHU	EEM RI	146	215	0	110	325	179	2.22	7.0
Motors	6 A		Other	AHU	EEM RI	97	143	0	73	216	119	2.22	7.0
Motors	28		Other	Circ Pump	EEM RI	24	36	0	18	54	30	2.22	7.0
Motors	8 A		Assembly	AHU	EEM RI	56	83	0	37	121	65	2.18	7.2
Motors	8 B		Assembly	AHU	EEM RI	56	83	0	37	121	65	2.18	7.2
Motors	36		Other	Cond Fan	EEM RI	243	364	0	164	528	285	2.17	7.2
Motors	6 WELL		Water Well	T 15003	EEM RI	99	176	0	39	215	116	2.17	7.2
Motors	17		Food Service	Cond Fan	EEM RI	81	101	0	74	176	94	2.16	7.2
Motors	6 A		Office	AHU	EEM RI	285	376	0	237	613	328	2.15	7.3
Motors	6 B		Office	AHU	EEM RI	448	591	0	372	963	515	2.15	7.3
Motors	21		Office	Cond Fan	EEM RI	263	349	0	220	569	305	2.15	7.3
Motors	46		Other	Makeup Pump	EEM RI	24	37	0	15	52	27	2.12	7.4
Motors	15		Lodging	Cond Fan	EEM RI	244	284	0	223	507	263	2.08	7.5
Motors	5		Lodging	AHU	EEM RI	20	24	0	19	42	22	2.08	7.5
Motors	15		Warehouse	Cond Fan	EEM RI	61	69	0	56	125	64	2.05	7.6
Motors	6		Public Order	Cond Fan	EEM RI	20	25	0	12	41	21	2.04	7.7
Motors	9		Health Care	Cond Fan	EEM ROF	29	30	0	29	60	30	2.04	7.7
Motors	1		Health Care	AHU	EEM ROF	15	15	0	15	30	15	2.04	7.7
Motors	22		Education	Cond Fan	EEM ROF	59	61	0	59	119	61	2.03	7.7
Motors	27		FH Detached	AHU	EEM ROF	117	118	0	117	236	118	2.01	7.8
Motors	5		FH 2 to 4	AHU	EEM ROF	548	551	0	548	1,099	551	2.01	7.8
Motors	32		FH Detached	Cond Fan	EEM ROF	20	20	0	20	39	20	2.01	7.8
Motors	6 A		Education	AHU	EEM RI	122	132	0	112	244	121	1.99	7.8
Motors	6 B		Education	AHU	EEM RI	285	308	0	260	568	283	1.99	7.8
Motors	6 A		Warehouse	AHU	EEM RI	285	329	0	237	566	281	1.99	7.9
Motors	6 B		Warehouse	AHU	EEM RI	457	470	0	338	808	401	1.99	7.9
Motors	20		Office	Cond Fan	EEM ROF	205	199	0	205	405	199	1.98	7.9
Motors	19		FH Attached	AHU	EEM ROF	414	406	0	414	820	406	1.98	7.9
Motors	13		Service	Cond Fan	EEM ROF	59	57	0	59	116	57	1.98	7.9
Motors	4 A		Service	AHU	EEM ROF	39	38	0	39	77	38	1.98	7.9
Motors	4 B		Service	AHU	EEM ROF	39	38	0	39	77	38	1.98	7.9
Motors	5 A		Office	AHU	EEM ROF	65	62	0	65	127	62	1.96	8.0
Motors	5 B		Office	AHU	EEM ROF	81	78	0	81	159	78	1.96	8.0
Motors	6		Food Service	AHU	EEM RI	41	34	0	24	79	38	1.94	8.1
Motors	5 A		Other	AHU	EEM RI	102	112	0	85	197	95	1.95	8.1
Motors	5 B		Other	AHU	EEM RI	173	188	0	135	315	152	1.95	8.1
Motors	5		Food Service	AHU	EEM ROF	33	6	0	33	63	30	1.92	8.1
Transportation	Conventional	Truck	Vehicles	Transit Truck, 4x2, 6,999 GVW & under	CNG Vehicle ROF	1,890	2,802	2,500	1,957	3,440	1,934	1.91	8.2
Motors	7 A		Assembly	AHU	EEM RI	45	76	0	33	92	44	1.90	8.2
Motors	7 B		Assembly	AHU	EEM RI	49	76	0	33	92	44	1.90	8.2
Motors	4 A		Lodging	AHU	EEM ROF	68	60	0	68	127	60	1.88	8.3
Motors	14		Lodging	Cond Fan	EEM ROF	17	17	0	17	32	15	1.88	8.3
Motors	4 B		Lodging	AHU	EEM ROF	85	75	0	85	159	75	1.88	8.3

Table 3.9b

Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annualized Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Annualized Installed Cost (1995 $)	Annualized Energy & Demand Savings (1995 $)	Annualized O&M Savings (1995 $)	Annualized Replacement Savings (1995 $)	Annualized Total Savings (1995 $)	Annualized Net Savings (1995 $)	Savings to Investment Ratio	Unamortized Payback Period
Transportation	Conversion	Truck	Vehicles	Carryall, 4x2, 6,999 GVW & under	CNG Vehicle ROF	4,432	8,626	4,967	4,889	8,331	3,898	1.88	8.3
Motors	35		Other	Cond. Fan	EEM RI	224	252	0	168	420	196	1.88	8.3
Motors	14		Warehouse	Cond. Fan	EEM ROF	51	44	0	51	94	44	1.86	8.4
Motors	26		Assembly	Cond. Fan	EEM ROF	59	50	0	59	109	50	1.85	8.4
Motors	5 A		Warehouse	AHU	EEM ROF	81	68	0	81	150	68	1.84	8.5
Motors	5 B		Warehouse	AHU	EEM ROF	114	95	0	114	209	95	1.84	8.5
Motors	34		Other	Cond. Fan	EEM ROF	51	42	0	51	92	42	1.82	8.6
Motors	11		Other	Air Comp	EEM ROF	17	14	0	17	31	14	1.82	8.6
Motors	21		Education	Cond. Fan	EEM ROF	152	125	0	152	277	125	1.82	8.6
Motors	6 A		Assembly	AHU	EEM ROF	90	73	0	90	163	73	1.81	8.6
Motors	6 B		Assembly	AHU	EEM ROF	127	102	0	127	229	102	1.81	8.6
Motors	26		FH Detached	AHU	EEM ROF	271	216	0	271	487	216	1.80	8.7
Motors	4 B		Other	AHU	EEM ROF	47	37	0	47	84	37	1.78	8.8
Motors	4 A		Other	AHU	EEM ROF	31	24	0	31	56	24	1.78	8.8
Motors	5 A		Education	AHU	EEM ROF	125	97	0	125	223	97	1.78	8.8
Motors	5 B		Education	AHU	EEM ROF	205	158	0	205	362	158	1.78	8.8
Motors	4		FH 2 to 4	AHU	EEM ROF	10,839	8,427	0	10,839	19,266	8,427	1.78	8.8
Motors	5		Public Order	Cond. Fan	EEM ROF	29	23	0	29	52	23	1.77	8.8
Motors	18		FH Attached	AHU	EEM ROF	1,502	1,137	0	1,502	2,639	1,137	1.76	8.9
Motors	3 B		Service	AHU	EEM ROF	33	25	0	33	57	25	1.76	8.9
Motors	3 A		Service	AHU	EEM ROF	16	12	0	16	29	12	1.76	8.9
Motors	16		Food Service	CWir Pump	VSD to Existing RI	988	2,056	10	308	1,718	730	1.74	9.0
Motors	4		Food Service	AHU	EEM ROF	820	591	0	820	1,411	591	1.72	9.1
Motors	19		Office	Cond. Fan	EEM ROF	230	164	0	230	394	164	1.71	9.1
Motors	4		Office	AHU	EEM ROF	54	39	0	54	93	39	1.71	9.1
Motors	12		FH 5 or More	AHU	EEM ROF	473	327	0	473	800	327	1.69	9.2
Motors	25		Assembly	Cond. Fan	EEM ROF	17	11	0	17	28	11	1.67	9.3
Motors	3		Lodging	AHU	EEM ROF	117	79	0	117	196	79	1.67	9.3
Motors	5 B		Assembly	AHU	EEM ROF	81	53	0	81	135	53	1.66	9.4
Motors	5 A		Assembly	AHU	EEM ROF	65	43	0	65	108	43	1.66	9.4
Motors	13		Warehouse	Cond. Fan	EEM ROF	103	67	0	103	170	67	1.65	9.4
Motors	15		Office	CWir Pump	VSD to Existing RI	559	1,086	10	166	914	354	1.63	9.6
Motors	20		Education	Cond. Fan	EEM ROF	73	46	0	73	119	46	1.63	9.6
Transportation	Conversion	Truck	Vehicles	Stake, 4x2, 10,000 GVW	CNG Vehicle ROF	2,525	2,149	5,633	1,946	4,076	1,551	1.61	9.7
Motors	3		Other	AHU	EEM ROF	225	138	0	225	363	138	1.61	9.7
Motors	9		FH 2 to 4	Cond. Fan	EEM ROF	234	143	0	234	377	143	1.61	9.7
Motors	23		FH Attached	Cond. Fan	EEM ROF	293	178	0	293	471	178	1.61	9.7
Motors	31		FH Detached	Cond. Fan	EEM ROF	88	53	0	88	141	53	1.61	9.7
Motors	4		Warehouse	AHU	EEM ROF	104	63	0	104	167	63	1.60	9.7
Motors	33		Other	Cond. Fan	EEM ROF	135	81	0	135	216	81	1.59	9.8
Motors	3		FH 2 to 4	AHU	EEM ROF	12,452	7,383	0	12,452	19,834	7,383	1.59	9.8
Motors	12		Service	Cond. Fan	EEM ROF	44	26	0	44	70	26	1.59	9.8
Motors	17		FH Attached	AHU	EEM ROF	3,092	2,960	0	3,092	6,052	2,960	1.58	9.9
Motors	2		Service	AHU	EEM ROF	28	16	0	28	44	16	1.58	9.9
Motors	4		Education	AHU	EEM ROF	50	28	0	50	78	28	1.56	10.0
Motors	17		Office	Cond. Fan	EEM ROF	51	28	0	51	80	28	1.55	10.1
Motors	2		Office	AHU	EEM ROF	13	7	0	13	20	7	1.55	10.1
Motors	11		FH 5 or More	AHU	EEM ROF	526	287	0	526	812	287	1.54	10.1
Motors	25		FH Detached	AHU	EEM ROF	181	95	0	181	276	95	1.53	10.2
Motors	23		Food Service	Refrig	EEM ROF	14	7	0	14	21	7	1.52	10.3
Motors	24		Assembly	Cond. Fan	EEM ROF	88	45	0	88	133	45	1.51	10.3
Motors	4		Assembly	AHU	EEM ROF	44	23	0	44	67	23	1.51	10.3
Motors	1		Office	AHU	EEM ROF	982	495	0	982	1,475	495	1.50	10.4
Motors	16		Office	Cond. Fan	EEM ROF	211	106	0	211	317	106	1.50	10.4
Motors	12		Lodging	Cond. Fan	EEM ROF	26	13	0	26	38	13	1.50	10.4
Motors	1		Lodging	AHU	EEM ROF	13	6	0	13	19	6	1.50	10.4
Motors	11		Warehouse	Cond. Fan	EEM ROF	26	12	0	26	38	12	1.48	10.5
Motors	1		Food Service	AHU	EEM ROF	25	12	0	25	37	12	1.48	10.5
Motors	10		Lodging	CWir Pump	VSD to Existing RI	420	747	10	118	619	199	1.47	10.6
Motors	2		Warehouse	AHU	EEM ROF	160	76	0	160	236	76	1.47	10.6
Motors	2		Food Service	AHU	EEM ROF	21	10	0	21	31	10	1.46	10.7
Motors	2		Education	AHU	EEM ROF	38	18	0	38	56	18	1.46	10.7
Motors	31		Other	Cond. Fan	EEM ROF	111	50	0	111	161	50	1.45	10.8
Motors	11		Lodging	Cond. Fan	EEM ROF	25	11	0	25	36	11	1.45	10.8
Motors	7		FH 2 to 4	Cond. Fan	EEM ROF	4,827	2,179	0	4,827	7,006	2,179	1.45	10.8
Motors	1		FH 2 to 4	AHU	EEM ROF	13	6	0	13	19	6	1.45	10.8
Motors	21		FH Attached	Cond. Fan	EEM ROF	686	304	0	686	992	304	1.44	10.9
Motors	1		Warehouse	AHU	EEM ROF	50	22	0	50	72	22	1.44	10.9
Motors	10		Warehouse	Cond. Fan	EEM ROF	143	61	0	143	205	61	1.43	10.9
Motors	18		Education	Cond. Fan	EEM ROF	34	15	0	34	49	15	1.43	10.9
Motors	30		Other	Cond. Fan	EEM ROF	124	52	0	124	176	52	1.42	11.0
Motors	1		Education	AHU	EEM ROF	25	10	0	25	35	10	1.42	11.0
Motors	1		Other	AHU	EEM ROF	33	14	0	33	46	14	1.42	11.0
Motors	14		FH 5 or More	Cond. Fan	EEM ROF	456	185	0	456	640	185	1.40	11.1

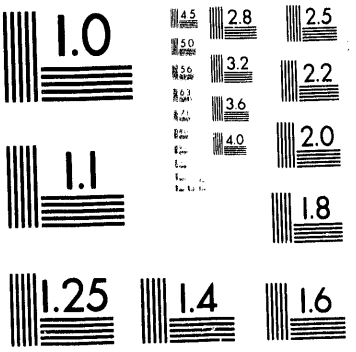
Table 3.9b

Non-Building EEO's Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annualized Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Annualized Installed Cost (1995 $)	Annualized Energy & Demand Savings (1995 $)	Annualized O&M Savings (1995 $)	Annualized Replacement Savings (1995 $)	Annualized Total Savings (1995 $)	Annualized Net Savings (1995 $)	Savings to Investment Ratio	Discounted Payback Period
Motors		29	FH Detached	Cond. Fan	EEM ROF	[illegible]	31	0	[illegible]	[illegible]	31	1.40	11.1
Motors		6	FH 2 to 4	Cond. Fan	EEM ROF	1,264	489	0	1,264	1,753	489	1.39	11.3
Motors		2	Assembly	AHU	EEM ROF	26	[illegible]	0	26	33	[illegible]	1.38	11.3
Motors		22	Assembly	Cond. Fan	EEM ROF	13	5	0	13	18	5	1.38	11.5
Motors		3	Office	AHU	EEM ROF	645	235	0	645	879	235	1.36	11.5
Motors		18	Office	Cond. Fan	EEM ROF	107	39	0	107	147	39	1.36	11.5
Motors		3	Food Service	AHU	EEM ROF	224	[illegible]	0	224	304	[illegible]	1.36	11.5
Motors		17 B	Education	CWtr Pump	VSD to Existing RI	1,093	1,025	20	321	1,481	391	1.36	11.5
Motors		13	FH 5 or More	Cond. Fan	EEM ROF	296	105	0	296	401	105	1.35	11.5
Motors		1	Assembly	AHU	EEM ROF	75	26	0	75	101	26	1.34	11.6
Motors		21	Assembly	Cond. Fan	EEM ROF	[illegible]	20	0	[illegible]	[illegible]	20	1.34	11.7
Motors		13	Lodging	Cond. Fan	EEM ROF	98	33	0	98	131	33	1.34	11.7
Motors		2	Lodging	AHU	EEM ROF	2,962	992	0	2,962	3,954	992	1.34	11.7
Motors		20	FH Attached	Cond. Fan	EEM ROF	85	28	0	85	113	28	1.33	11.8
Motors		12	Warehouse	Cond. Fan	EEM ROF	126	41	0	126	167	41	1.33	11.8
Motors		22	Other	CWtr Pump	VSD to Existing RI	557	918	16	176	733	177	1.32	11.9
Motors		2	Other	AHU	EEM ROF	367	96	0	367	463	96	1.31	11.9
Motors		32	Other	Cond. Fan	EEM ROF	81	25	0	81	105	25	1.30	12.0
Motors		19	Education	Cond. Fan	EEM ROF	255	[illegible]	0	255	333	[illegible]	1.30	12.0
Motors		3	Warehouse	AHU	EEM ROF	397	120	0	397	517	120	1.30	12.0
Motors		3	Education	AHU	EEM ROF	155	46	0	155	201	46	1.30	12.1
Motors		8	FH 2 to 4	Cond. Fan	EEM ROF	15,463	4,563	0	15,463	20,026	4,563	1.30	12.1
Motors		1	Service	AHU	EEM ROF	14	4	0	14	18	4	1.29	12.1
Motors		11	Service	Cond. Fan	EEM ROF	14	4	0	14	18	4	1.29	12.1
Motors		2	FH 2 to 4	AHU	EEM ROF	1,498	444	0	1,498	1,813	444	1.29	12.1
Motors		30	FH Detached	Cond. Fan	EEM ROF	310	89	0	310	399	89	1.29	12.1
Motors		22	FH Attached	Cond. Fan	EEM ROF	5,374	1,544	0	5,374	6,918	1,544	1.29	12.1
Motors		24	FH Detached	AHU	EEM ROF	25	[illegible]	0	25	32	[illegible]	1.28	12.2
Motors		15	FH 5 or More	Cond. Fan	EEM ROF	390	105	0	390	495	105	1.26	12.4
Motors		10	FH 5 or More	AHU	EEM ROF	333	87	0	333	420	87	1.26	12.4
Motors		23	Assembly	Cond. Fan	EEM ROF	136	36	0	136	173	36	1.26	12.4
Motors		3	Assembly	AHU	EEM ROF	175	43	0	175	218	43	1.25	12.5
Motors		10	Service	CWtr Pump	VSD to Existing RI	849	1,317	20	268	1,098	248	1.25	12.5
Motors		16	FH Attached	AHU	EEM ROF	96	23	0	96	119	23	1.24	12.6
Transportation		Conversion Bus	Vehicles	Bus, School, 28-29 pass	CNG Vehicle ROF	778	436	341	154	923	45	1.06	14.8

Table 3.10
Non-Building EBO's Constituting the Minimum Life-Cycle Cost Efficiency Resource: Cumulative Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Cumulative First Year Energy Savings (MBtus)	Cumulative First Year Demand Savings (kW max)	Cumulative Full Implement Energy Savings (MBtus)	Cumulative Full Implement Demand Savings (kW max)	Cumulative Net Savings (1995 $)	Cumulative Discounted Payback Period	Cumulative Savings to Investment Ratio	Incremental Savings to Investment Ratio
T&D		Substation	Substation	Sub Transformers	Conservation Voltage Reduction RI	4,266	2,447	4,266	2,447	826,865	0.0	2,068.01	2,068.01
Lights		Ext Lighting	8 Ball Fields	Lighting Controls	Lighting Controls RI	12,218	2,499	12,218	2,499	1,704,342	0.4	43.19	22.94
Motors		54 CEP	Other	Cond. Pump	VSD & EEM RI	12,950	2,795	12,950	2,795	1,988,528	0.4	37.05	18.88
Transportation	Conversion	Truck	Vehicles	Tractor, 6x4, 24,000-44,500 GVW	CNG Vehicle ROF	12,950	2,795	12,973	2,795	2,018,627	0.4	35.33	15.78
Motors		41 CEP	Other	Cond. Pump	VSD to Existing RI	15,240	3,724	15,291	3,736	2,422,487	0.6	26.66	12.34
Motors		50	Other	Pumps	VSD to Existing RI	15,869	3,977	15,954	3,994	2,522,896	0.6	25.42	12.31
Motors		49	Other	Pumps	VSD to Existing RI	16,374	4,180	16,453	4,202	2,605,705	0.6	24.55	12.16
Motors		48	Other	Pumps	VSD to Existing RI	16,756	4,333	16,845	4,359	2,664,830	0.7	23.95	12.01
Motors		42 CEP	Other	Cond. Pump	VSD to Existing RI	18,376	4,988	18,486	5,025	2,964,049	0.7	21.56	11.67
Motors		21 CEP	Other	CTwr Fan	VSD to Existing RI	18,895	5,190	19,015	5,229	3,058,137	0.7	20.99	11.59
Motors		20 CEP	Other	CTwr Fan	VSD to Existing RI	20,156	5,695	20,338	5,746	3,288,549	0.8	19.30	9.63
T&D		Substation	Substation	Capacitor Bank	Power Factor Correction to .95 RI	20,205	5,705	20,356	5,756	3,385,061	0.8	18.48	7.87
Motors		40	Other	Cond. Pump	VSD to Existing RI	20,379	5,781	20,535	5,834	3,421,304	0.9	18.17	7.55
Motors		57 CEP	Other	FD Fan #4	EEM RI	20,481	5,822	20,637	5,875	3,435,898	0.9	18.04	6.57
Cooling		Hag Inn 1	Hag Inn 1	AC and Heat Source	Shade Screen RI	20,605	5,930	20,761	5,985	3,465,907	0.9	17.72	6.53
Motors		12	Health Care	Cond. Pump	VSD to Existing RI	20,674	5,970	20,833	6,026	3,477,638	0.9	17.61	6.48
Motors		7	Health Care	CTwr Fan	VSD to Existing RI	20,743	6,011	20,906	6,068	3,489,369	0.9	17.49	6.48
Cooling		Hag Inn 2	Hag Inn 2	AC and Heat Source	Shade Screen RI	20,941	6,189	21,104	6,237	3,539,507	0.9	17.05	6.46
Motors		15	Service	Cond. Pump	VSD to Existing RI	20,992	6,231	21,157	6,290	3,556,516	0.9	16.85	5.77
Motors		9	Service	CTwr Fan	VSD to Existing RI	21,043	6,283	21,209	6,344	3,573,524	0.9	16.67	5.77
Motors		13	Food Service	CTwr Fan	VSD to Existing RI	21,108	6,322	21,277	6,384	3,588,635	0.9	16.52	5.58
Motors		21	Food Service	Cond. Pump	VSD to Existing RI	21,174	6,361	21,344	6,424	3,605,786	1.0	16.36	5.58
Motors		51 CEP	Other	HTW Pump	EEM RI	21,259	6,395	21,429	6,458	3,614,080	1.0	16.26	5.55
Motors		19	Other	CTwr Fan	VSD to Existing RI	21,380	6,449	21,555	6,514	3,637,889	1.0	16.05	5.32
Motors		18	Warehouse	Refrig	EEM RI	21,457	6,483	21,632	6,548	3,646,992	1.0	15.92	5.07
Motors		56 CEP	Other	CWtr Pump	EEM RI	21,527	6,511	21,702	6,576	3,655,763	1.0	15.82	4.91
Motors		39	Other	Cond. Pump	VSD to Existing RI	21,573	6,539	21,749	6,616	3,668,538	1.0	15.68	4.85
Motors		58 CEP	Other	Under Air #4	EEM RI	21,713	6,606	21,889	6,672	3,684,376	1.0	15.49	4.72
Motors		5	Food Sales	Refrig	EEM RI	21,743	6,623	21,919	6,689	3,688,441	1.0	15.45	4.64
Motors		14	Office	CTwr Fan	VSD to Existing RI	21,792	6,658	21,970	6,726	3,698,677	1.0	15.33	4.61
Motors		25	Office	Cond. Pump	VSD to Existing RI	21,841	6,694	22,021	6,763	3,708,944	1.0	15.21	4.61
Motors		29	Other	Circ. Pump	EEM RI	21,870	6,705	22,050	6,774	3,712,338	1.0	15.17	4.59
Motors		43	Other	HTW Pump	EEM RI	21,899	6,717	22,079	6,786	3,715,762	1.0	15.13	4.59
Motors		53 CEP	Other	CWtr Pump	VSD & EEM RI	23,511	8,182	23,691	8,251	4,344,244	1.3	10.24	4.51
Motors		45 CEP	Other	HTW Pump	EEM RI	23,682	8,251	23,862	8,320	4,322,108	1.3	10.18	4.49
Motors		44 CEP	Other	HTW Pump	EEM RI	23,822	8,307	24,002	8,376	4,336,895	1.3	10.13	4.48
Motors		6	Health Care	AHU	EEM RI	23,850	8,324	24,030	8,393	4,340,761	1.3	10.12	4.46
Motors		5 WELL	Water Well	P-4524	EEM RI	23,973	8,380	24,153	8,449	4,355,076	1.4	10.07	4.37
Motors		17	Warehouse	Refrig	EEM RI	23,984	8,385	24,164	8,454	4,356,530	1.4	10.07	4.35
Motors		6	Food Sales	Refrig	EEM RI	24,024	8,407	24,204	8,475	4,361,626	1.4	10.05	4.30
Motors		4	Health Care	AHU	EEM RI	24,058	8,414	24,217	8,480	4,363,568	1.4	10.04	4.29
Motors		16	Education	CTwr Fan	VSD to Existing RI	24,099	8,468	24,282	8,539	4,380,258	1.4	9.98	4.16
Motors		26	Education	Cond. Pump	VSD to Existing RI	24,161	8,521	24,346	8,594	4,396,907	1.4	9.92	4.16
Motors		27	Education	Refrig	EEM RI	24,177	8,530	24,361	8,605	4,399,074	1.4	9.91	4.07
Motors		55 CEP	Other	CWtr Pump	EEM RI	24,212	8,544	24,397	8,617	4,405,826	1.4	9.88	4.07
Transportation	Conversion	Ambulance	Vehicles	Modular, 4x2	CNG Vehicle ROF	24,212	8,544	24,516	8,617	4,697,633	1.4	9.57	4.04
Motors		5	Health Care	AHU	EEM RI	24,243	8,563	24,547	8,636	4,701,997	1.4	9.55	4.02
Motors		13	Health Care	Vac. Sys	EEM RI	24,257	8,570	24,561	8,643	4,705,709	1.4	9.55	3.97
Motors		18	Other	CTwr Fan	VSD to Existing RI	24,288	8,597	24,595	8,671	4,711,719	1.4	9.52	3.87
Motors		38	Other	Cond. Pump	VSD to Existing RI	24,319	8,624	24,625	8,699	4,719,729	1.4	9.49	3.87
Motors		52 CEP	Other	Makeup Pump	EEM RI	24,339	8,640	24,646	8,715	4,722,863	1.4	9.48	3.81
Transportation	Conversion	Bus	Vehicles	Bus, Intercity, 41-51 pass, 4x2	CNG Vehicle ROF	24,339	8,640	24,980	8,715	4,925,534	1.8	8.82	3.79
Motors		15	Education	CTwr Fan	VSD to Existing RI	24,386	8,681	27,029	8,758	4,957,805	1.8	8.79	3.74
Motors		25	Education	Cond. Pump	VSD to Existing RI	24,433	8,721	27,078	8,816	4,956,056	1.8	8.75	3.74
Motors		2 WELL	Water Well	P-456	EEM RI	24,543	8,766	27,189	8,869	4,963,921	1.8	8.71	3.71
Motors		16	Other	Air Comp	EEM RI	24,582	8,824	27,227	8,948	4,969,942	1.8	8.69	3.68
Motors		4 WELL	Water Well	T-9961	EEM RI	24,689	8,892	27,334	8,971	4,983,486	1.8	8.63	3.64
Motors		3 WELL	Water Well	P-1345	EEM RI	24,789	8,961	27,434	9,046	4,996,388	1.8	8.61	3.52
Transportation	Conversion	Bus	Vehicles	Bus, School, 42-45 pass	CNG Vehicle ROF	24,789	8,961	27,478	9,046	5,049,199	1.8	8.45	3.48
Motors		17	Assembly	CTwr Fan	VSD to Existing RI	24,818	9,014	27,569	9,095	5,061,951	1.9	8.41	3.41
Motors		31	Assembly	Cond. Pump	VSD to Existing RI	24,847	9,068	27,559	9,151	5,074,663	1.9	8.37	3.41
Motors		25 CEP	Other	CWtr Pump	VSD to Existing RI	30,869	10,578	31,537	10,755	5,512,250	2.1	7.31	3.36
Motors		26 CEP	Other	CWtr Pump	VSD to Existing RI	35,869	12,580	36,276	12,647	6,029,130	2.4	6.51	3.35
Motors		47	Other	Oil Pump	EEM RI	35,635	12,666	36,275	12,670	6,054,370	2.4	6.51	3.33
Motors		27 CEP	Other	CWtr Pump	VSD to Existing RI	41,138	14,833	41,893	14,887	6,637,080	2.6	5.90	3.32
Motors		1 WELL	Water Well	P-953	EEM RI	41,361	14,945	41,974	14,997	6,658,295	2.7	5.88	3.31
Motors		11	Food Service	AHU	EEM RI	41,390	14,974	42,089	15,051	6,663,865	2.7	5.87	3.30
Motors		24	Office	Cond. Fan	EEM RI	41,394	14,994	42,017	15,041	6,666,242	2.7	5.87	3.29
Motors		2	Food Sales	AHU	EEM RI	41,429	15,022	42,041	15,074	6,671,316	2.7	5.87	3.27
Motors		25	Food Service	Refrig	EEM RI	41,441	15,029	42,054	15,082	6,673,048	2.7	5.87	3.27
Motors		3	Health Care	AHU	EEM RI	41,453	15,036	42,066	15,088	6,674,769	2.7	5.86	3.27
Motors		11	Health Care	Cond. Fan	EEM RI	41,456	15,046	42,070	15,094	6,675,632	2.7	5.86	3.27
Motors		12	Office	AHU	EEM RI	41,458	15,051	42,091	15,115	6,679,094	2.7	5.86	3.24


1.0
4.5
2.8
2.5
5.0
3.2
2.2
5.6
3.6
6.3
4.0
2.0
1.1
1.8
1.25
1.4
1.6

4 of 4

Table 3.10
Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resource: Cumulative Annual Energy and Demand Reductions

End Use	Bldg. Set No	Bldg. Type	Use Area	Existing Technology	Retrofit Technology	Cumulative First Year Energy Savings (MBtu)	Cumulative First Year Demand Savings (kW mo)	Cumulative Full Implement Energy Savings (MBtu)	Cumulative Full Implement Demand Savings (kW mo)	Cumulative Net Savings (1993 $)	Cumulative Discounted Payback Period	Cumulative Savings to Investment Ratio	Individual Savings to Investment Ratio
Motors	4		Food Sales	Cond. Fan	EEM - RI	41,504	15,078	42,117	15,130	6,684,065	2.7	5.86	3.21
Motors	9 B		Office	AHU	EEM - RI	41,540	15,117	42,153	15,169	6,690,775	2.7	5.85	3.21
Motors	9 A		Office	AHU	EEM - RI	41,569	15,149	42,182	15,200	6,696,142	2.7	5.85	3.21
Motors	13		Food Service	Air Comp.	EEM - RI	41,575	15,156	42,188	15,208	6,697,475	2.7	5.84	3.20
Motors	20		Food Service	Cond. Fan	EEM - RI	41,582	15,160	42,195	15,212	6,698,808	2.7	5.84	3.20
Motors	10 A		Office	AHU	EEM - RI	41,607	15,188	42,220	15,239	6,703,453	2.7	5.84	3.20
Motors	10 B		Office	AHU	EEM - RI	41,640	15,224	42,253	15,275	6,709,645	2.7	5.83	3.20
Motors	13		Office	Air Comp.	EEM - RI	41,673	15,260	42,286	15,312	6,715,838	2.7	5.83	3.20
Motors	14		Food Service	Air Comp.	EEM - RI	41,692	15,282	42,305	15,333	6,719,163	2.7	5.83	3.15
Motors	9		Food Service	AHU	EEM - RI	41,699	15,291	42,312	15,342	6,720,649	2.7	5.82	3.11
Motors	1		Food Sales	AHU	EEM - RI	41,705	15,299	42,318	15,350	6,721,923	2.7	5.82	3.10
Motors	4		Public Order	AHU	EEM - RI	41,713	15,306	42,326	15,358	6,723,182	2.7	5.82	3.07
Motors	16		Assembly	CTwr. Fan	VSD to Existing - RI	41,735	15,347	42,349	15,400	6,732,360	2.7	5.81	3.07
Motors	30		Assembly	Cond. Pump	VSD to Existing - RI	41,757	15,387	42,372	15,443	6,741,539	2.7	5.80	3.07
Transportation	Conversion Truck		Vehicles	Carryall, 4x4, 7,500 GVW	CNG Vehicle - ROF	41,757	15,387	42,542	15,443	6,799,492	2.7	5.75	3.05
Motors	10		Education	AHU	EEM - RI	41,776	15,420	42,561	15,476	6,804,078	2.7	5.75	3.05
Motors	13		Education	Air Comp.	EEM - RI	41,786	15,436	42,571	15,492	6,806,370	2.7	5.74	3.05
Motors	8		Lodging	AHU	EEM - RI	41,791	15,442	42,577	15,498	6,807,613	2.7	5.74	3.05
Motors	15		Other	Air Comp.	EEM - RI	41,811	15,476	42,596	15,532	6,812,112	2.7	5.74	3.00
Transportation	Conversion Truck		Vehicles	Carryall, 4x2, Conv. 15 pagr. 7,700 GVW	CNG Vehicle - ROF	41,811	15,476	42,875	15,532	6,883,439	2.8	5.67	2.99
Motors	11		Office	AHU	EEM - RI	41,832	15,499	42,896	15,555	6,887,206	2.8	5.67	2.97
Motors	8 B		Office	AHU	EEM - RI	41,906	15,579	42,969	15,635	6,900,680	2.8	5.66	2.94
Motors	8 A		Office	AHU	EEM - RI	41,956	15,634	43,019	15,690	6,909,944	2.8	5.65	2.94
Motors	23		Office	Cond. Fan	EEM - RI	42,020	15,680	43,084	15,736	6,921,734	2.8	5.64	2.94
Motors	8		Warehouse	AHU	EEM - RI	42,026	15,687	43,090	15,743	6,923,080	2.8	5.63	2.91
Motors	8 B		Food Service	AHU	EEM - RI	42,034	15,697	43,098	15,753	6,924,731	2.8	5.63	2.90
Motors	12		Food Service	Air Comp.	EEM - RI	42,039	15,702	43,102	15,758	6,925,556	2.8	5.63	2.90
Motors	19		Food Service	Cond. Fan	EEM - RI	42,043	15,705	43,106	15,760	6,926,382	2.8	5.63	2.90
Motors	22		Food Service	HW Circ.	EEM - RI	42,047	15,710	43,110	15,765	6,927,207	2.8	5.63	2.90
Motors	8 A		Food Service	AHU	EEM - RI	42,051	15,715	43,115	15,770	6,928,033	2.8	5.63	2.90
Motors	10		Food Service	AHU	EEM - RI	42,061	15,726	43,124	15,782	6,929,842	2.8	5.63	2.90
Motors	24		Education	Cond. Fan	EEM - RI	42,065	15,730	43,129	15,786	6,930,992	2.8	5.63	2.90
Motors	7		Service	AHU	EEM - RI	42,082	15,764	43,146	15,820	6,935,234	2.8	5.62	2.89
Motors	14		Other	Air Comp.	EEM - RI	42,107	15,807	43,171	15,863	6,940,979	2.8	5.62	2.86
Motors	11		Education	AHU	EEM - RI	42,132	15,850	43,196	15,906	6,946,714	2.8	5.61	2.85
Motors	14		Education	Air Comp.	EEM - RI	42,145	15,872	43,208	15,927	6,949,581	2.8	5.61	2.85
Motors	13		Other	Air Comp.	EEM - RI	42,155	15,890	43,219	15,946	6,952,150	2.8	5.61	2.82
Motors	17 A		Education	CWtr Pump	EEM - RI	42,166	15,899	43,229	15,955	6,954,715	2.8	5.60	2.82
Motors	8		Education	AHU	EEM - RI	42,171	15,908	43,234	15,964	6,955,997	2.8	5.60	2.82
Motors	3		Food Sales	Cond. Fan	EEM - RI	42,175	15,911	43,238	15,966	6,956,785	2.8	5.60	2.82
Motors	10		Other	AHU	EEM - RI	42,187	15,932	43,251	15,988	6,959,565	2.8	5.60	2.80
Motors	7		Lodging	AHU	EEM - RI	42,194	15,940	43,258	15,995	6,961,103	2.8	5.60	2.77
Motors	9		Lodging	Air Comp.	EEM - RI	42,219	15,974	43,283	16,030	6,966,485	2.8	5.59	2.77
Motors	24 CEP		Other	CWtr Pump	VSD to Existing - RI	42,947	16,303	44,013	16,359	7,045,048	2.8	5.51	2.76
Motors	3		Public Order	AHU	EEM - RI	42,952	16,308	44,017	16,364	7,045,806	2.8	5.51	2.75
Motors	8		Public Order	Cond. Fan	EEM - RI	42,957	16,310	44,022	16,367	7,046,563	2.8	5.51	2.75
Motors	8 B		Other	AHU	EEM - RI	42,966	16,326	44,032	16,382	7,048,656	2.8	5.51	2.72
Motors	8 A		Other	AHU	EEM - RI	42,971	16,334	44,036	16,390	7,049,702	2.8	5.51	2.72
Motors	16		Warehouse	Cond. Fan	EEM - RI	42,974	16,336	44,039	16,392	7,050,450	2.8	5.50	2.72
Motors	24		Food Service	Refrig.	EEM - RI	42,990	16,345	44,055	16,402	7,052,620	2.8	5.50	2.71
Motors	2		Health Care	AHU	EEM - RI	42,997	16,350	44,063	16,406	7,053,705	2.8	5.50	2.71
Motors	12		Assembly	AHU	EEM - RI	43,011	16,399	44,076	16,455	7,059,302	2.8	5.50	2.67
Motors	12		Education	Air Comp.	EEM - RI	43,017	16,409	44,082	16,465	7,060,725	2.8	5.49	2.64
Motors	23		Education	Cond. Fan	EEM - RI	43,022	16,414	44,088	16,470	7,062,148	2.8	5.49	2.64
Motors	14		Assembly	AHU	EEM - RI	43,030	16,442	44,095	16,499	7,065,276	2.8	5.49	2.63
Motors	12		Other	Air Comp.	EEM - RI	43,034	16,446	44,099	16,502	7,065,888	2.8	5.49	2.61
Motors	9		Education	AHU	EEM - RI	43,054	16,481	44,120	16,537	7,070,451	2.8	5.48	2.59
Motors	9		Warehouse	AHU	EEM - RI	43,062	16,489	44,127	16,546	7,071,953	2.9	5.48	2.57
Motors	22		Office	Cond. Fan	EEM - RI	43,094	16,512	44,159	16,569	7,077,895	2.9	5.47	2.56
Motors	7 A		Office	AHU	EEM - RI	43,126	16,547	44,191	16,603	7,083,837	2.9	5.47	2.56
Motors	7 B		Office	AHU	EEM - RI	43,177	16,602	44,242	16,659	7,093,344	2.9	5.46	2.56
Motors	7 WELL		Water Well	S-19222	EEM - RI	43,182	16,608	44,247	16,665	7,094,444	2.9	5.45	2.56
Motors	7 A		Food Service	AHU	EEM - RI	43,191	16,619	44,256	16,675	7,096,213	2.9	5.45	2.55
Motors	7 B		Food Service	AHU	EEM - RI	43,205	16,636	44,270	16,693	7,099,162	2.9	5.45	2.55
Motors	18		Food Service	Cond. Fan	EEM - RI	43,211	16,640	44,276	16,696	7,100,341	2.9	5.45	2.55
Motors	7 A		Other	AHU	EEM - RI	43,231	16,674	44,296	16,731	7,105,048	2.9	5.44	2.55
Motors	7 B		Other	AHU	EEM - RI	43,263	16,729	44,328	16,786	7,112,445	2.9	5.43	2.55
Motors	6		Service	AHU	EEM - RI	43,266	16,734	44,331	16,791	7,113,117	2.9	5.43	2.55
Motors	28		Assembly	Cond. Fan	EEM - RI	43,270	16,742	44,335	16,798	7,114,988	2.9	5.43	2.54
Motors	18		Assembly	CWtr Pump	EEM - RI	43,272	16,746	44,337	16,802	7,115,923	2.9	5.43	2.54
Motors	9		Assembly	AHU	EEM - RI	43,274	16,754	44,339	16,810	7,116,859	2.9	5.43	2.54
Motors	13		Assembly	AHU	EEM - RI	43,280	16,775	44,345	16,832	7,119,189	2.9	5.43	2.51
Motors	9		Other	AHU	EEM - RI	43,294	16,798	44,359	16,855	7,122,028	2.9	5.42	2.49

Table 3.10

Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resource: Cumulative Annual Energy and Demand Reductions

End Use	Bldg. Bldg Set No.	Type	Use Area	Existing Technology	Retrofit Technology	Cumulative First Year Energy Savings (MBtu)	Cumulative First Year Demand Savings (kW mo)	Cumulative Full Implement Energy Savings (MBtu)	Cumulative Full Implement Demand Savings (kW mo)	Cumulative Net Savings (1993 $)	Cumulative Discounted Payback Period	Cumulative Savings to Investment Ratio	Individual Savings to Investment Ratio
Motors	10	A	Assembly	AHU	EEM - RI	43,299	16,817	44,364	16,873	7,124,112	2.9	5.42	2.48
Motors	10	B	Assembly	AHU	EEM - RI	43,304	16,835	44,369	16,891	7,126,197	2.9	5.42	2.48
Motors	15		Assembly	Air Comp.	EEM - RI	43,306	16,844	44,371	16,900	7,127,239	2.9	5.42	2.48
Motors	29		Assembly	Cond. Fan	EEM - RI	43,309	16,848	44,374	16,905	7,128,281	2.9	5.41	2.48
Motors	2		Public Order	AHU	EEM - RI	43,312	16,852	44,377	16,908	7,128,842	2.9	5.41	2.48
Motors	37		Other	Cond. Fan	EEM - RI	43,315	16,854	44,380	16,911	7,129,477	2.9	5.41	2.46
Motors	16		Lodging	Cond. Fan	EEM - RI	43,320	16,858	44,385	16,914	7,130,574	2.9	5.41	2.44
Motors	19		Assembly	CWtr Pump	EEM - RI	43,325	16,867	44,390	16,923	7,132,590	2.9	5.41	2.43
Motors	7	B	Warehouse	AHU	EEM - RI	43,332	16,875	44,397	16,931	7,134,190	2.9	5.41	2.40
Motors	7	A	Warehouse	AHU	EEM - RI	43,336	16,880	44,401	16,936	7,135,256	2.9	5.41	2.40
Motors	6	A	Lodging	AHU	EEM - RI	43,349	16,895	44,414	16,949	7,137,894	2.9	5.40	2.39
Motors	6	B	Lodging	AHU	EEM - RI	43,368	16,914	44,433	16,970	7,142,114	2.9	5.40	2.39
Motors	8		Health Care	CWtr Pump	VSD to Existing - RI	43,487	16,983	44,553	17,040	7,154,049	2.9	5.38	2.37
Motors	8		Service	Air Comp.	EEM - RI	43,540	17,093	44,607	17,150	7,166,468	2.9	5.36	2.35
Transportation	Conversion	Truck	Vehicles	Stake, 4x2, 7,000 GVW	CNG Vehicle - ROF	43,540	17,093	45,998	17,150	7,471,283	3.1	4.99	2.34
Motors	27		Assembly	Cond. Fan	EEM - RI	43,546	17,103	46,004	17,160	7,473,594	3.1	4.99	2.33
Motors	10		Health Care	Cond. Fan	EEM - RI	43,548	17,104	46,006	17,161	7,473,959	3.1	4.99	2.33
Motors	11		Assembly	AHU	EEM - RI	43,555	17,127	46,013	17,184	7,476,489	3.1	4.99	2.33
Motors	20		Assembly	CWtr Pump	EEM - RI	43,558	17,133	46,016	17,190	7,477,754	3.1	4.99	2.33
Motors	17		Other	Air Comp.	EEM - RI	43,607	17,218	46,065	17,275	7,487,330	3.1	4.98	2.31
Motors	28		FH Detached	AHU	EEM - RI	43,609	17,220	46,067	17,277	7,487,822	3.1	4.98	2.30
Transportation	Conversion	Sedan	Vehicles	Sedan	CNG Vehicle - ROF	43,609	17,220	46,652	17,277	7,629,304	3.2	4.83	2.28
Motors	7	A	Education	AHU	EEM - RI	43,621	17,241	46,664	17,298	7,632,217	3.2	4.82	2.28
Motors	7	B	Education	AHU	EEM - RI	43,641	17,276	46,684	17,333	7,637,073	3.2	4.82	2.28
Motors	7		Public Order	Cond. Fan	EEM - RI	43,645	17,278	46,687	17,335	7,637,554	3.2	4.82	2.27
Motors	16		Service	HTW Pump	EEM - RI	43,648	17,284	46,691	17,342	7,638,512	3.2	4.82	2.26
Motors	5	B	Service	AHU	EEM - RI	43,651	17,291	46,694	17,348	7,639,470	3.2	4.82	2.26
Motors	14		Service	Cond. Fan	EEM - RI	43,653	17,293	46,696	17,350	7,639,949	3.2	4.82	2.26
Motors	5	A	Service	AHU	EEM - RI	43,655	17,297	46,697	17,354	7,640,428	3.2	4.82	2.26
Transportation	Conversion	Truck	Vehicles	Tractor, 4x2, 24,000-44,500 GVW	CNG Vehicle - ROF	43,655	17,297	46,730	17,354	7,652,810	3.3	4.80	2.26
Motors	1		Public Order	AHU	EEM - RI	43,659	17,301	46,734	17,358	7,653,606	3.3	4.80	2.25
Motors	23		Other	CWtr Pump	VSD to Existing - RI	44,034	17,433	47,110	17,490	7,691,946	3.3	4.76	2.24
Motors	6	WELL	Water Well	T-7732	EEM - RI	44,038	17,442	47,115	17,500	7,694,299	3.3	4.76	2.23
Motors	6	B	Other	AHU	EEM - RI	44,050	17,463	47,127	17,521	7,697,090	3.3	4.76	2.22
Motors	6	A	Other	AHU	EEM - RI	44,059	17,477	47,135	17,535	7,698,951	3.3	4.76	2.22
Motors	28		Other	Circ. Pump	EEM - RI	44,061	17,480	47,137	17,538	7,699,416	3.3	4.76	2.22
Motors	8	A	Assembly	AHU	EEM - RI	44,063	17,490	47,140	17,548	7,700,437	3.3	4.76	2.18
Motors	8	B	Assembly	AHU	EEM - RI	44,066	17,500	47,142	17,558	7,701,457	3.3	4.75	2.18
Motors	36		Other	Cond. Fan	EEM - RI	44,086	17,518	47,163	17,575	7,705,904	3.3	4.75	2.17
Motors	6	WELL	Water Well	T-15003	EEM - RI	44,091	17,525	47,167	17,582	7,707,711	3.3	4.75	2.17
Motors	17		Food Service	Cond. Fan	EEM - RI	44,098	17,529	47,175	17,587	7,709,185	3.3	4.75	2.16
Motors	6	A	Office	AHU	EEM - RI	44,127	17,561	47,204	17,619	7,714,310	3.3	4.74	2.15
Motors	6	B	Office	AHU	EEM - RI	44,173	17,611	47,250	17,669	7,722,363	3.3	4.73	2.15
Motors	21		Office	Cond. Fan	EEM - RI	44,200	17,631	47,277	17,688	7,727,121	3.3	4.73	2.15
Motors	46		Other	Makeup Pump	EEM - RI	44,202	17,634	47,279	17,692	7,727,546	3.3	4.73	2.12
Motors	15		Lodging	Cond. Fan	EEM - RI	44,222	17,648	47,298	17,705	7,731,658	3.3	4.72	2.08
Motors	5		Lodging	AHU	EEM - RI	44,223	17,649	47,300	17,707	7,732,001	3.3	4.72	2.08
Motors	13		Warehouse	Cond. Fan	EEM - RI	44,228	17,653	47,304	17,710	7,732,998	3.3	4.72	2.05
Motors	6		Public Order	Cond. Fan	EEM - RI	44,230	17,654	47,306	17,711	7,733,328	3.3	4.72	2.04
Motors	9		Health Care	Cond. Fan	EEM - ROF	44,230	17,654	47,309	17,713	7,733,803	3.3	4.72	2.04
Motors	1		Health Care	AHU	EEM - ROF	44,230	17,654	47,310	17,714	7,734,040	3.3	4.72	2.04
Motors	22		Education	Cond. Fan	EEM - ROF	44,230	17,654	47,313	17,716	7,734,989	3.3	4.72	2.03
Motors	27		FH Detached	AHU	EEM - ROF	44,230	17,654	47,319	17,724	7,736,834	3.3	4.71	2.01
Motors	5		FH 2 to 4	AHU	EEM - ROF	44,230	17,654	47,344	17,759	7,745,446	3.3	4.70	2.01
Motors	32		FH Detached	Cond. Fan	EEM - ROF	44,230	17,654	47,345	17,760	7,745,754	3.3	4.70	2.01
Motors	6	A	Education	AHU	EEM - RI	44,238	17,668	47,353	17,774	7,747,652	3.3	4.70	1.99
Motors	6	B	Education	AHU	EEM - RI	44,256	17,699	47,371	17,806	7,752,080	3.3	4.69	1.99
Motors	6	A	Warehouse	AHU	EEM - RI	44,277	17,723	47,392	17,829	7,756,467	3.3	4.69	1.99
Motors	6	B	Warehouse	AHU	EEM - RI	44,307	17,757	47,422	17,863	7,762,733	3.3	4.68	1.99
Motors	20		Office	Cond. Fan	EEM - ROF	44,307	17,757	47,435	17,873	7,765,848	3.3	4.68	1.98
Motors	19		FH Attached	AHU	EEM - ROF	44,307	17,757	47,454	17,900	7,772,193	3.3	4.67	1.98
Motors	13		Service	Cond. Fan	EEM - ROF	44,307	17,757	47,457	17,903	7,773,091	3.3	4.67	1.98
Motors	4	A	Service	AHU	EEM - ROF	44,307	17,757	47,459	17,906	7,773,690	3.3	4.67	1.98
Motors	4	B	Service	AHU	EEM - ROF	44,307	17,757	47,460	17,910	7,774,289	3.3	4.67	1.98
Motors	5	A	Office	AHU	EEM - ROF	44,307	17,757	47,465	17,914	7,775,263	3.3	4.66	1.96
Motors	5	B	Office	AHU	EEM - ROF	44,307	17,757	47,470	17,920	7,776,480	3.4	4.66	1.96
Motors	6		Food Service	AHU	EEM - RI	44,311	17,762	47,474	17,925	7,777,077	3.4	4.66	1.94
Motors	5	A	Other	AHU	EEM - RI	44,318	17,773	47,480	17,936	7,778,563	3.4	4.66	1.93
Motors	5	B	Other	AHU	EEM - RI	44,328	17,791	47,491	17,954	7,780,941	3.4	4.66	1.93
Motors	5		Food Service	AHU	EEM - ROF	44,328	17,791	47,493	17,956	7,781,410	3.4	4.66	1.92
Transportation	Conversion	Truck	Vehicles	Panel Truck, 4x2, 6,999 GVW & under	CNG Vehicle - ROF	44,328	17,791	47,624	17,956	7,806,943	3.4	4.62	1.91
Motors	7	A	Assembly	AHU	EEM - RI	44,330	17,798	47,626	17,963	7,807,628	3.4	4.62	1.91
Motors	7	B	Assembly	AHU	EEM - RI	44,332	17,800	47,628	17,970	7,808,313	3.4	4.62	1.91

Table 3.10
Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resource: Cumulative Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Cumulative First Year Energy Savings (MBtu)	Cumulative First Year Demand Savings (kW mo)	Cumulative Full Implement Energy Savings (MBtu)	Cumulative Full Implement Demand Savings (kW mo)	Cumulative Net Savings (1993 $)	Cumulative Discounted Payback Period	Cumulative Savings to Investment Ratio	Individual Savings to Investment Ratio
Motors	4	A	Lodging	AHU	EEM - ROF	44,332	17,805	47,631	17,974	7,809,246	3.4	4.62	1.88
Motors	14		Lodging	Cond. Fan	EEM - ROF	44,332	17,805	47,632	17,974	7,809,479	3.4	4.62	1.88
Motors	4	B	Lodging	AHU	EEM - ROF	44,332	17,805	47,636	17,979	7,810,646	3.4	4.61	1.88
Transportation	Conversion	Truck	Vehicles	Carryall, 4x2, 6,999 GVW & under	CNG Vehicle - ROF	44,332	17,805	48,040	17,979	7,871,547	3.4	4.53	1.88
Motors	35		Other	Cond. Fan	EEM - RI	44,347	17,817	48,055	17,991	7,874,609	3.5	4.53	1.88
Motors	14		Warehouse	Cond. Fan	EEM - ROF	44,347	17,817	48,057	17,993	7,875,290	3.5	4.52	1.86
Motors	26		Assembly	Cond. Fan	EEM - ROF	44,347	17,817	48,058	17,995	7,876,070	3.5	4.52	1.85
Motors	5	A	Warehouse	AHU	EEM - ROF	44,347	17,817	48,062	18,000	7,877,134	3.5	4.52	1.84
Motors	5	B	Warehouse	AHU	EEM - ROF	44,347	17,817	48,068	18,006	7,878,624	3.5	4.52	1.84
Motors	34		Other	Cond. Fan	EEM - ROF	44,347	17,817	48,070	18,008	7,879,275	3.5	4.52	1.82
Motors	11		Other	Air Comp.	EEM - ROF	44,347	17,817	48,070	18,009	7,879,492	3.5	4.52	1.82
Motors	21		Education	Cond. Fan	EEM - ROF	44,347	17,817	48,076	18,014	7,881,443	3.5	4.52	1.82
Motors	6	A	Assembly	AHU	EEM - ROF	44,347	17,817	48,079	18,022	7,882,582	3.5	4.51	1.81
Motors	6	B	Assembly	AHU	EEM - ROF	44,347	17,817	48,082	18,034	7,884,178	3.5	4.51	1.81
Motors	26		FH Detached	AHU	EEM - ROF	44,347	17,817	48,092	18,048	7,887,550	3.5	4.51	1.80
Motors	4	B	Other	AHU	EEM - ROF	44,347	17,817	48,094	18,052	7,888,122	3.5	4.51	1.78
Motors	4	A	Other	AHU	EEM - ROF	44,347	17,817	48,095	18,054	7,888,503	3.5	4.51	1.78
Motors	5	A	Education	AHU	EEM - ROF	44,347	17,817	48,100	18,063	7,890,025	3.5	4.50	1.78
Motors	5	B	Education	AHU	EEM - ROF	44,347	17,817	48,109	18,078	7,892,499	3.5	4.50	1.78
Motors	4		FH 2 to 4	AHU	EEM - ROF	44,347	17,817	48,520	18,656	8,024,142	3.6	4.31	1.78
Motors	5		Public Order	Cond. Fan	EEM - ROF	44,347	17,817	48,521	18,656	8,024,497	3.6	4.31	1.77
Motors	18		FH Attached	AHU	EEM - ROF	44,347	17,817	48,580	18,740	8,042,260	3.6	4.28	1.76
Motors	3	B	Service	AHU	EEM - ROF	44,347	17,817	48,582	18,742	8,042,645	3.6	4.28	1.76
Motors	3	A	Service	AHU	EEM - ROF	44,347	17,817	48,582	18,743	8,042,837	3.6	4.28	1.76
Motors	16		Food Service	CWtr Pump	VSD to Existing - RI	44,460	17,885	48,696	18,811	8,054,243	3.7	4.27	1.74
Motors	4		Food Service	AHU	EEM - ROF	44,460	17,885	48,732	18,854	8,063,474	3.7	4.25	1.72
Motors	19		Office	Cond. Fan	EEM - ROF	44,460	17,885	48,744	18,862	8,066,082	3.7	4.25	1.71
Motors	4		Office	AHU	EEM - ROF	44,460	17,885	48,747	18,866	8,066,634	3.7	4.25	1.71
Motors	12		FH 5 or More	AHU	EEM - ROF	44,460	17,885	48,768	18,895	8,071,747	3.7	4.24	1.69
Motors	25		Assembly	Cond. Fan	EEM - ROF	44,460	17,885	48,768	18,896	8,071,925	3.7	4.24	1.67
Motors	3		Lodging	AHU	EEM - ROF	44,460	17,885	48,773	18,900	8,073,157	3.7	4.24	1.67
Motors	5	B	Assembly	AHU	EEM - ROF	44,460	17,885	48,774	18,906	8,073,992	3.7	4.24	1.66
Motors	5	A	Assembly	AHU	EEM - ROF	44,460	17,885	48,776	18,911	8,074,659	3.7	4.24	1.66
Motors	13		Warehouse	Cond. Fan	EEM - ROF	44,460	17,885	48,779	18,913	8,075,708	3.7	4.24	1.65
Motors	15		Office	CWtr Pump	VSD to Existing - RI	44,524	17,931	48,843	18,960	8,081,241	3.7	4.23	1.63
Motors	20		Education	Cond. Fan	EEM - ROF	44,524	17,931	48,846	18,962	8,081,956	3.7	4.23	1.63
Transportation	Conversion	Truck	Vehicles	Stake, 4x2, 10,000 GVW	CNG Vehicle - ROF	44,524	17,931	48,918	18,962	8,106,179	3.7	4.19	1.61
Motors	3		Other	AHU	EEM - ROF	44,524	17,931	48,926	18,974	8,108,329	3.7	4.18	1.61
Motors	9		FH 2 to 4	Cond. Fan	EEM - ROF	44,524	17,931	48,932	18,980	8,110,535	3.7	4.18	1.61
Motors	23		FH Attached	Cond. Fan	EEM - ROF	44,524	17,931	48,940	18,988	8,113,338	3.7	4.17	1.61
Motors	31		FH Detached	Cond. Fan	EEM - ROF	44,524	17,931	48,943	18,990	8,114,173	3.7	4.17	1.61
Motors	4		Warehouse	AHU	EEM - ROF	44,524	17,931	48,947	18,995	8,115,157	3.7	4.17	1.60
Motors	33		Other	Cond. Fan	EEM - ROF	44,524	17,931	48,951	18,999	8,116,415	3.7	4.17	1.59
Motors	3		FH 2 to 4	AHU	EEM - ROF	44,524	17,931	49,311	19,505	8,231,750	3.9	3.99	1.59
Motors	12		Service	Cond. Fan	EEM - ROF	44,524	17,931	49,312	19,506	8,232,106	3.9	3.99	1.59
Motors	17		FH Attached	AHU	EEM - ROF	44,524	17,931	49,466	19,722	8,278,077	4.0	3.92	1.58
Motors	2		Service	AHU	EEM - ROF	44,524	17,931	49,466	19,723	8,278,331	4.0	3.92	1.58
Motors	4		Education	AHU	EEM - ROF	44,524	17,931	49,468	19,726	8,278,770	4.0	3.92	1.56
Motors	17		Office	Cond. Fan	EEM - ROF	44,524	17,931	49,470	19,727	8,279,213	4.0	3.92	1.55
Motors	2		Office	AHU	EEM - ROF	44,524	17,931	49,470	19,728	8,279,324	4.0	3.92	1.55
Motors	11		FH 5 or More	AHU	EEM - ROF	44,524	17,931	49,487	19,752	8,283,801	4.0	3.91	1.54
Motors	25		FH Detached	AHU	EEM - ROF	44,524	17,931	49,494	19,761	8,285,290	4.0	3.91	1.53
Motors	23		Food Service	Refrig.	EEM - ROF	44,524	17,931	49,494	19,761	8,285,405	4.0	3.91	1.52
Motors	24		Assembly	Cond. Fan	EEM - ROF	44,524	17,931	49,495	19,763	8,286,108	4.0	3.91	1.51
Motors	4		Assembly	AHU	EEM - ROF	44,524	17,931	49,496	19,766	8,286,460	4.0	3.91	1.51
Motors	1		Office	AHU	EEM - ROF	44,524	17,931	49,528	19,800	8,294,155	4.0	3.89	1.50
Motors	16		Office	Cond. Fan	EEM - ROF	44,524	17,931	49,534	19,805	8,295,811	4.0	3.89	1.50
Motors	12		Lodging	Cond. Fan	EEM - ROF	44,524	17,931	49,535	19,805	8,296,010	4.0	3.89	1.50
Motors	1		Lodging	AHU	EEM - ROF	44,524	17,931	49,535	19,806	8,296,110	4.0	3.89	1.50
Motors	11		Warehouse	Cond. Fan	EEM - ROF	44,524	17,931	49,536	19,806	8,296,304	4.0	3.89	1.48
Motors	1		Food Service	AHU	EEM - ROF	44,524	17,931	49,537	19,807	8,296,491	4.0	3.89	1.48
Motors	10		Lodging	CWtr Pump	VSD to Existing - RI	44,561	17,957	49,575	19,834	8,299,603	4.0	3.88	1.47
Motors	2		Warehouse	AHU	EEM - ROF	44,561	17,957	49,579	19,838	8,300,785	4.0	3.88	1.47
Motors	2		Food Service	AHU	EEM - ROF	44,561	17,957	49,580	19,839	8,300,937	4.0	3.88	1.46
Motors	2		Education	AHU	EEM - ROF	44,561	17,957	49,581	19,841	8,301,215	4.0	3.88	1.46
Motors	31		Other	Cond. Fan	EEM - ROF	44,561	17,957	49,583	19,843	8,301,998	4.0	3.88	1.45
Motors	11		Lodging	Cond. Fan	EEM - ROF	44,561	17,957	49,584	19,844	8,302,173	4.0	3.88	1.45
Motors	7		FH 2 to 4	Cond. Fan	EEM - ROF	44,561	17,957	49,683	19,937	8,336,120	4.1	3.82	1.45
Motors	1		FH 2 to 4	AHU	EEM - ROF	44,561	17,957	49,683	19,937	8,336,210	4.1	3.82	1.45
Motors	21		FH Attached	Cond. Fan	EEM - ROF	44,561	17,957	49,698	19,951	8,340,939	4.1	3.81	1.44
Motors	1		Warehouse	AHU	EEM - ROF	44,561	17,957	49,699	19,952	[illegible]	4.1	3.81	1.44
Motors	10		Warehouse	Cond. Fan	EEM - ROF	44,561	17,957	49,703	19,955	8,342,238	4.1	3.81	1.43
Motors	18		Education	Cond. Fan	EEM - ROF	44,561	17,957	49,704	19,955	8,342,466	4.1	3.80	1.43

Table 3.10
Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resource: Cumulative Annual Energy and Demand Reductions

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Cumulative First Year Energy Savings (MBtu)	Cumulative First Year Demand Savings (kW mo)	Cumulative Full Implement Energy Savings (MBtu)	Cumulative Full Implement Demand Savings (kW mo)	Cumulative Net Savings (1993 $)	Cumulative Discounted Payback Period	Cumulative Savings to Investment Ratio	Individual Savings to Investment Ratio
Motors	30		Other	Cond. Fan	EEM - ROF	44,561	17,957	49,706	19,958	8,343,281	4.1	3.80	1.42
Motors	1		Education	AHU	EEM - ROF	44,561	17,957	49,707	19,958	8,343,443	4.1	3.80	1.42
Motors	1		Other	AHU	EEM - ROF	44,561	17,957	49,707	19,960	8,343,657	4.1	3.80	1.42
Motors	14		FH 5 or More	Cond. Fan	EEM - ROF	44,561	17,957	49,719	19,970	8,346,554	4.1	3.80	1.40
Motors	29		FH Detached	Cond. Fan	EEM - ROF	44,561	17,957	49,720	19,972	8,347,087	4.1	3.80	1.40
Motors	6		FH 2 to 4	Cond. Fan	EEM - ROF	44,561	17,957	49,746	19,996	8,354,675	4.1	3.78	1.39
Motors	2		Assembly	AHU	EEM - ROF	44,561	17,957	49,746	19,997	8,354,827	4.1	3.78	1.38
Motors	22		Assembly	Cond. Fan	EEM - ROF	44,561	17,957	49,746	19,997	8,354,904	4.1	3.78	1.38
Motors	3		Office	AHU	EEM - ROF	44,561	17,957	49,762	20,015	8,358,567	4.1	3.77	1.36
Motors	18		Office	Cond. Fan	EEM - ROF	44,561	17,957	49,765	20,017	8,359,178	4.1	3.77	1.36
Motors	3		Food Service	AHU	EEM - ROF	44,561	17,957	49,770	20,022	8,360,430	4.1	3.77	1.36
Motors	17 B		Education	CWtr Pump	VSD to Existing - RI	44,641	18,027	49,851	20,092	8,366,531	4.2	3.75	1.36
Motors	13		FH 5 or More	Cond. Fan	EEM - ROF	44,641	18,027	49,858	20,099	8,368,168	4.2	3.75	1.35
Motors	1		Assembly	AHU	EEM - ROF	44,641	18,027	49,858	20,101	8,368,569	4.2	3.75	1.34
Motors	21		Assembly	Cond. Fan	EEM - ROF	44,641	18,027	49,859	20,102	8,368,882	4.2	3.75	1.34
Motors	13		Lodging	Cond. Fan	EEM - ROF	44,641	18,027	49,861	20,104	8,369,394	4.2	3.75	1.34
Motors	2		Lodging	AHU	EEM - ROF	44,641	18,027	49,916	20,161	8,384,897	4.2	3.71	1.34
Motors	20		FH Attached	Cond. Fan	EEM - ROF	44,641	18,027	49,918	20,163	8,385,334	4.2	3.71	1.33
Motors	12		Warehouse	Cond. Fan	EEM - ROF	44,641	18,027	49,920	20,165	8,385,974	4.2	3.71	1.33
Motors	22		Other	CWtr Pump	VSD to Existing - RI	44,682	18,061	49,961	20,210	8,388,737	4.2	3.70	1.32
Motors	2		Other	AHU	EEM - ROF	44,682	18,061	49,965	20,208	8,390,233	4.2	3.70	1.31
Motors	32		Other	Cond. Fan	EEM - ROF	44,682	18,061	49,967	20,209	8,390,616	4.2	3.70	1.30
Motors	19		Education	Cond. Fan	EEM - ROF	44,682	18,061	49,971	20,213	8,391,826	4.2	3.69	1.30
Motors	3		Warehouse	AHU	EEM - ROF	44,682	18,061	49,978	20,221	8,393,695	4.2	3.69	1.30
Motors	3		Education	AHU	EEM - ROF	44,682	18,061	49,981	20,226	8,394,410	4.2	3.69	1.30
Motors	8		FH 2 to 4	Cond. Fan	EEM - ROF	44,682	18,061	50,204	20,435	8,465,697	4.4	3.52	1.30
Motors	1		Service	AHU	EEM - ROF	44,682	18,061	50,204	20,435	8,465,762	4.4	3.52	1.29
Motors	11		Service	Cond. Fan	EEM - ROF	44,682	18,061	50,204	20,435	8,465,826	4.4	3.52	1.29
Motors	2		FH 2 to 4	AHU	EEM - ROF	44,682	18,061	50,225	20,465	8,472,145	4.5	3.50	1.29
Motors	30		FH Detached	Cond. Fan	EEM - ROF	44,682	18,061	50,230	20,469	8,473,536	4.5	3.50	1.29
Motors	22		FH Attached	Cond. Fan	EEM - ROF	44,682	18,061	50,311	20,545	8,497,653	4.5	3.44	1.29
Motors	24		FH Detached	AHU	EEM - ROF	44,682	18,061	50,311	20,545	8,497,762	4.5	3.44	1.28
Motors	15		FH 5 or More	Cond. Fan	EEM - ROF	44,682	18,061	50,318	20,552	8,499,363	4.5	3.44	1.26
Motors	10		FH 5 or More	AHU	EEM - ROF	44,682	18,061	50,323	20,560	8,500,729	4.5	3.44	1.26
Motors	23		Assembly	Cond. Fan	EEM - ROF	44,682	18,061	50,324	20,561	8,501,287	4.5	3.44	1.26
Motors	3		Assembly	AHU	EEM - ROF	44,682	18,061	50,326	20,566	8,501,966	4.5	3.43	1.25
Motors	10		Service	CWtr Pump	VSD to Existing - RI	44,733	18,114	50,378	20,619	8,505,221	4.6	3.43	1.25
Motors	16		FH Attached	AHU	EEM - ROF	44,733	18,114	50,380	20,622	8,505,585	4.6	3.43	1.24
Transportation	Conversion Bus		Vehicles	Bus, School, 28-29 pasg	CNG Vehicle - ROF	44,733	18,114	50,396	20,622	8,506,290	4.6	3.42	1.06

Table 3.11
Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resources: Cumulative Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Cumulative Installed Cost (1993 $)	Cumulative Energy & Demand Savings (1993 $)	Cumulative O&M Savings (1993 $)	Cumulative Replacement Savings (1993 $)	Cumulative Total Savings (1993 $)	Cumulative Net Savings (1993 $)	Cumulative Discounted Payback Period	Cumulative Savings to Investment Ratio	Individual Savings to Investment Ratio
T&D		Substation	Substation	Sub. Transformers	Conservation Voltage Reduction RI	400	827,205	0	0	827,205	826,805	0 0	2,068 01	2,068 01
Lights		Ext. Lighting	8 Ball Fields	Lighting Controls	Lighting Controls RI	40,400	1,760,945	0	16,205	1,744,742	1,704,342	0 4	43 19	22 94
Motors		54 CEP	Other	Cond. Pump	VSD & EEM RI	54,057	2,015,904	156	13,163	2,002,585	1,948,528	0 4	37 05	18 88
Transportation	Conversion	Truck	Vehicles	Tractor, 6x4, 24,000-44,500 GVW	CNG Vehicle ROF	58,799	2,025,991	66,492	15,058	2,077,426	2,018,627	0 4	35 33	15 78
Motors		41 CEP	Other	Cond. Pump	VSD to Existing RI	94,425	2,466,417	66,180	15,683	2,516,913	2,422,487	0 6	26 66	12 34
Motors		50	Other	Pumps	VSD to Existing RI	103,307	2,576,437	66,023	16,259	2,626,202	2,522,896	0 6	25 42	12 31
Motors		49	Other	Pumps	VSD to Existing RI	110,547	2,664,996	65,867	16,611	2,714,252	2,603,705	0 6	24 55	12 16
Motors		48	Other	Pumps	VSD to Existing RI	116,096	2,731,974	65,711	16,779	2,780,906	2,664,810	0 7	23 95	12 01
Motors		42 CEP	Other	Cond. Pump	VSD to Existing RI	144,137	3,058,438	65,555	15,806	3,108,186	2,964,049	0 7	21 56	11 67
Motors		21 CEP	Other	CTwr Fan	VSD to Existing RI	155,018	3,162,158	65,399	16,382	3,211,155	3,058,137	0 7	20 99	11 59
Motors		20 CEP	Other	CTwr Fan	VSD to Existing RI	179,661	3,421,389	64,930	18,108	3,468,211	3,288,549	0 8	19 30	9 65
T&D		Substation	Substation	Capacitor Bank	Power Factor Correction to 95 RI	193,701	3,531,984	64,886	18,108	3,578,763	3,385,061	0 8	18 48	7 87
Motors		40	Other	Cond. Pump	VSD to Existing RI	199,250	3,574,180	64,750	18,275	3,620,634	3,421,384	0 9	18 17	7 55
Motors		57 CEP	Other	FD Fan #4	EEM RI	201,496	3,587,891	64,745	17,242	3,635,394	3,433,898	0 9	18 04	6 57
Cooling		Hsg fam 1	Hsg fam 1	AC and Heat Source	Shade Screen RI	207,287	3,631,053	64,745	22,605	3,673,194	3,465,907	0 9	17 72	6 53
Motors		12	Health Care	Cond. Pump	VSD to Existing RI	209,428	3,645,168	64,589	22,692	3,687,066	3,477,638	0 9	17 61	6 48
Motors		7	Health Care	CTwr Fan	VSD to Existing RI	211,569	3,659,284	64,433	22,779	3,700,938	3,489,369	0 9	17 49	6 48
Cooling		Hsg fam 2	Hsg fam 2	AC and Heat Source	Shade Screen RI	220,849	3,727,296	64,433	31,572	3,760,357	3,539,507	0 9	17 03	6 40
Motors		15	Service	Cond. Pump	VSD to Existing RI	224,417	3,747,970	64,277	31,515	3,780,932	3,556,516	0 9	16 85	5 77
Motors		9	Service	CTwr Fan	VSD to Existing RI	227,984	3,768,642	64,121	31,257	3,801,507	3,573,524	0 9	16 67	5 77
Motors		15	Food Service	CTwr Fan	VSD to Existing RI	231,288	3,787,347	63,964	31,368	3,819,943	3,588,655	0 9	15 52	5 58
Motors		21	Food Service	Cond. Pump	VSD to Existing RI	234,592	3,806,050	63,808	31,479	3,838,578	3,603,786	1 0	16 36	5 58
Motors		51 CEP	Other	HTW Pump	EEM RI	236,858	3,817,475	63,808	30,446	3,850,858	3,614,000	1 0	16 26	5 55
Motors		19	Other	CTwr Fan	VSD to Existing RI	242,118	3,847,159	63,496	30,687	3,879,968	3,637,849	1 0	16 03	5 52
Motors		18	Warehouse	Refrig	EEM RI	244,364	3,856,496	63,496	28,635	3,891,357	3,646,992	1 0	15 92	5 07
Motors		36 CEP	Other	CWtr Pump	EEM RI	246,610	3,866,526	63,496	27,448	3,902,373	3,655,763	1 0	15 82	4 91
Motors		39	Other	Cond. Pump	VSD to Existing RI	249,943	3,882,657	63,339	27,515	3,918,481	3,668,538	1 0	15 68	4 85
Motors		58 CEP	Other	Under Air #4	EEM RI	254,195	3,900,712	63,418	25,559	3,938,571	3,684,376	1 0	15 49	4 72
Motors		5	Food Sales	Refrig.	EEM RI	255,311	3,904,874	63,418	24,559	3,943,752	3,688,441	1 0	15 45	4 64
Motors		14	Office	CTwr Fan	VSD to Existing RI	258,149	3,918,505	63,261	24,740	3,956,827	3,698,677	1 0	15 35	4 61
Motors		25	Office	Cond. Pump	VSD to Existing RI	260,987	3,931,737	63,105	24,941	3,969,901	3,708,914	1 0	15 21	4 61
Motors		29	Other	Circ. Pump	EEM RI	261,941	3,955,543	63,105	24,369	3,974,279	3,712,338	1 0	15 17	4 59
Motors		43	Other	HTW Pump	EEM RI	262,895	3,939,349	63,105	23,797	3,978,657	3,715,762	1 0	15 13	4 59
Motors		53 CEP	Other	CWtr Pump	VSD & EEM RI	487,346	4,939,554	62,949	10,912	4,991,591	4,504,244	1 5	10 24	4 51
Motors		45 CEP	Other	HTW Pump	EEM RI	492,471	4,957,860	62,949	6,250	5,014,579	4,522,108	1 5	10 18	4 49
Motors		44 CEP	Other	HTW Pump	EEM RI	496,723	4,973,016	62,949	2,346	5,033,619	4,536,895	1 5	10 13	4 48
Motors		6	Health Care	AHU	EEM RI	497,839	4,977,070	62,949	1,419	5,038,600	4,540,761	1 5	10 12	4 46
Motors		5 WELL	Water Well	P-4524	EEM RI	502,091	4,993,960	62,949	258	5,057,167	4,555,076	1 6	10 07	4 37
Motors		17	Warehouse	Refrig	EEM RI	502,525	4,995,452	62,949	655	5,059,055	4,556,530	1 6	10 07	4 35
Motors		6	Food Sales	Refrig	EEM RI	504,071	5,000,682	62,949	2,067	5,065,698	4,561,626	1 6	10 05	4 30
Motors		4	Health Care	AHU	EEM RI	504,678	5,002,676	62,949	2,622	5,068,246	4,563,568	1 6	10 04	4 20
Motors		16	Education	CTwr Fan	VSD to Existing RI	509,959	5,025,180	62,636	2,380	5,090,196	4,580,238	1 6	9 98	4 16
Motors		26	Education	Cond. Pump	VSD to Existing RI	515,239	5,047,683	62,324	2,139	5,112,146	4,596,907	1 6	9 92	4 16
Motors		27	Education	Refrig	EEM RI	515,944	5,049,911	62,324	2,783	5,115,018	4,599,074	1 6	9 91	4 07
Motors		55 CEP	Other	CWtr Pump	EEM RI	517,490	5,055,167	62,324	3,824	5,121,316	4,603,826	1 6	9 90	4 07
Transportation	Conversion	Ambulance	Vehicles	Modular, 4x2	CNG Vehicle ROF	548,312	5,107,019	144,859	5,893	5,245,965	4,697,653	1 6	9 57	4 04
Motors		5	Health Care	AHU	EEM RI	549,722	5,111,858	144,859	5,048	5,251,629	4,701,907	1 6	9 55	4 02
Motors		13	Health Care	Vac. Sys	EEM RI	550,529	5,114,217	144,859	5,018	5,254,038	4,703,709	1 6	9 55	3 97
Motors		18	Other	CTwr Fan	VSD to Existing RI	553,125	5,125,440	144,683	5,280	5,264,844	4,711,719	1 6	9 52	3 87
Motors		38	Other	Cond. Pump	VSD to Existing RI	555,920	5,136,664	144,527	5,542	5,275,649	4,719,729	1 6	9 49	3 87
Motors		52 CEP	Other	Makeup Pump	EEM RI	557,036	5,140,400	144,527	5,028	5,279,898	4,722,863	1 6	9 48	3 81
Transportation	Conversion	Bus	Vehicles	Bus, Intercity, 41-51 pagr, 4x2	CNG Vehicle ROF	629,745	5,285,307	504,064	54,072	5,555,299	4,925,554	1 8	8 82	3 79
Motors		15	Education	CTwr Fan	VSD to Existing RI	634,214	5,302,518	503,752	54,250	5,572,019	4,937,805	1 8	8 79	3 74
Motors		25	Education	Cond. Pump	VSD to Existing RI	638,683	5,319,729	503,439	54,429	5,588,739	4,950,056	1 8	8 75	3 74
Motors		2 WELL	Water Well	P-456	EEM RI	643,808	5,336,698	503,439	52,408	5,607,729	4,963,921	1 8	8 71	3 71
Motors		16	Other	Air Comp	EEM RI	646,054	5,342,913	503,439	30,556	5,615,997	4,969,942	1 8	8 69	3 68
Motors		4 WELL	Water Well	T-9961	EEM RI	651,179	5,359,561	503,439	28,554	5,634,666	4,983,486	1 8	8 65	3 64
Motors		3 WELL	Water Well	P-1545	EEM RI	656,304	5,375,565	503,439	26,413	5,652,692	4,996,888	1 8	8 61	3 52
Transportation	Conversion	Bus	Vehicles	Bus, School, 42-45 pagr	CNG Vehicle ROF	677,582	5,593,574	503,742	30,535	5,726,781	5,049,199	1 8	8 45	3 48
Motors		17	Assembly	CTwr Fan	VSD to Existing RI	682,862	5,412,140	503,450	50,776	5,744,793	5,061,931	1 9	8 41	3 41
Motors		51	Assembly	Cond. Pump	VSD to Existing RI	688,143	5,430,706	503,117	51,018	5,762,806	5,074,663	1 9	8 37	3 41
Motors		25 CEP	Other	CWtr Pump	VSD to Existing RI	873,569	6,115,336	502,805	92,323	6,385,819	5,512,250	2 1	7 31	3 36
Motors		26 CEP	Other	CWtr Pump	VSD to Existing RI	1,093,508	6,922,478	502,649	102,490	7,122,637	6,029,130	2 4	6 51	3 35
Motors		47	Other	Oil Pump	EEM RI	1,095,754	6,927,913	502,649	160,458	7,130,124	6,034,370	2 4	6 51	3 33
Motors		27 CEP	Other	CWtr Pump	VSD to Existing RI	1,555,840	7,874,067	502,493	245,660	7,992,900	6,637,060	2 6	5 90	3 32
Motors		1 WELL	Water Well	P-953	EEM RI	1,565,014	7,900,858	502,493	240,041	8,025,309	6,658,295	2 7	5 88	3 31
Motors		11	Food Service	AHU	EEM RI	1,567,260	7,906,409	502,493	238,176	8,030,725	6,663,465	2 7	5 87	3 30
Motors		24	Office	Cond. Fan	EEM RI	1,568,474	7,909,290	502,493	237,067	8,034,716	6,666,242	2 7	5 87	3 29
Motors		2	Food Sales	AHU	EEM RI	1,570,706	7,914,558	502,493	235,028	8,042,022	6,671,316	2 7	5 87	3 27
Motors		25	Food Service	Refrig	EEM RI	1,571,466	7,916,350	502,493	234,354	8,044,508	6,673,043	2 7	5 87	3 27
Motors		5	Health Care	AHU	EEM RI	1,572,226	7,918,142	502,493	233,680	8,046,995	6,674,769	2 7	5 86	3 27
Motors		11	Health Care	Cond. Fan	EEM RI	1,572,606	7,919,038	502,493	233,293	8,048,238	6,675,632	2 7	5 86	3 27
Motors		12	Office	AHU	EEM RI	1,574,152	7,922,654	502,493	231,889	8,055,246	6,679,094	2 7	5 86	3 24
Motors		4	Food Sales	Cond. Fan	EEM RI	1,576,598	7,927,799	502,493	229,829	8,060,463	6,684,065	2 7	5 86	3 21
Motors		9 B	Office	AHU	EEM RI	1,579,433	7,935,266	502,493	227,551	8,070,207	6,690,775	2 7	5 85	3 21
Motors		9 A	Office	AHU	EEM RI	1,581,861	7,941,249	502,493	225,729	8,075,993	6,696,142	2 7	5 85	3 21
Motors		13	Food Service	Air Comp	EEM RI	1,582,468	7,942,625	502,493	225,175	8,076,943	6,697,475	2 7	5 84	3 20
Motors		20	Food Service	Cond. Fan	EEM RI	1,583,075	7,944,011	502,493	224,620	8,078,824	6,698,808	2 7	5 84	3 20
Motors		10 A	Office	AHU	EEM RI	1,585,190	7,948,848	502,493	222,688	8,083,642	6,703,454	2 7	5 84	3 20

Table 3.11

Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resource: Cumulative Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Cumulative Installed Cost (1995 $)	Cumulative Energy & Demand Savings (1995 $)	Cumulative O&M Savings (1995 $)	Cumulative Replacement Savings (1995 $)	Cumulative Total Savings (1995 $)	Cumulative Net Savings (1995 $)	Cumulative Discounted Payback Period	Cumulative Savings to Investment Ratio	Individual Savings to Investment Ratio
Motors		10 B	Office	AHU	EEM - RI	1,388,010	7,955,274	362,493	220,112	8,097,655	6,709,645	2.7	5.83	3.20
Motors		13	Office	Air Comp	EEM - RI	1,390,830	7,961,711	362,493	217,536	8,106,668	6,715,838	2.7	5.83	3.20
Motors		14	Food Service	Air Comp	EEM - RI	1,392,376	7,965,169	362,493	216,123	8,111,538	6,719,163	2.7	5.83	3.15
Motors		9	Food Service	AHU	EEM - RI	1,393,081	7,966,717	362,493	215,479	8,113,730	6,720,649	2.7	5.82	3.11
Motors		1	Food Sales	AHU	EEM - RI	1,393,688	7,968,043	362,493	214,925	8,115,610	6,721,923	2.7	5.82	3.10
Motors		4	Public Order	AHU	EEM - RI	1,394,295	7,969,745	362,493	214,761	8,117,477	6,723,182	2.7	5.82	3.07
Motors		16	Assembly	CTwr Fan	VSD to Existing - RI	1,398,729	7,983,905	362,180	214,996	8,131,089	6,732,360	2.7	5.81	3.07
Motors		30	Assembly	Cond. Pump	VSD to Existing - RI	1,403,163	7,998,066	361,868	215,232	8,144,702	6,741,539	2.7	5.80	3.07
Transportation	Conversion	Truck	Vehicles	Carryall, 4x4, 7,500 GVW	CNG Vehicle - ROF	1,431,371	8,054,810	421,856	245,802	8,230,863	6,799,492	2.7	5.75	3.05
Motors		10	Education	AHU	EEM - RI	1,433,603	8,059,588	421,856	243,763	8,237,681	6,804,078	2.7	5.75	3.05
Motors		13	Education	Air Comp	EEM - RI	1,434,719	8,061,978	421,856	242,744	8,241,090	6,806,370	2.7	5.74	3.05
Motors		8	Lodging	AHU	EEM - RI	1,435,326	8,063,272	421,856	242,189	8,242,939	6,807,613	2.7	5.74	3.05
Motors		15	Other	Air Comp	EEM - RI	1,437,572	8,067,966	421,856	240,137	8,249,684	6,812,112	2.7	5.74	3.00
Transportation	Conversion	Truck	Vehicles	Carryall, 4x2, Conv, 15 psgr, 7,700 GVW	CNG Vehicle - ROF	1,473,474	8,160,741	475,217	279,045	8,356,913	6,883,439	2.8	5.67	2.99
Motors		11	Office	AHU	EEM - RI	1,475,382	8,164,673	475,217	277,302	8,362,588	6,887,206	2.8	5.67	2.97
Motors		8 B	Office	AHU	EEM - RI	1,482,326	8,179,325	475,217	271,536	8,385,006	6,900,680	2.8	5.66	2.94
Motors		8 A	Office	AHU	EEM - RI	1,487,100	8,189,999	475,217	267,572	8,397,044	6,909,944	2.8	5.65	2.94
Motors		23	Office	Cond. Fan	EEM - RI	1,493,176	8,202,219	475,217	262,526	8,414,910	6,921,734	2.8	5.64	2.94
Motors		8	Warehouse	AHU	EEM - RI	1,493,881	8,203,626	475,217	261,882	8,416,961	6,923,080	2.8	5.63	2.91
Motors		8 B	Food Service	AHU	EEM - RI	1,494,749	8,205,352	475,217	261,089	8,419,480	6,924,731	2.8	5.63	2.90
Motors		12	Food Service	Air Comp	EEM - RI	1,495,183	8,206,216	475,217	260,693	8,420,739	6,925,556	2.8	5.63	2.90
Motors		19	Food Service	Cond. Fan	EEM - RI	1,495,617	8,207,079	475,217	260,296	8,421,999	6,926,382	2.8	5.63	2.90
Motors		22	Food Service	HW Circ	EEM - RI	1,496,051	8,207,942	475,217	259,900	8,423,259	6,927,207	2.8	5.63	2.90
Motors		8 A	Food Service	AHU	EEM - RI	1,496,485	8,208,805	475,217	259,503	8,424,518	6,928,033	2.8	5.63	2.90
Motors		10	Food Service	AHU	EEM - RI	1,497,439	8,210,696	475,217	258,632	8,427,281	6,929,842	2.8	5.63	2.90
Motors		24	Education	Cond. Fan	EEM - RI	1,498,046	8,211,899	475,217	258,077	8,429,058	6,930,992	2.8	5.63	2.90
Motors		7	Service	AHU	EEM - RI	1,500,292	8,216,335	475,217	256,026	8,435,526	6,935,234	2.8	5.62	2.89
Motors		14	Other	Air Comp	EEM - RI	1,503,384	8,222,347	475,217	253,201	8,444,363	6,940,979	2.8	5.62	2.86
Motors		11	Education	AHU	EEM - RI	1,506,476	8,228,349	475,217	250,376	8,455,190	6,946,714	2.8	5.61	2.85
Motors		12	Education	Air Comp	EEM - RI	1,508,022	8,231,350	475,217	248,964	8,457,603	6,949,581	2.8	5.61	2.85
Motors		13	Other	Air Comp	EEM - RI	1,509,432	8,234,042	475,217	247,676	8,461,582	6,952,150	2.8	5.61	2.82
Motors		17 A	Education	CWtr Pump	EEM - RI	1,510,842	8,236,728	475,217	246,388	8,465,557	6,954,715	2.8	5.60	2.82
Motors		8	Education	AHU	EEM - RI	1,511,547	8,238,071	475,217	245,744	8,467,544	6,955,997	2.8	5.60	2.82
Motors		3	Food Sales	Cond. Fan	EEM - RI	1,511,981	8,238,897	475,217	245,348	8,468,766	6,956,785	2.8	5.60	2.82
Motors		10	Other	AHU	EEM - RI	1,513,527	8,242,063	475,217	244,187	8,473,092	6,959,565	2.8	5.60	2.80
Motors		7	Lodging	AHU	EEM - RI	1,514,395	8,243,676	475,217	243,395	8,475,498	6,961,103	2.8	5.60	2.77
Motors		9	Lodging	Air Comp	EEM - RI	1,517,433	8,249,320	475,217	240,619	8,483,918	6,966,485	2.8	5.59	2.77
Motors		24 CEP	Other	CWtr Pump	VSD to Existing - RI	1,561,953	8,388,057	475,061	256,116	8,607,002	7,045,048	2.8	5.51	2.76
Motors		3	Public Order	AHU	EEM - RI	1,562,387	8,389,131	475,061	255,999	8,608,193	7,045,806	2.8	5.51	2.75
Motors		8	Public Order	Cond. Fan	EEM - RI	1,562,821	8,390,205	475,061	255,881	8,609,385	7,046,563	2.8	5.51	2.75
Motors		8 B	Other	AHU	EEM - RI	1,564,035	8,392,784	475,061	255,153	8,612,692	7,048,656	2.8	5.51	2.72
Motors		8 A	Other	AHU	EEM - RI	1,564,642	8,394,074	475,061	254,789	8,614,345	7,049,702	2.8	5.51	2.72
Motors		16	Warehouse	Cond. Fan	EEM - RI	1,565,076	8,394,858	475,061	254,393	8,615,526	7,050,450	2.8	5.50	2.72
Motors		24	Food Service	Refrig	EEM - RI	1,566,348	8,397,139	475,061	253,231	8,618,969	7,052,620	2.8	5.50	2.71
Motors		2	Health Care	AHU	EEM - RI	1,566,984	8,398,279	475,061	252,650	8,620,690	7,053,705	2.8	5.50	2.71
Motors		12	Assembly	AHU	EEM - RI	1,570,332	8,404,165	475,061	249,591	8,629,634	7,059,302	2.8	5.50	2.67
Motors		12	Education	Air Comp	EEM - RI	1,571,200	8,405,663	475,061	248,798	8,631,925	7,060,725	2.8	5.49	2.64
Motors		23	Education	Cond. Fan	EEM - RI	1,572,068	8,407,162	475,061	248,005	8,634,217	7,062,148	2.8	5.49	2.64
Motors		14	Assembly	AHU	EEM - RI	1,573,986	8,410,456	475,061	246,253	8,639,265	7,065,276	2.8	5.49	2.63
Motors		12	Other	Air Comp	EEM - RI	1,574,366	8,411,219	475,061	246,026	8,640,254	7,065,888	2.8	5.49	2.61
Motors		9	Education	AHU	EEM - RI	1,577,228	8,416,268	475,061	243,649	8,647,680	7,070,451	2.8	5.48	2.59
Motors		9	Warehouse	AHU	EEM - RI	1,578,182	8,418,152	475,061	243,077	8,650,135	7,071,953	2.9	5.48	2.57
Motors		22	Office	Cond. Fan	EEM - RI	1,581,982	8,424,738	475,061	239,922	8,659,877	7,077,895	2.9	5.47	2.56
Motors		7 A	Office	AHU	EEM - RI	1,585,782	8,431,325	475,061	236,766	8,669,619	7,083,837	2.9	5.47	2.56
Motors		7 B	Office	AHU	EEM - RI	1,591,862	8,441,864	475,061	231,718	8,685,206	7,093,344	2.9	5.46	2.56
Motors		7 WELL	Water Well	S-19222	EEM - RI	1,592,567	8,443,390	475,061	231,440	8,687,011	7,094,444	2.9	5.45	2.56
Motors		7 A	Food Service	AHU	EEM - RI	1,593,707	8,445,258	475,061	230,398	8,689,921	7,096,213	2.9	5.45	2.55
Motors		7 B	Food Service	AHU	EEM - RI	1,595,607	8,448,371	475,061	228,662	8,694,769	7,099,162	2.9	5.45	2.55
Motors		18	Food Service	Cond. Fan	EEM - RI	1,596,367	8,449,617	475,061	227,968	8,696,709	7,100,341	2.9	5.45	2.55
Motors		7 A	Other	AHU	EEM - RI	1,599,405	8,455,082	475,061	225,688	8,704,454	7,105,048	2.9	5.44	2.55
Motors		7 B	Other	AHU	EEM - RI	1,604,179	8,463,670	475,061	222,106	8,716,624	7,112,445	2.9	5.43	2.55
Motors		6	Service	AHU	EEM - RI	1,604,613	8,464,379	475,061	221,710	8,717,750	7,113,117	2.9	5.43	2.55
Motors		28	Assembly	Cond. Fan	EEM - RI	1,605,827	8,466,555	475,061	220,601	8,720,815	7,114,988	2.9	5.43	2.54
Motors		18	Assembly	CWtr Pump	EEM - RI	1,606,434	8,467,343	475,061	220,046	8,722,358	7,115,923	2.9	5.43	2.54
Motors		9	Assembly	AHU	EEM - RI	1,607,041	8,468,351	475,061	219,492	8,723,900	7,116,859	2.9	5.43	2.54
Motors		13	Assembly	AHU	EEM - RI	1,608,587	8,470,795	475,061	218,079	8,727,777	7,119,189	2.9	5.43	2.51
Motors		9	Other	AHU	EEM - RI	1,610,495	8,474,398	475,061	216,935	8,732,524	7,122,028	2.9	5.42	2.49
Motors		10 A	Assembly	AHU	EEM - RI	1,611,905	8,476,604	475,061	215,647	8,736,018	7,124,112	2.9	5.42	2.48
Motors		10 B	Assembly	AHU	EEM - RI	1,61[illegible],315	8,478,811	475,061	214,359	8,739,512	7,126,197	2.9	5.42	2.48
Motors		15	Assembly	Air Comp	EEM - RI	1,614,020	8,479,914	475,061	213,715	8,741,259	7,127,239	2.9	5.42	2.48
Motors		29	Assembly	Cond. Fan	EEM - RI	1,614,725	8,481,017	475,061	213,071	8,743,007	7,128,281	2.9	5.41	2.48
Motors		2	Public Order	AHU	EEM - RI	1,615,105	8,481,730	475,061	212,843	8,743,947	7,128,842	2.9	5.41	2.48
Motors		37	Other	Cond. Fan	EEM - RI	1,615,539	8,482,538	475,061	212,583	8,745,016	7,129,477	2.9	5.41	2.46
Motors		16	Lodging	Cond. Fan	EEM - RI	1,616,299	8,483,702	475,061	211,889	8,746,874	7,130,574	2.9	5.41	2.44
Motors		19	Assembly	CWtr Pump	EEM - RI	1,617,709	8,485,957	475,061	210,718	8,750,300	7,132,590	2.9	5.41	2.43
Motors		7 B	Warehouse	AHU	EEM - RI	1,618,849	8,487,655	475,061	209,676	8,753,039	7,134,190	2.9	5.41	2.40
Motors		7 A	Warehouse	AHU	EEM - RI	1,619,666	8,488,787	475,061	208,982	8,754,366	7,135,256	2.9	5.41	2.40
Motors		6 A	Lodging	AHU	EEM - RI	1,621,509	8,491,[illegible]	475,061	207,404	8,759,403	7,137,894	2.9	5.40	2.39
Motors		6 B	Lodging	AHU	EEM - RI	1,624,546	8,496,483	475,061	204,88[illegible]	8,766,664	7,142,114	2.9	5.40	2.39

Table 3.11
Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resource: Cumulative Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Cumulative Installed Cost (1993 $)	Cumulative Energy & Demand Savings (1993 $)	Cumulative O&M Savings (1993 $)	Cumulative Replacement Savings (1993 $)	Cumulative Total Savings (1993 $)	Cumulative Net Savings (1993 $)	Cumulative Discounted Payback Period	Cumulative Savings to Investment Ratio	Individual Savings to Investment Ratio
Motors	8		Health Care	CWtr Pump	VSD to Existing RI	1,635,266	8,519,915	474,904	207,502	8,787,515	7,154,049	2.9	5.38	2.37
Motors	8		Service	Air Comp	EPM RI	1,642,440	8,533,124	474,904	199,122	8,808,907	7,166,468	2.9	5.36	2.35
Transportation	Conversion	Truck	Vehicles	Stake, 4x2, 7,000 GVW	CNG Vehicle ROF	1,870,672	8,997,229	746,250	401,524	9,341,955	7,471,283	3.1	4.99	2.34
Motors	27		Assembly	Cond Fan	EPM RI	1,872,408	8,999,690	746,250	399,958	9,346,002	7,473,594	3.1	4.99	2.33
Motors	10		Health Care	Cond Fan	EPM RI	1,872,683	9,000,079	746,250	399,687	9,346,642	7,473,959	3.1	4.99	2.33
Motors	11		Assembly	AHU	EPM RI	1,874,591	9,002,774	746,250	397,944	9,351,080	7,476,489	3.1	4.99	2.33
Motors	20		Assembly	CWtr Pump	EPM RI	1,875,545	9,004,121	746,250	397,072	9,353,299	7,477,754	3.1	4.99	2.33
Motors	17		Other	Air Comp	EPM RI	1,882,851	9,016,076	746,250	392,165	9,370,161	7,487,330	3.1	4.98	2.31
Motors	28		FH Detached	AHU	EPM RI	1,885,211	9,016,602	746,250	391,818	9,371,034	7,487,822	3.1	4.98	2.30
Transportation	Conversion	Sedan	Vehicles	Sedan	CNG Vehicle ROF	1,995,447	9,223,514	946,233	546,996	9,622,751	7,629,304	3.2	4.83	2.28
Motors	7 A		Education	AHU	EPM RI	1,995,727	9,226,814	946,233	545,102	9,627,944	7,632,217	3.2	4.82	2.28
Motors	7 B		Education	AHU	EPM RI	1,999,527	9,232,314	946,233	541,947	9,636,600	7,637,073	3.2	4.82	2.28
Motors	7		Public Order	Cond Fan	EPM RI	1,999,907	9,233,073	946,233	541,844	9,637,461	7,637,554	3.2	4.82	2.27
Motors	16		Service	HTW Pump	EPM RI	2,000,667	9,234,097	946,233	541,150	9,639,179	7,638,512	3.2	4.82	2.26
Motors	5 B		Service	AHU	EPM RI	2,001,427	9,235,120	946,233	540,456	9,640,897	7,639,470	3.2	4.82	2.26
Motors	14		Service	Cond Fan	EPM RI	2,001,807	9,235,632	946,233	540,109	9,641,756	7,639,949	3.2	4.82	2.26
Motors	5 A		Service	AHU	EPM RI	2,002,187	9,236,144	946,233	539,761	9,642,615	7,640,428	3.2	4.82	2.26
Transportation	Conversion	Truck	Vehicles	Tractor, 4x2, 24,000-44,500 GVW	CNG Vehicle ROF	2,012,050	9,251,021	959,058	545,199	9,664,860	7,652,810	3.3	4.80	2.26
Motors	1		Public Order	AHU	EPM RI	2,012,686	9,251,872	959,058	544,618	9,666,292	7,653,606	3.3	4.80	2.25
Motors	23		Other	CWtr Pump	VSD to Existing RI	2,045,605	9,351,645	958,882	554,976	9,755,550	7,691,946	3.3	4.76	2.24
Motors	6 WELL		Water Well	T 7732	EPM RI	2,045,523	9,355,159	958,882	554,220	9,759,822	7,694,299	3.3	4.76	2.23
Motors	6 B		Other	AHU	EPM RI	2,047,803	9,358,520	958,882	552,509	9,744,895	7,697,090	3.3	4.76	2.22
Motors	6 A		Other	AHU	EPM RI	2,049,323	9,360,760	958,882	551,368	9,748,274	7,698,951	3.3	4.76	2.22
Motors	28		Other	Circ Pump	EPM RI	2,049,703	9,361,320	958,882	551,083	9,749,119	7,699,416	3.3	4.76	2.22
Motors	8 A		Assembly	AHU	EPM RI	2,050,571	9,362,624	958,882	550,498	9,751,007	7,700,437	3.3	4.76	2.18
Motors	8 B		Assembly	AHU	EPM RI	2,051,439	9,363,928	958,882	549,914	9,752,896	7,701,457	3.3	4.75	2.18
Motors	36		Other	Cond Fan	EPM RI	2,055,239	9,369,615	958,882	547,354	9,761,145	7,705,904	3.3	4.75	2.17
Motors	6 WELL		Water Well	T 15003	EPM RI	2,056,785	9,372,558	958,882	546,745	9,764,496	7,707,711	3.3	4.75	2.17
Motors	17		Food Service	Cond Fan	EPM RI	2,058,057	9,373,943	958,882	545,583	9,767,242	7,709,185	3.3	4.75	2.16
Motors	6 A		Office	AHU	EPM RI	2,062,509	9,379,822	958,882	541,886	9,776,819	7,714,310	3.3	4.74	2.15
Motors	6 B		Office	AHU	EPM RI	2,069,505	9,389,062	958,882	536,077	9,791,868	7,722,363	3.3	4.73	2.15
Motors	21		Office	Cond Fan	EPM RI	2,073,639	9,374,522	958,882	532,644	9,800,760	7,727,121	3.3	4.73	2.15
Motors	46		Other	Makeup Pump	EPM RI	2,074,019	9,375,099	958,882	532,416	9,801,565	7,727,546	3.3	4.73	2.12
Motors	13		Lodging	Cond Fan	EPM RI	2,077,835	9,379,540	958,882	528,930	9,809,495	7,731,658	3.3	4.72	2.08
Motors	5		Lodging	AHU	EPM RI	2,078,153	9,379,911	958,882	528,640	9,810,153	7,732,001	3.3	4.72	2.08
Motors	15		Warehouse	Cond Fan	EPM RI	2,079,107	9,380,991	958,882	527,768	9,812,105	7,732,998	3.3	4.72	2.05
Motors	6		Public Order	Cond Fan	EPM RI	2,079,425	9,381,448	958,882	527,577	9,812,753	7,733,328	3.3	4.72	2.04
Motors	9		Health Care	Cond Fan	EPM ROF	2,079,882	9,381,923	958,882	527,120	9,813,685	7,733,803	3.3	4.72	2.04
Motors	1		Health Care	AHU	EPM ROF	2,080,111	9,382,160	958,882	526,891	9,814,151	7,734,040	3.3	4.72	2.04
Motors	22		Education	Cond Fan	EPM ROF	2,081,028	9,383,109	958,882	525,974	9,816,017	7,734,989	3.3	4.72	2.03
Motors	27		FH Detached	AHU	EPM ROF	2,082,863	9,384,954	958,882	524,139	9,819,697	7,736,834	3.3	4.71	2.01
Motors	5		FH 2 to 4	AHU	EPM ROF	2,091,425	9,393,566	958,882	515,577	9,836,871	7,745,446	3.3	4.70	2.01
Motors	32		FH Detached	Cond Fan	EPM ROF	2,091,730	9,393,874	958,882	515,272	9,837,484	7,745,754	3.3	4.70	2.01
Motors	6 A		Education	AHU	EPM RI	2,093,658	9,395,937	958,882	513,329	9,841,290	7,747,632	3.3	4.70	1.99
Motors	6 B		Education	AHU	EPM RI	2,098,090	9,400,750	958,882	509,462	9,850,171	7,752,080	3.3	4.69	1.99
Motors	6 A		Warehouse	AHU	EPM RI	2,102,542	9,405,892	958,882	505,765	9,859,009	7,756,467	3.3	4.69	1.99
Motors	6 B		Warehouse	AHU	EPM RI	2,108,902	9,413,237	958,882	500,484	9,871,636	7,762,733	3.3	4.68	1.99
Motors	20		Office	Cond Fan	EPM ROF	2,112,075	9,416,352	958,882	497,311	9,877,924	7,765,848	3.3	4.68	1.98
Motors	19		FH Attached	AHU	EPM ROF	2,118,544	9,422,697	958,882	490,842	9,890,737	7,772,193	3.3	4.67	1.98
Motors	13		Service	Cond Fan	EPM ROF	2,119,461	9,423,595	958,882	489,925	9,892,552	7,773,091	3.3	4.67	1.98
Motors	4 A		Service	AHU	EPM ROF	2,120,075	9,424,194	958,882	489,314	9,893,765	7,773,690	3.3	4.67	1.98
Motors	4 B		Service	AHU	EPM ROF	2,120,684	9,424,793	958,882	488,702	9,894,973	7,774,289	3.3	4.67	1.98
Motors	5 A		Office	AHU	EPM ROF	2,121,701	9,425,767	958,882	487,685	9,896,964	7,775,263	3.3	4.66	1.96
Motors	5 B		Office	AHU	EPM ROF	2,122,972	9,426,984	958,882	486,414	9,899,452	7,776,480	3.4	4.66	1.96
Motors	6		Food Service	AHU	EPM RI	2,123,608	9,427,835	958,882	486,032	9,900,685	7,777,077	3.4	4.66	1.94
Motors	5 A		Other	AHU	EPM RI	2,125,198	9,429,591	958,882	484,712	9,903,761	7,778,563	3.4	4.66	1.93
Motors	5 B		Other	AHU	EPM RI	2,127,742	9,432,401	958,882	482,600	9,908,684	7,780,941	3.4	4.66	1.93
Motors	5		Food Service	AHU	EPM ROF	2,128,251	9,432,870	958,882	482,091	9,909,661	7,781,410	3.4	4.66	1.92
Transportation	Conversion	Truck	Vehicles	Panel Truck, 4x2, 6,999 GVW & under	CNG Vehicle ROF	2,156,459	9,476,638	999,425	512,661	9,963,402	7,806,943	3.4	4.62	1.91
Motors	7 A		Assembly	AHU	EPM RI	2,157,219	9,477,571	999,425	512,150	9,964,847	7,807,628	3.4	4.62	1.90
Motors	7 B		Assembly	AHU	EPM RI	2,157,979	9,478,504	999,425	511,638	9,966,292	7,808,313	3.4	4.62	1.90
Motors	4 A		Lodging	AHU	EPM ROF	2,159,057	9,479,848	999,425	510,580	9,968,283	7,809,246	3.4	4.62	1.88
Motors	14		Lodging	Cond Fan	EPM ROF	2,159,501	9,479,671	999,425	510,316	9,968,781	7,809,479	3.4	4.62	1.88
Motors	4 B		Lodging	AHU	EPM ROF	2,160,624	9,480,357	999,425	508,993	9,971,269	7,810,646	3.4	4.61	1.88
Transportation	Conversion	Truck	Vehicles	Carryall, 4x2, 6,999 GVW & under	CNG Vehicle ROF	2,229,865	9,615,599	1,069,840	584,029	10,101,409	7,871,547	3.4	4.55	1.88
Motors	35		Other	Cond Fan	EPM RI	2,233,561	9,619,535	1,069,840	581,464	10,107,970	7,874,609	3.5	4.55	1.88
Motors	14		Warehouse	Cond Fan	EPM ROF	2,234,154	9,620,216	1,069,840	580,611	10,109,444	7,875,290	3.5	4.52	1.86
Motors	26		Assembly	Cond Fan	EPM ROF	2,235,071	9,620,995	1,069,840	579,694	10,111,141	7,876,070	3.5	4.52	1.85
Motors	5 A		Warehouse	AHU	EPM ROF	2,236,343	9,622,059	1,069,840	578,425	10,113,476	7,877,134	3.5	4.52	1.84
Motors	5 B		Warehouse	AHU	EPM ROF	2,238,122	9,623,549	1,069,840	576,645	10,116,746	7,878,624	3.5	4.52	1.84
Motors	34		Other	Cond Fan	EPM ROF	2,238,916	9,624,201	1,069,840	575,850	10,118,191	7,879,275	3.5	4.52	1.82
Motors	11		Other	Air Comp	EPM ROF	2,239,180	9,624,418	1,069,840	575,585	10,118,672	7,879,492	3.5	4.52	1.82
Motors	21		Education	Cond Fan	EPM ROF	2,241,560	9,626,368	1,069,840	573,205	10,123,003	7,881,443	3.5	4.52	1.82
Motors	6 A		Assembly	AHU	EPM ROF	2,242,975	9,627,508	1,069,840	571,792	10,125,556	7,882,582	3.5	4.51	1.81
Motors	6 B		Assembly	AHU	EPM ROF	2,244,952	9,629,105	1,069,840	569,815	10,129,130	7,884,178	3.5	4.51	1.81
Motors	26		FH Detached	AHU	EPM ROF	2,249,185	9,632,476	1,069,840	565,582	10,136,733	7,887,550	3.5	4.51	1.80
Motors	4 B		Other	AHU	EPM ROF	2,249,916	9,633,047	1,069,840	564,849	10,138,039	7,888,122	3.5	4.51	1.78
Motors	4 A		Other	AHU	EPM ROF	2,250,403	9,633,429	1,069,840	564,360	10,138,909	7,888,503	3.5	4.51	1.78
Motors	5 A		Education	AHU	EPM ROF	2,252,361	9,634,951	1,069,840	562,464	10,142,386	7,890,025	3.5	4.50	1.78

Table 3.11
Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resource: Cumulative Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Cumulative Installed Cost (1995 $)	Cumulative Energy & Demand Savings (1995 $)	Cumulative O&M Savings (1995 $)	Cumulative Replacement Savings (1995 $)	Cumulative Total Savings (1995 $)	Cumulative Net Savings (1995 $)	Cumulative Discounted Payback Period	Cumulative Savings to Investment Ratio	Individual Savings to Investment Ratio
Motors		5 B	Education	AHU	EEM ROF	2,255,539	9,637,424	1,069,840	559,220	10,148,058	7,892,499	5 5	4 50	1 78
Motors		4	FH 2 to 4	AHU	EEM ROF	2,424,872	9,769,068	1,069,840	589,893	10,449,014	8,024,142	5 6	4 31	1 78
Motors		5	Public Order	Cond Fan	EEM ROF	2,425,330	9,769,422	1,069,840	589,436	10,449,826	8,024,497	5 6	4 31	1 77
Motors		18	FH Attached	AHU	EEM ROF	2,448,799	9,787,185	1,069,840	565,966	10,491,059	8,042,260	5 6	4 28	1 76
Motors		5 B	Service	AHU	EEM ROF	2,449,508	9,787,570	1,069,840	565,458	10,491,952	8,042,645	5 6	4 28	1 76
Motors		3 A	Service	AHU	EEM ROF	2,449,562	9,787,765	1,069,840	565,203	10,492,399	8,042,837	5 6	4 28	1 76
Motors		16	Food Service	CWtr Pump	VSD to Existing RI	2,464,994	9,819,568	1,069,684	570,015	10,519,257	8,054,243	5 7	4 27	1 74
Motors		4	Food Service	AHU	EEM ROF	2,477,869	9,828,799	1,069,684	557,200	10,541,283	8,063,474	5 7	4 25	1 72
Motors		19	Office	Cond Fan	EEM ROF	2,481,406	9,831,557	1,069,684	553,603	10,547,458	8,066,032	5 7	4 25	1 71
Motors		4	Office	AHU	EEM ROF	2,482,252	9,831,959	1,069,684	552,756	10,548,886	8,066,634	5 7	4 25	1 71
Motors		12	FH 5 or More	AHU	EEM ROF	2,489,642	9,837,072	1,069,684	545,367	10,561,989	8,071,747	5 7	4 24	1 69
Motors		25	Assembly	Cond Fan	EEM ROF	2,489,906	9,837,250	1,069,684	545,102	10,561,831	8,071,925	5 7	4 24	1 67
Motors		3	Lodging	AHU	EEM ROF	2,491,757	9,838,482	1,069,684	543,272	10,564,894	8,073,157	5 7	4 24	1 67
Motors		5 B	Assembly	AHU	EEM ROF	2,493,008	9,839,317	1,069,684	542,000	10,567,000	8,073,992	5 7	4 24	1 66
Motors		5 A	Assembly	AHU	EEM ROF	2,494,025	9,839,984	1,069,684	540,983	10,568,685	8,074,659	5 7	4 24	1 66
Motors		13	Warehouse	Cond Fan	EEM ROF	2,495,627	9,841,033	1,069,684	539,581	10,571,356	8,075,708	5 7	4 24	1 65
Motors		15	Office	CWtr Pump	VSD to Existing RI	2,504,365	9,848,051	1,069,527	541,972	10,585,606	8,081,241	5 7	4 23	1 65
Motors		20	Education	Cond Fan	EEM ROF	2,505,510	9,848,767	1,069,527	540,828	10,587,466	8,081,956	5 7	4 23	1 63
Transportation	Conversion	Truck	Vehicles	Stake, 4x2, 10,000 GVW	CNG Vehicle ROF	2,544,962	9,892,344	1,126,278	367,481	10,651,141	8,106,179	5 7	4 19	1 61
Motors		3	Other	AHU	EEM ROF	2,548,483	9,894,494	1,126,278	365,960	10,656,812	8,108,329	5 7	4 18	1 61
Motors		9	FH 2 to 4	Cond Fan	EEM ROF	2,552,144	9,896,720	1,126,278	360,298	10,662,700	8,110,555	5 7	4 18	1 61
Motors		23	FH Attached	Cond Fan	EEM ROF	2,556,721	9,899,503	1,126,278	355,722	10,670,059	8,113,338	5 7	4 17	1 61
Motors		31	FH Detached	Cond Fan	EEM ROF	2,558,094	9,900,338	1,126,278	354,348	10,672,267	8,114,173	5 7	4 17	1 61
Motors		4	Warehouse	AHU	EEM ROF	2,559,722	9,901,322	1,126,278	352,721	10,674,879	8,115,157	5 7	4 17	1 60
Motors		33	Other	Cond Fan	EEM ROF	2,561,838	9,902,580	1,126,278	350,603	10,678,253	8,116,415	5 7	4 17	1 59
Motors		5	FH 2 to 4	AHU	EEM ROF	2,756,357	10,017,915	1,126,278	156,086	10,988,107	8,231,750	5 9	3 99	1 59
Motors		12	Service	Cond Fan	EEM ROF	2,757,044	10,018,321	1,126,278	155,399	10,989,200	8,232,156	5 9	3 99	1 59
Motors		17	FH Attached	AHU	EEM ROF	2,856,598	10,064,242	1,126,278	75,845	11,114,676	8,278,077	6 0	3 92	1 58
Motors		2	Service	AHU	EEM ROF	2,857,038	10,064,496	1,126,278	75,405	11,115,370	8,278,331	6 0	3 92	1 58
Motors		4	Education	AHU	EEM ROF	2,857,821	10,064,955	1,126,278	74,622	11,116,591	8,278,770	6 0	3 92	1 56
Motors		17	Office	Cond Fan	EEM ROF	2,858,621	10,065,378	1,126,278	73,822	11,117,854	8,279,215	6 0	3 92	1 55
Motors		2	Office	AHU	EEM ROF	2,858,821	10,065,489	1,126,278	73,622	11,118,145	8,279,324	6 0	3 92	1 55
Motors		11	FH 5 or More	AHU	EEM ROF	2,847,037	10,069,966	1,126,278	65,406	11,130,858	8,283,801	6 0	3 91	1 54
Motors		25	FH Detached	AHU	EEM ROF	2,849,858	10,071,455	1,126,278	62,585	11,135,148	8,285,290	6 0	3 91	1 53
Motors		23	Food Service	Refrig	EEM ROF	2,850,076	10,071,568	1,126,278	62,367	11,135,479	8,285,403	6 0	3 91	1 52
Motors		24	Assembly	Cond Fan	EEM ROF	2,851,449	10,072,273	1,126,278	60,995	11,137,557	8,286,108	6 0	3 91	1 51
Motors		4	Assembly	AHU	EEM ROF	2,852,156	10,072,625	1,126,278	60,307	11,138,596	8,286,460	6 0	3 91	1 51
Motors		1	Office	AHU	EEM ROF	2,867,480	10,080,320	1,126,278	44,965	11,161,655	8,294,155	6 0	3 89	1 50
Motors		16	Office	Cond Fan	EEM ROF	2,870,782	10,081,976	1,126,278	41,661	11,166,593	8,295,811	6 0	3 89	1 50
Motors		12	Lodging	Cond Fan	EEM ROF	2,871,182	10,082,175	1,126,278	41,261	11,167,192	8,296,010	6 0	3 89	1 50
Motors		1	Lodging	AHU	EEM ROF	2,871,582	10,082,275	1,126,278	41,061	11,167,492	8,296,110	6 0	3 89	1 50
Motors		11	Warehouse	Cond Fan	EEM ROF	2,871,782	10,082,469	1,126,278	40,661	11,168,086	8,296,304	6 0	3 89	1 48
Motors		1	Food Service	AHU	EEM ROF	2,872,171	10,082,656	1,126,278	40,272	11,168,662	8,296,491	6 0	3 89	1 48
Motors		10	Lodging	CWtr Pump	VSD to Existing RI	2,878,729	10,094,324	1,126,122	42,113	11,178,532	8,299,603	6 0	3 88	1 47
Motors		2	Warehouse	AHU	EEM ROF	2,881,229	10,095,506	1,126,122	39,613	11,182,014	8,300,785	6 0	3 88	1 47
Motors		2	Food Service	AHU	EEM ROF	2,881,558	10,095,658	1,126,122	39,284	11,182,495	8,300,937	6 0	3 88	1 46
Motors		2	Education	AHU	EEM ROF	2,882,158	10,095,936	1,126,122	38,684	11,183,373	8,301,215	6 0	3 88	1 46
Motors		31	Other	Cond Fan	EEM ROF	2,883,889	10,096,718	1,126,122	36,954	11,185,886	8,301,998	6 0	3 88	1 45
Motors		11	Lodging	Cond Fan	EEM ROF	2,884,277	10,096,895	1,126,122	36,565	11,186,450	8,302,173	6 0	3 88	1 45
Motors		7	FH 2 to 4	Cond Fan	EEM ROF	2,956,677	10,130,841	1,126,122	38,815	11,295,797	8,336,120	6 1	3 82	1 45
Motors		1	FH 2 to 4	AHU	EEM ROF	2,959,877	10,130,953	1,126,122	39,035	11,296,087	8,336,210	6 1	3 82	1 45
Motors		21	FH Attached	Cond Fan	EEM ROF	2,970,646	10,135,659	1,126,122	49,804	11,311,585	8,340,939	6 1	3 81	1 44
Motors		1	Warehouse	AHU	EEM ROF	2,971,425	10,136,000	1,126,122	50,581	11,312,703	8,341,279	6 1	3 81	1 44
Motors		10	Warehouse	Cond Fan	EEM ROF	2,975,664	10,136,959	1,126,122	52,822	11,315,902	8,342,238	6 1	3 81	1 45
Motors		18	Education	Cond Fan	EEM ROF	2,974,198	10,137,187	1,126,122	53,556	11,316,664	8,342,466	6 1	3 80	1 45
Motors		30	Other	Cond Fan	EEM ROF	2,976,140	10,138,001	1,126,122	55,298	11,319,421	8,343,281	6 1	3 80	1 42
Motors		1	Education	AHU	EEM ROF	2,976,529	10,138,164	1,126,122	55,686	11,319,972	8,343,443	6 1	3 80	1 42
Motors		1	Other	AHU	EEM ROF	2,977,041	10,138,377	1,126,122	56,199	11,320,698	8,343,657	6 1	3 80	1 42
Motors		14	FH 5 or More	Cond Fan	EEM ROF	2,984,222	10,141,273	1,126,122	63,380	11,330,776	8,346,554	6 1	3 80	1 40
Motors		29	FH Detached	Cond Fan	EEM ROF	2,985,419	10,141,758	1,126,122	64,576	11,332,456	8,347,037	6 1	3 80	1 40
Motors		6	FH 2 to 4	Cond Fan	EEM ROF	3,005,172	10,149,396	1,126,122	84,330	11,359,847	8,354,675	6 1	3 78	1 39
Motors		2	Assembly	AHU	EEM ROF	3,005,572	10,149,548	1,126,122	84,730	11,360,400	8,354,827	6 1	3 78	1 38
Motors		22	Assembly	Cond Fan	EEM ROF	3,005,772	10,149,624	1,126,122	84,930	11,360,676	8,354,904	6 1	3 78	1 38
Motors		3	Office	AHU	EEM ROF	3,015,846	10,153,288	1,126,122	95,064	11,374,413	8,358,567	6 1	3 77	1 36
Motors		18	Office	Cond Fan	EEM ROF	3,017,525	10,153,898	1,126,122	96,685	11,376,703	8,359,178	6 1	3 77	1 36
Motors		3	Food Service	AHU	EEM ROF	3,021,017	10,155,151	1,126,122	100,175	11,381,448	8,360,430	6 1	3 77	1 36
Motors		17 B	Education	CWtr Pump	VSD to Existing RI	3,038,098	10,185,666	1,125,809	95,154	11,404,629	8,366,531	6 2	3 75	1 36
Motors		15	FH 5 or More	Cond Fan	EEM ROF	3,042,727	10,185,303	1,125,809	99,784	11,410,896	8,368,168	6 2	3 75	1 35
Motors		1	Assembly	AHU	EEM ROF	3,043,895	10,185,704	1,125,809	100,946	11,412,462	8,368,569	6 2	3 75	1 34
Motors		21	Assembly	Cond Fan	EEM ROF	3,044,827	10,186,017	1,125,809	101,885	11,413,709	8,368,882	6 2	3 75	1 34
Motors		15	Lodging	Cond Fan	EEM ROF	3,046,554	10,186,529	1,125,809	103,611	11,415,749	8,369,394	6 2	3 75	1 34
Motors		2	Lodging	AHU	EEM ROF	3,092,628	10,202,032	1,125,809	149,684	11,477,525	8,384,897	6 2	3 71	1 34
Motors		20	FH Attached	Cond Fan	EEM ROF	3,095,956	10,202,469	1,125,809	151,012	11,479,290	8,385,334	6 2	3 71	1 33
Motors		12	Warehouse	Cond Fan	EEM ROF	3,095,920	10,203,309	1,125,809	152,977	11,481,895	8,385,974	6 2	3 71	1 33
Motors		22	Other	CWtr Pump	VSD to Existing RI	3,104,616	10,217,374	1,125,653	150,325	11,493,352	8,388,737	6 2	3 70	1 32
Motors		2	Other	AHU	EEM ROF	3,109,417	10,218,871	1,125,653	155,127	11,499,651	8,390,235	6 2	3 70	1 31
Motors		32	Other	Cond Fan	EEM ROF	3,110,677	10,219,254	1,125,653	156,386	11,501,293	8,390,616	6 2	3 70	1 30
Motors		19	Education	Cond Fan	EEM ROF	3,114,664	10,220,464	1,125,653	160,373	11,506,490	8,391,826	6 2	3 69	1 30
Motors		3	Warehouse	AHU	EEM ROF	3,120,874	10,222,333	1,125,653	166,585	11,514,506	8,393,695	6 2	3 69	1 30

Table 3.11

Non-Building ERO's Constituting the Minimum Life-Cycle Cost Efficiency Resource: Cumulative Present Values of Costs and Savings

End Use	Bldg Set No	Bldg Type	Use Area	Existing Technology	Retrofit Technology	Cumulative Installed Cost (1993 $)	Cumulative Energy & Demand Savings (1993 $)	Cumulative O&M Savings (1993 $)	Cumulative Replacement Savings (1993 $)	Cumulative Total Savings (1993 $)	Cumulative Net Savings (1993 $)	Cumulative Discounted Payback Period	Cumulative Savings to Investment Ratio	Individual Savings to Investment Ratio
Motors	5		Education	AHU	EPM ROF	5,125,295	10,225,048	1,125,655	169,004	11,517,706	8,504,410	4.2	5.69	1.50
Motors	8		FH 2 to 4	Cond. Fan	EPM ROF	5,564,861	10,294,335	1,125,655	410,570	11,830,558	8,465,697	4.4	5.52	1.50
Motors	1		Service	AHU	EPM ROF	5,565,079	10,294,399	1,125,655	410,788	11,830,840	8,465,762	4.4	5.52	1.29
Motors	11		Service	Cond. Fan	EPM ROF	5,565,297	10,294,464	1,125,655	411,006	11,831,123	8,465,826	4.4	5.52	1.29
Motors	2		FH 2 to 4	AHU	EPM ROF	5,587,293	10,300,783	1,125,655	435,003	11,859,438	8,472,145	4.5	5.50	1.29
Motors	30		FH Detached	Cond. Fan	EPM ROF	5,392,137	10,302,174	1,125,655	437,846	11,865,673	8,475,536	4.5	5.50	1.29
Motors	22		FH Attached	Cond. Fan	EPM ROF	5,476,086	10,326,291	1,125,655	521,796	11,973,740	8,497,653	4.5	5.44	1.29
Motors	24		FH Detached	AHU	EPM ROF	5,476,475	10,326,400	1,125,655	522,184	11,974,236	8,497,762	4.5	5.44	1.28
Motors	15		FH 5 or More	Cond. Fan	EPM ROF	5,482,574	10,328,001	1,125,655	528,283	11,981,937	8,499,363	4.5	5.44	1.26
Motors	10		FH 5 or More	AHU	EPM ROF	5,487,777	10,329,367	1,125,655	533,486	11,988,506	8,500,729	4.5	5.44	1.26
Motors	23		Assembly	Cond. Fan	EPM ROF	5,489,960	10,329,925	1,125,655	535,669	11,991,246	8,501,287	4.5	5.44	1.26
Motors	3		Assembly	AHU	EPM ROF	5,492,688	10,330,604	1,125,655	538,397	11,994,654	8,501,966	4.5	5.43	1.25
Motors	10		Service	CWin Pump	VSD to Existing RI	5,505,957	10,351,184	1,125,341	554,654	12,011,178	8,505,221	4.6	5.43	1.25
Motors	16		FH Attached	AHU	EPM ROF	5,507,450	10,351,548	1,125,341	556,147	12,013,035	8,505,585	4.6	5.43	1.24
Transportation	Conversion Bus		Vehicles	Bus, School, 28 29 pasgr	CNG Vehicle ROF	5,519,609	10,358,566	1,133,798	533,734	12,025,899	8,506,290	4.6	5.42	1.06

Table 3.12a
Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Present Values Aggregated By Category

ERO Category	Estimated Current Facility Energy Use (MBtu)	Estimated Post-Retrofit Facilty Energy Use (MBtu)	Estimated Facility Annual Energy Savings (MBtu)	Estimated Percent Energy Savings	First Year Energy Cost Savings (1993 $)	Present Value Total Savings (1993 $)	Estimated Investment Required for Retrofits (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Heating	206,339	154,910	51,429	25%	na	na	na	na	na	na
Cooling	227,617	196,664	30,953	14%	na	na	na	na	na	na
Vent	69,823	64,608	5,215	7%	na	na	na	na	na	na
Lights	115,658	65,323	50,335	44%	na	na	na	na	na	na
Plugs	136,402	136,402	0	0%	na	na	na	na	na	na
Hot Water	192,858	130,279	62,579	32%	na	na	na	na	na	na
Totals	948,697	748,186	200,511	21%	1,856,434	35,653,362	10,716,690	24,936,672	3.33	4.7

Table 3.12b
Non-Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Present Values Aggregated By Category

ERO Category	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement. Energy Savings (MBtu)	Full Implement. Demand Savings (kW-mo)	Present Value of Installed Cost (1993 $)	Present Value of Energy & Demand Savings (1993 $)	Present Value of O&M Savings (1993 $)	Present Value of Replacement Savings (1993 $)	Present Value of Total Savings (1993 $)	Net Present Value (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Cooling	323	277	323	277	15,071	111,175	0	-13,957	97,218	82,147	6.45	2.4
Lights	7,953	52	7,953	52	40,000	933,740	0	-16,203	917,537	877,537	22.94	0.7
Motors	32,174	15,329	34,234	17,837	2,759,046	7,096,458	-8,811	1,175,938	8,263,585	5,504,539	3.00	5.2
Transportation	0	0	3,603	0	691,051	1,279,193	1,142,653	-612,045	1,809,801	1,118,750	2.62	6.0
T & D	4,284	2,457	4,284	2,457	14,440	937,801	-44	0	937,757	923,317	64.94	0.2
Totals	44,733	18,114	50,396	20,622	3,519,609	10,358,366	1,133,798	533,734	12,025,899	8,506,290	3.42	4.6

Table 3.13
Non-Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Annualized Values Aggregated by Category

ERO Category	First Year Energy Savings (MBtu)	First Year Demand Savings (kW-mo)	Full Implement. Energy Savings (MBtu)	Full Implement. Demand Savings (kW-mo)	Annualized Installed Cost (1993 $)	Annualized Energy & Demand Savings (1993 $)	Annualized O&M Savings (1993 $)	Annualized Replacement Savings (1993 $)	Annualized Total Savings (1993 $)	Annualized Net Savings (1993 $)	Savings to Investment Ratio	Discounted Payback Period
Cooling	323	277	323	277	965	7,117	0	-893	6,223	5,258	6.45	2.4
Lights	7,953	52	7,953	52	2,560	59,771	0	-1,037	58,733	56,173	22.94	0.7
Motors	32,174	15,329	34,234	17,837	176,612	454,258	-564	75,274	528,968	352,356	3.00	5.2
Transportation	0	0	3,603	0	44,236	81,884	73,143	-39,178	115,849	71,613	2.62	6.0
T & D	4,284	2,457	4,284	2,457	924	60,030	-3	0	60,028	59,103	64.94	0.2
Totals	44,733	18,114	50,396	20,622	225,297	663,059	72,577	34,165	769,801	544,504	3.42	4.6

Table 3.14a
Summary of Total Minimum Life-Cycle Cost Efficiency Resource: Building EROs

Summary of Energy and Demand Savings

Estimated Current Facility Energy Use (MBtu/yr)	948,698
Estimated Post-Retrofit Facility Energy Use (MBtu/yr)	748,186
Estimated Facility Annual Energy Savings (MBtu/yr)	200,511
Estimated Facility Percent Energy Savings	21%

Summary of Costs and Benefits

	Present Value (1993 $)
First Year Energy Cost Savings due to Retrofits	1,856,434
Present Value of Total Savings	35,653,362
Total Estimated Investment Required for Retrofits	10,716,690
Net Present Value of Retrofits	24,936,672
Savings to Investment Ratio	3.33
Discounted Payback	4.7

Table 3.14b
Summary of Total Minimum Life-Cycle Cost Efficiency Resource: Non-Building EROs

Summary of Energy and Demand Savings

First Year Energy Savings (MBtu/yr)	44,733
First Year Demand Savings (kW-mo)	18,114
Full Implementation Energy Savings (MBtu/yr)	50,396
Full Implementation Demand Savings (MBtu/yr)	20,622

Summary of Costs and Benefits

	Present Value (1993 $)	Annualized Value (1993 $)
Value of Installed Cost	3,519,609	225,297
Value of Energy and Demand Savings	10,358,366	663,059
Value of O&M Savings	1,133,798	72,577
Value of Replacement Cost Savings	533,734	34,165
Value of Total Savings	12,025,899	769,801
Net Value of Savings	8,506,290	544,504
Savings to Investment Ratio	3.42	3.42
Discounted Payback	4.6	4.6

Table 3.15a
Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Fuel Balance Table

	Existing		Resulting		Net Conservation	
Fuel Type	Existing Energy Use (MBtu)	Existing Demand (kW-mo)	Resulting Energy Use (MBtu)	Resulting Demand (kW-mo)	Net Energy Use Reduction (MBtu)	Net Demand Reduction (kW-mo)
Chilled Water	112,127	NA	92,204	NA	19,921	NA
District Hot Water	115,595	NA	77,899	NA	37,696	NA
Electricity	471,611	NA	386,663	NA	84,948	NA
Fuel Oil #2	53,377	NA	38,475	NA	14,901	NA
Natural Gas	159,333	NA	138,811	NA	20,523	NA
Propane	36,655	NA	14,133	NA	22,522	NA
Totals	948,698	NA	748,186	NA	200,511	NA

Table 3.15b
Non-Building EROs Constituting the Minimum Life-Cycle Cost Efficiency Resource: Fuel Balance Table

	Existing		Conservation		New Load		Resulting		Net Conservation	
Fuel Type	Existing Energy Use (MBtu)	Existing Demand (kW-mo)	Energy Use Reduction (MBtu)	Demand Reduction (kW-mo)	Increased Energy Use (MBtu)	Increased Demand (kW-mo)	Resulting Energy Use (MBtu)	Resulting Demand (kW-mo)	Net Energy Use Reduction (MBtu)	Net Demand Reduction (kW-mo)
Diesel	11,848	NA	6,733	NA	0	NA	5,116	NA	6,733	NA
Electricity	510,244	278,810	46,794	20,622	0	0	463,450	258,188	46,794	20,622
Fuel Oil #2	67,510	NA	0	NA	0	NA	67,510	NA	0	NA
Fuel Oil #5	80,020	NA	0	NA	0	NA	80,020	NA	0	NA
Gasoline	16,774	NA	14,882	NA	0	NA	1,893	NA	14,882	NA
Natural Gas	143,900	NA	0	NA	18,012	NA	161,912	NA	-18,012	NA
Propane	15,842	NA	0	NA	0	0	15,842	NA	0	NA
Wood Chips	600,300	NA	0	NA	0	0	600,300	NA	0	NA
Totals	1,446,439	278,810	68,408	20,622	18,012	0	1,396,042	258,188	50,396	20,622

Table 3.16. Weather Data Comparison

Weather Data	FY 1990[a]	30 Year Average[a]
Heating Degree Days[b]	1,580	2,227
Cooling Degree Days[b]	2,792	2,222

Notes:
(a) Data from Savannah, GA weather station
(b) Base 65° F.

Table 3.17. Annual Facility Energy Use by Fuel Type

Fuel	Existing Consumption Estimate (MBtu)	Actual Existing Consumption[a] (MBtu)
Electricity	471,611	404,468
Fuel Oil #2	53,377	33,174
Natural Gas	159,333	143,900
Propane	36,655	15,842

Notes:
(a) Actual consumption minus consumption due to central plant

Table 3.18. Annual Facility Energy Use by Fuel Type and End Use Technology

Fuel Type/ End use	% of Total
Electricity:	
Heating	0.85%
Cooling	15.72%
Vent./Fans	8.78%
DHW	0.48%
Cooking	2.00%
Refrigeration	6.54%
Lighting	27.70%
Other Bldg. End Use	12.56%
Nat. Guard	3.12%
Central Plant	20.45%
T&D Loss	1.81%
Total	100.00%
Natural Gas:	
Heating	52.01%
DHW	29.82%
Cooking	17.50%
Other	0.67%
Total	100.00%
Fuel Oil #2:	
Heating	30.37%
DHW	18.76%
Central Plant	50.87%
Total	100.00%
Propane:	
Heating	55.85%
DHW	25.14%
Cooking	11.98%
Other	3.28%
DEH (Trlr Park)	3.76%
Total	100.00%

4.0 References

10 CFR 436. 1992. U.S. Department of Energy, "Federal Energy Management and Planning Programs." *U.S. Code of Federal Regulations.*

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE). 1989. *1989 ASHRAE Handbook Fundamentals.* ASHRAE Headquarters, Atlanta, Georgia.

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE). 1989. *Ventilation for Acceptable Indoor Air Quality.* ASHRAE Standard 62-1989, ASHRAE Headquarters, Atlanta, Georgia.

American Society of Heating, Refrigeration and Air-Conditioning Engineers, Inc. (ASHRAE). 1991. *ASHRAE Heating, Ventilating, and Air-Conditioning Applications Handbook.* ASHRAE Headquarters, Atlanta, Georgia.

ANSI/IEEE C57.92-1981. *Guide for Loading Mineral-Oil-Immersed Power Transformers Up To and Including 100 MVA with 55°C or 65°C Average Winding Rise,* Institute of Electrical and Electronics Engineers, New York, NY.

Architect's and Engineer's Guide to Energy Conservation in Existing Buildings, Volume 2 - Energy Conservation Opportunities. April 1990. DOE/RL/01830P-H4, DOE Field Office, Richland, Washington.

Balcomb, J. D. 1980. *Passive Solar Design Handbook (Volume II).* Prepared by Los Alamos National Laboratory for the U.S. Department of Energy, Washington, D.C.

Boiler Efficiency Institute (BEI). 1991. *Boiler Efficiency Improvement.* Boiler Efficiency Institute, Auburn, Alabama.

Brooks, C. L., J. J. Bonk, S. F. Mauser, C. J. Merrell, R. A. Cordasev, and D. R. Smith. 1986. *Transmission & Distribution Efficiency Improvement R&D Survey Project: Final Report.* DOE/BP-17102-1, Bonneville Power Administration, Portland, Oregon.

Daellenbach, K. K., J. E. Dagle, A. L. Dittmer, D. B. Elliott, M. A. Halverson, B. J. Hickman, G. B. Parker, E. E. Richman, and S. A. Shankle. 1993. *Vandenberg Air force Base Integrated Resource Assessment - Volume 3: Resource Assessment.* PNL-8730 Vol. 3, Pacific Northwest Laboratory, Richland, Washington.

De Steese, J. G., S. B. Merrick, R. C. Tepel, and J. W. Callaway. 1987. *Assessment of Conservation Voltage Reduction Applicable in the Bonneville Power Administration Service Area.* DOE/BP 14031-1, Prepared by Pacific Northwest Laboratory for the Bonneville Power Administration, Portland, Oregon.

Dirks, J. A., and L. E. Wrench. August 1993. "Facility Energy Decision Screening (FEDS) Software System." In *Proceedings of the International Energy and Environmental Congress.* August 4-5, 1993, Minneapolis, Minnesota.

Dirks, J. A., E. E. Richman, R. W. Shultz, and F. A. Shankle. 1992. *Lighting Technology Screening Matrix (LTSM)*. Software developed by Pacific Northwest Laboratory, Richland Washington. Copyright 1992, Battelle Memorial Institute.

Dixon, D. R., P. R. Armstrong, K. K. Daellenbach, J. E. Dagle, F. V. Di Massa, D. B. Elliot, J. M. Keller E. E. Richman, S. A. Shankle, G. P. Sullivan, and R. R. Wahlstrom. 1992. *Fort Drum Integrated Resource Assessment - Volume 3: Resource Assessment*. PNL-8424 Vol. 3. Pacific Northwest Laboratory, Richland, Washington.

Dixon, D. R., P. R. Armstrong, S. A. Shankle, D. B. Elliot, J. M. Keller, R. R. Wahlstrom, J. E. Dagle, D. J. Stucky, and D. R. Dixon. 1993. *Griffiss AFB Integrated Resource Assessment - Volume 3: Resource Assessment*. PNL-8545 Vol. 3. Pacific Northwest Laboratory, Richland, Washington.

Earley, M. W., R. H. Murray, and J. M. Caloggero. 1989. *The National Electrical Code-1990 Handbook*. National Fire Protection Association, Quincy Massachusetts.

Gönen, T. 1986. *Electric Power Distribution System Engineering*. McGraw Hill Book Company, New York.

Illuminating Engineering Society of North America (IES). 1981. *Illuminating Engineering Society of North America Lighting Handbook*. Illuminating Engineering Society of North America, New York.

Keller, J. M., G. P. Sullivan, R. R. Wahlstrom, and L. L. Larson. 1993. *Fort Stewart Integrated Resource Assessment - Volume 2: Baseline Detail*. PNL-8771 Vol. 2, Pacific Northwest Laboratory, Richland, Washington.

Halverson, M. A., and G. B. Parker. 1991. *Test Report for Fort Stewart, Electric Substation Monitoring*, Pacific Northwest Laboratory, Richland, Washington.

JRB Associates, Inc. *Energy Engineering Analysis Program: Basewide Energy Systems Plan for Fort Stewart*, JRB Inc., McLean, Virginia, 1981.

Larson, L. L., and J. M. Keller. 1993. *Fort Stewart Integrated Resource Assessment - Volume 1: Executive Summary*. PNL-8771 Vol. 1, Pacific Northwest Laboratory, Richland, Washington.

Lovins, A., J. Neymark, P. Flanigan, P. Kiernan, B. Bancroft, and M. Sheppard. 1989. *The State of the Art: Drivepower*. (Competitek series.) Rocky Mountain Institute, Snowmass, Colorado.

Nadel, S., M. Shepard, S. Greenberg, G. Katz, A. De Almeida. 1991. *Energy-Efficient Motor Systems*. American Council for an Energy Efficient Economy (ACEEE), Washington, D.C., and Berkeley, California.

National Bureau of Standards (NBS). 1987. *Life-Cycle Costing Manual for the Federal Energy Management Program*. NBS Handbook 135, United States Government Printing Office, Washington, D.C.

National Institute of Standards and Technology (NIST). 1991. *Energy Prices and Discount Factors for Life-Cycle Cost Analysis 1992*. NISTIR 85-3272-6, Gaithersburg, Maryland.

NFPA. 1989. National Fire Protection Association (NFPA) 496 - Standard for Purged and Pressurized Enclosures for Electrical Equipment.

NFPA. 1990. National Fire Protection Association (NFPA) 70 - National Electrical Code.

R. S. Means Company Inc. 1992a. *MEANS Building Construction Cost Data: 1992 15th Annual Edition*. Kingston, Massachusetts.

R. S. Means Company Inc. 1992b. *MEANS Electrical Cost Data: 1992 15th Annual Edition*. Kingston, Massachusetts.

R. S. Means Company Inc. 1992c. *MEANS Mechanical Cost Data: 1992 15th Annual Edition*. Kingston, Massachusetts.

Shepard, M., A. B. Lovins, J. Neymark, D. J. Houghton, and H. R. Heede. 1990. *The State of the Art: Appliances*. (Competitek series). Rocky Mountain Institute, Snowmass, Colorado.

Solar Energy Research Institute (SERI). 1990. *Insolation Data Manual and Direct Normal Solar Radiation Data Manual*. SERI/TP-220-3880, Solar Energy Research Institute, Golden, Colorado.

Stucky, D. J., and S. A. Shankle. 1993. *Natural Gas Cost for Evaluating Energy Resource Opportunities at Fort Stewart*. PNL-8490, Pacific Northwest Laboratory, Richland, Washington.

Turiel, I. 1990. *U.S. Residential Appliance Energy Efficiency: Present Status and Future Directions*. Lawrence Berkeley Laboratory, Berkeley, California.

U.S. Army. 1978. *Engineering Weather Data for Design and Construction*. Department of the Army, Technical Manual 5-785, U.S. Government Printing Office, Washington, D.C.

U.S. Department of Commerce, National Bureau of Standards (NBS). November 1987. *Life-Cycle Costing Manual for the Federal Energy Management Program*. NBS Handbook 135, Prepared for Federal Energy Management Program Staff Office, U.S. Department of Energy. U.S. Government Printing Office, Washington, D.C.

Washington State Energy Office (WSEO). 1992. *MotorMaster Electric Motor Selection Software*. Washington State Energy Office (with support of the U.S. Department of Energy and the Bonneville Power Administration), Olympia, Washington.

Westinghouse Electric Corporation. 1987. *Substation Transformers*. Price List 43-300. WEC Small Transformers Division, South Boston, Virginia.

Westinghouse Electric Corporation. 1981. *Power Transformers*. Technical Data 48-500. WEC Medium Power Transformer Division, Sharon, Pennsylvania.

Wilson, A. 1990. *1991 Consumer Guide to Home Energy Savings*. American Council for an Energy Efficient Economy, Washington, D.C.

W. W. Grainger Inc. 1992. *Grainger General Catalog No. 380*. W. W. Grainger Inc., North Suburban, Illinois.

Appendix A

Fuel Cost Calculations

Appendix A

Fuel Cost Calculations

Federal agencies are required to analyze all potential energy investments using a life-cycle costing (LCC) methodology developed by the National Institute of Standards and Technology (NIST) (NBS 1987). The NIST LCC methodology proceeds by calculating all relevant costs of a project and discounting them to result in present dollars, and then subtracting that sum from a similarly constructed LCC of a "no-action" baseline. This difference is called the net present value (NPV) of the action being considered. Actions are recommended for implementation if the NPV is positive and greater than the NPV of any competing actions. This methodology results in minimizing the LCC of energy services at a site.

In order to examine the energy resource opportunities (EROs) at Fort Stewart, marginal fuel costs must be calculated. The marginal, or avoided, cost of gas service is used in conjunction with the estimated energy savings of an ERO to calculate the dollar value of those savings. This appendix presents a more detailed description of the calculations performed to determine the appropriate marginal rates that were used for natural gas and electricity within the Fort Stewart LCC analysis.

A.1 Methodology

The first step in the LCC process is to determine the present value of all future energy costs associated with an ERO and the no-action baseline. This is done by calculating the current year energy cost, known as the base year energy cost, escalating that cost to represent future real price increases, and then discounting the stream of costs to result in the present value. In accordance with the NIST LCC methodology, only the energy cost relevant to the ERO analysis should be included. The relevant energy cost is the energy cost that can be avoided by the ERO. Any cost that is common to the ERO and the no-action baseline is not relevant as it will cancel itself out when the difference is taken to obtain the NPV.

The relevant energy cost is obtained by using the marginal cost of the fuel. The marginal, or avoided, energy cost of fuel is the appropriate cost to use in conjunction with the estimated energy cost savings of an ERO so that the dollar value of those savings can be calculated. For this reason, it is important that only variable costs, which are affected by the amount of fuel used, are included. A cost is considered variable if the amount of fuel used affects the dollar amount paid. Fixed costs associated with a fuel, such as minimum monthly charges, will be paid despite any increase or reduction in fuel usage, and therefore do not affect the marginal cost.

According to Title 10 of the Code of Federal Regulations (CFR) Part 436 Subpart A 436.19, the life-cycle cost is the sum of the present values of investment costs, non-fuel operation and maintenance costs, replacement costs, and energy costs. The energy cost stream is composed of annual expenditures. Per 10 CFR Part 436 Subpart A 436.17, the base year energy cost is calculated by multiplying the total amount of energy used in the base year by the price per unit of energy in the base year. The present value of energy costs over the project study period is the product of the energy cost in the base year multiplied by the appropriate modified uniform present worth factor adjusted for energy price escalation for the applicable region, sector, fuel type, and study period. To determine the energy cost, it is necessary to calculate the appropriate cost of energy for each fuel type.

A.2 Natural Gas cost Determination

One of the costs incorporated within the LCC is the energy cost. The energy cost is obtained by multiplying the amount of fuel required by the cost of that fuel. In the case of Fort Stewart, the cost of natural gas has been complicated to some extent by the addition of a propane-air station at the site which is being built under a shared energy savings (SES) contract. Under this contract, a contractor has been retained to build, operate, maintain, repair, and fuel the propane-air station. The contractor will be paid with a portion of the cost savings associated with the installation of the propane-air station. The propane-air station will provide an alternative or back-up fuel for natural gas end-uses in the event of a natural gas curtailment. Because of this, the base year energy cost for natural gas cannot be derived from billing data alone. Instead, the appropriate cost is the cost of gas *service*, which will be provided by both natural gas and propane, to the extent that the propane will be serving as a substitute for natural gas. Information presented in this section has been extracted from the report, "Natural Gas Cost for Evaluating Energy Resource Opportunities at Fort Stewart," by D. J. Stucky and S. A. Shankle (1993).

The addition of the plant also allows Fort Stewart to purchase natural gas from Atlanta Gas Light (AGL) at an interruptible rate. An interruptible rate is less than a firm rate because the gas company can interrupt or curtail (cut off) service to the customer, while a firm contract requires the gas company to deliver a certain amount of fuel, with curtailments ideally occurring only after that delivery requirement has been met.

A.2.1 SES Contract Information

Usually, the cost of gas is derived from the installation's monthly gas bills; however, the construction of a propane-air station at Fort Stewart and the shared energy savings contract by which it was financed have made the costing process more complicated. The contract provides for monthly payments to be made by Fort Stewart to the contractor. These payments depend on the availability of cost savings the Fort experiences by purchasing gas at an interruptible rate, as opposed to purchasing gas on a firm basis, as was previously the case. Payments made to the contractor that vary with the amount of propane used affect the cost of gas service. In order to determine the proper gas service cost, these components must be combined to reflect the marginal cost of gas service. Because the SES contract requires both fixed and variable payments, the contract must be broken down so that only the appropriate payments to the contractor are included in the cost analysis.

Under the SES contract, the contractor's payments have been divided into three parts. The first part is a fixed dollar amount for each month that covers the contractor's debt service. The second part is a fixed dollar amount that covers all other items except propane, and which includes profit. Part three of the contract is the payment to the contractor for propane supplied during the billing period. The contract stipulates that the payments made to the contractor cannot exceed 100% of the savings experienced by the Fort in the given month due to the propane-air station. In the event that sufficient savings are not available for that month to provide the contractor with the full contracted payment, then the amount in excess of savings is added to the part-one payment of the following month. If any of the payment carried over is a portion of the part-three payment, then that amount would be considered a variable cost within the part-one payment. For the purpose of this analysis, however, it is assumed that savings will be sufficient to cover the monthly payments, and contract payments will be charged in the appropriate month.

According to the contract, the first two parts mentioned above are fixed payments that will be paid whether or not the plant is actually operated during the billing period.[a] Per 10 CFR 436 Subpart A 436.17, these fixed costs should be excluded from the LCC methodology. Therefore, the only factors affecting the marginal cost of gas service are the natural gas rate, cost and amount of propane used, and cost of electricity to run the propane-air station.

While the contract payments have not yet been initiated, the contract has been signed; therefore, the fixed payments will need to be made regardless of the type of fuel used. The contract does have a provision for termination for convenience. If the contract were to be terminated, it would be necessary for the Fort to buy out some of the contractor costs. These costs would be composed of the part-one contract payment (the loan amount), less the interest on the loan, plus any additional design or legal costs. Because the Fort is essentially committed to making the part-one payment whether or not the station is ever built, it would not be feasible to cancel the contract unless natural gas usage was to be eliminated or severely reduced.[b]

If the costs of parts one and two were to be included in the LCC analysis, they would need to be included in both the LCC calculation of the ERO and the LCC calculation of the base case, since the Fort is obligated to make fixed payments on parts one and two of the SES contract regardless of gas use. When the two LCCs are subtracted to obtain the net present value, per 10 CFR 436 Subpart A 436.20, the payments to parts one and two cancel. The inclusion of these types of irrelevant costs is unnecessary, and only the relevant, incremental cost of an ERO needs to be included in the LCC analysis.

While the issue of fixed contract payments is not relevant for determining the base energy cost, it is possible that it could become relevant through the implementation of EROs. If the combined effect of implemented EROs increases or decreases total gas usage, the savings experienced by the Fort for the propane-air station could be affected. If savings were to be reduced enough such that the fixed contract payments were pushed further into the future, the reduction in the present value of the payments would need to be accounted for in the LCC analysis. The reduction in the present value of the payments should be included as a cost increase or decrease in the LCC analysis, but should not be factored into the marginal cost of gas service.

A.2.2 Calculation of Natural Gas Rate Component

The base year natural gas rate was derived from the report "Projection of Gas Cost Resulting from Use of Propane-Air Mixing Plant at Fort Stewart" (Wise 1992, contained in Stucky and Shankle 1993). The report presents an estimate of what the annual natural gas cost would have been assuming that the Fort had bought gas at the interruptible rate. The estimate is based on actual billing data for the same time period. The total bill, based on the Atlanta Gas Light (AGL) I-24 rate schedule calculation with 100% interruptible therms, is comprised of a monthly customer charge, purchased gas adjustment on interruptible gas, commodity charge on interruptible gas, and a base take-or-pay charge.

Included in our calculation were all costs that are dependent upon the amount of gas supplied. These costs were the commodity charge, the purchased gas adjustment (PGA) on interruptible gas, and the base take-or-pay charge. The take-or-pay charge was included because AGL levies the charge on all therms

---

(a) Personal Communications, Denise Kelley, Fort Stewart. October 7, 1992. 9:40 a.m. PDT.; Plyles McManus, Army Corps of Engineers, Huntsville Division. October 8, 1992. 11:37 a.m. PDT.

(b) Personal Communication, Plyler McManus, Army Corps of Engineers, Huntsville Division. October 26, 1992. 1:20 p.m. PDT.

purchased. The monthly customer charge was not included since it is independent from gas usage. The resulting annual payment was divided by the total number of therms used by the Fort to determine the cost per therm for gas service associated with natural gas. The total number of therms includes the amount of gas delivered to the Fort by AGL and the amount estimated to be supplied by the propane-air station.

A.2.3 Calculation of Propane-Air Station Cost Component

The contractor's estimation for a payment schedule under part three of the contract was based on the assumption that 10,000 therms of propane per month would be required during December and January. Since mid-1986, Fort Stewart has had a total of seven curtailments in December through February, considered to be the winter season (see Table A.1). Out of six winter seasons, only one season has had curtailments in two of the three months. Six of the curtailments have ranged in duration from 18 to 44 hours and in volume from 120 thousand cubic feet (mcf) to 413 mcf (the equivalent of 1,240 therms to 4,270 therms). The seventh curtailment, in December 1989, was unusually large. During that month, Fort Stewart was curtailed for a total of 151 hours and 1,535 mcf, or 15,872 therms. Because the curtailments occurred while the Fort was purchasing natural gas on a firm basis, it would be reasonable to assume that curtailments under an interruptible rate would be greater in volume. Based on historical data, the propane-air station was sized assuming an operation schedule of 48 hours per year,[a] and our estimate was calculated accordingly.

The cost of electricity used in the analysis is a melded overall average electricity rate paid by Fort Stewart. The amounts of electricity and propane required to run the plant were derived from engineering estimates of the plant and were calculated using Equations (A.1) and (A.2):

Equation A.1. Propane Requirement

$$F = OH \times PC \times LF \tag{A.1}$$

Table A.1. Fort Stewart Curtailment History

Month/Year of Curtailment	Winter Season	MCF Curtailed	Therm Equivalent	Winter Season Total
Jan. 1987	1986-87	246	2,543.6	2,543.6
Jan. 1988 Feb. 1988	1987-88	413 183	4,270.4 1,892.2	6,162.6
Feb. 1989	1988-89	263	2,719.4	2,719.4
Dec. 1989	1989-90	1,535	15,871.9	15,871.9
Dec. 1990	1990-91	203	2,099.0	2,099.0
Jan. 1992	1991-92	120	1,240.8	1,240.8

(a) Personal Communication, Plyler McManus, Army Corps of Engineers, Huntsville Division. October 8, 1992. 11:37 a.m. PDT.

Equation A.2. Electricity Cost

$$P_E = OH \times E \times LF \times C_E \tag{A.2}$$

where F = fuel required per month, in MBtu
OH = operating hours per month (24 hours/month for total of 48 hours/year)
LF = plant load factor (0.60)
P_E = electricity cost for propane-air station per month
PC = plant capacity (134 MBtu / 1 Hour)
E = electricity required per hour (74 kWh / hour)
C_E = cost of electricity per kilowatt-hour ($0.047).

According to plant specifications,[a] 74 kilowatt-hours per hour are required to run the plant, which uses a 100-horsepower compressor and has a capacity of 134 million BTU (MBtu)[b] per hour. It was assumed that the compressor load was 60% over a 24-hour day.[c] A minor load would also be incurred from the use of lights and controls, but because the amount would be minimal compared to the compressor load, this was excluded from the analysis.

Equation (A.1) resulted in approximately 3,860 MBtu, or 38,600 therms,[d] per year. This amount is more than twice that required by the Fort during its largest curtailment in the past six years. Because the Fort will be purchasing natural gas on a completely interruptible rate with the propane-air station, it is possible that curtailments could be of longer duration or fuel amount. As the next section illustrates, however, the portion of the gas service cost attributed to propane and electricity is small, therefore, the estimate of 38,600 therms should be adequate to account for the propane and electricity portions of the gas service cost, with no appreciable difference in the event that the actual requirement is higher.

A.2.4 Results

Our analysis results in a marginal cost of natural gas service of 30.0 cents per therm assuming a total of 38,600 therms of propane annually. The analysis indicates that because the amount of propane that may be required in the event of a curtailment is small relative to the combined gas and propane usage, and because the plant does not use a significant amount of electricity, variations in the actual plant use should not significantly affect the cost per therm.

Table A.2 contains the results of the analysis. The table breaks out the components of the cost of gas service into the cost of interruptible gas without the fixed monthly charge, the cost of propane, the cost of electricity, and the total fuel cost. The cost per therm for interruptible gas is 95.4% of the total, the cost of propane per therm is 4.6% of the total, and the cost of electricity is less than one-tenth of one percent of the total.

(a) Personal Communication, Plyler McManus, Army Corps of Engineers, Huntsville Division. October 9, 1992. 9:12 a.m. PDT.
(b) 1 MBtu = 10 therms.
(c) Personal Communication, Plyler McManus, Army Corps of Engineers, Huntsville Division. May 20, 1992. 10:30 a.m. PDT.
(d) 1 therm = 1.0953 gallons propane.

Table A.2. Fort Stewart Gas Service Cost Calculation Assuming Curtailment of 38,600 Therms Annually

Month	Cost of Inter. Gas w/o Fixed Charge	Cost of Propane	Cost of Electricity	Total Fuel Cost
Oct	$23,584	$0	$0.00	$23,584
Nov	$49,929	$0	$0.00	$49,929
Dec	$58,419	$10,570	$50.08	$69,043
Jan	$73,094	$10,570	$50.08	$83,718
Feb	$55,740	$0	$0.00	$55,740
Mar	46,720	0$	$0.00	$46,720
Apr	30,659	$0	$0.00	$30,659
May	$23,415	$0	$0.00	$23,415
Jun	$25,654	$0	$0.00	$25,654
Jul	$18,487	$0	$0.00	$18,487
Aug	$19,330	$0	$0.00	$19,330
Sep	$17,593	$0	$0.00	$17,593
TOTAL	$442,624	$21,139	$100.17	$463,872
Average Annual Component Cost/Therm	**$0.2862**	**$0.0137**	**$100.17**	**$0.2999**
Assumptions:			1,508,085	
Delivered Natural Gas Therms			38,600	
Therms from Propane			1,546,685	
Total Gas Service Therms			$0.500/gallon	
Cost of Propane			$0.047/kWh	
Cost of Electricity				
Conversion: 1 therm = 1.0953 Gallons Propane				

The average annual component cost per therm was calculated by dividing the total cost of each component by the total estimated therms required for gas service. The total therm requirement for gas service was calculated by adding the total therms delivered by AGL to the total estimated number of therms which would be supplied by propane.

A.2.5 Addendum to Results

When the cost of gas service analysis was performed for Fort Stewart, the electricity rate structure had not been examined by PNL and the prices of propane and natural gas were taken from the Wise report, "Projection of Gas Cost Resulting from Use of Propane-Air Mixing Plant at Fort Stewart," (Stucky and Shankle 1993), due to time constraints. Since then, the fuel rates at Fort Stewart have been more closely examined and the appropriate cost of electricity has been determined (see Section A.3). The cost of gas service was calculated based on a $0.50 per gallon cost for propane and a $0.047 per kWh cost for electricity. While these numbers are no longer valid, the introduction of the correct values does not change the cost of gas service significantly as the propane and electricity elements made up only a small fraction of the total cost. The natural gas cost component calculation was also not completely accurate. For the natural gas cost report, the estimated value of the bill was used to calculate the cost of natural gas from AGL. The bill was comprised of the commodity charge, the PGA, the base take or pay, and the monthly customer charge, and the cost of natural gas was calculated by subtracting off the monthly customer charge. However, the AGL rate structure is based on declining block rates, and Fort Stewart's purchases swing between the first and second blocks, depending on the season. Therefore, a consumption weighted average for all charges should have been calculated, including a marginal consumption weighted commodity charge. When this is done, the actual marginal commodity charge is calculated to be $0.063 per therm and the weighted consumption average is $0.2908 per therm.

Data from Fort Stewart indicate that the price of propane has been around $0.679 per gallon. As discussed in Section A.3, the cost per kWh for electricity is $0.0115 with no change in billing demand because the propane-air station would be expected to run only in the winter months. Using these values in conjunction with those in Table A.2 results in a total propane cost of $28,707 ($0.0186 per therm of gas service), a total electricity cost of $24.51 (less than 1/10,000 of a dollar per therm), and a total gas cost of $435,643 ($0.2817 per therm). Combined, the more accurate cost for gas service is $0.3002 per therm; an increase of 0.11% over the reported cost in the report. Due to the small difference between the more recent cost of gas service and the cost reported, the reported cost was used in the LCC analysis to minimize confusion between documents.

A.3 Electricity Cost Determination

Electricity rates are composed primarily of charges for demand and charges for consumption. Demand charges are based on the maximum (peak) demand for kilowatts (kW) for a given duration within some time frame, such as the peak one hour demand within the billing period. Consumption charges are based on the total electricity consumption, in kilowatt-hours (kWh), within the billing period. These charges can be flat rates per kWh, or they can vary with the time of use, which can be defined as on-peak and off-peak for the utility during a 24 hour time period, or as seasonal to allow for changes in winter and summer consumption patterns.

The cost of electricity at Fort Stewart is complicated by the structure of the rate schedule under which Fort Stewart purchases its electricity. Fort Stewart purchases its electricity from Georgia Power Company (GPC) under GPC's government rate, schedule G-10, that incorporates declining block rates. The structure of a declining block rate is such that the cost per unit of electricity declines as electricity consumption increases. To further complicate matters, the G-10 structure incorporates a "floating" cut-off point between the last two blocks of the rate structure. This floating point is based on billing demand.

A.3.1 Fort Stewart Electricity Rate Structure

Many electricity rate structures incorporate declining block rates. These are rate structures where the cost per unit of electricity changes depending on the quantity of electricity consumed. Schedule G-10 is an example of a rate structure which incorporates declining block rates. A declining block rate structure does not have an explicit demand charge; instead, the demand charges are incorporated into the block rates. The charges are designed to cover the utility's variable cost plus a share of the capital cost; and as consumption increases, the share of capital cost declines. This stimulates greater load through price discrimination.

Table A.3 illustrates the declining block rate used by GPC schedule G-10. The first three blocks are straightforward, with specific kWh consumption boundaries. The cut-off between the fourth and fifth block, however, is based on billing demand. The demand-determined cut-off point acts as an incentive to flatten out the customer's load; thereby reducing the utility's idle capacity. Schedule G-10 calculates billing demand from actual demand with a seasonal ratchet, using the peak 30 minute kW demand from the current month and 11 previous months. According to historical billing data, the summer months (June through September) determine the billing demand for the remainder of the 12-month period. Billing demand is discussed more thoroughly later in this section.

Inappropriateness of Single or Average Electricity Price

Under this type of rate schedule, there is no single price for the electricity consumed. A facility using 1,500,000 kWh in a month, and with billing demand of 6,000 kW, would pay $0.0600 per kWh for the first 50,000 kWh; $0.0582 per kWh for the next 150,000 kWh; $0.0442 for the next 800,000 kWh and $0.0410 for the last 500,000 kWh. This would result in total monthly energy charges of $67,590.

The above rate structure and consumption level would result in a consumption weighted average rate of $0.0451/kWh. However, this number is meaningless for the purpose of valuing energy savings. As an example, consider the decision of whether or not to spend $12,500 to reduce electricity consumption by 20% and summer demand by 20%. Assume this is a one-time expenditure, and that savings are limited to a one year period. (This oversimplification eliminates the need to discount streams of costs and savings.) A 20% reduction in energy use would constitute a savings of 300,000 kWh, reducing total consumption to 1.2 million kWh. If the savings were valued using the average rate, they would be worth $13,530. In fact, however, the savings are limited to the "Over 1,000,000 kWh" block of the rate schedule, and so would result in a decrease in energy charges of $0.041 per kWh, or $12,300. Using the average rate, the cost-effective decision is to spend the $12,500 to reduce energy use by 20%. Using the more accurate block rate, the cost-effective decision is not to make the investment.

Table A.3. Fort Stewart Electricity Rate Schedule (Partial)

Block	Rate
Less than or equal to 300 times billing demand:	
First 50,000 kWh @	$0.0600
Next 150,000 kWh @	$0.0582
Next 800,000 kWh @	$0.0442
Over 1,000,000 kWh @	$0.0410
Greater than 300 times billing demand:	
All kWh @	$0.0115

Examples such as the one above illustrate the need to use the appropriate block rate in valuing energy efficiency projects that do not result in the facility's total energy use being reduced enough to result in a new block rate. In those cases where an energy efficiency measure would result in changing the utility's block, the issue is considerably more difficult. At Fort Stewart, the electricity consumption level is considerably greater than 1 million kWh, so it was not necessary to deal with the fixed rate cut-offs. Because Fort Stewart does consume more than 300 times billing demand, however, the problem of the floating point must be addressed.

Effects of Billing Demand

The cut-off point between the fourth and fifth blocks of the G-10 schedule is not a set amount; rather, it "floats" depending on billing demand. In this case, the valuation of savings must account for both changes in consumption and changes in demand, which have been complicated by the floating cut-off as block four electricity is converted to block five electricity when billing demand is reduced.

To illustrate the importance of including billing demand, the examples from the previous section can be used. Using the same initial example as before (1.5 million kWh average monthly electricity consumption) but assuming an average monthly billing demand of 4,500 kW, which translates to a cut-off point of 1.35 million kWh, results in a total bill of $63,165 (see Table A.4). Assume that the hypothetical ERO will reduce electricity consumption by 20%, summer demand by 20%, and costs $12,500 to implement. The expected monthly consumption with the ERO is reduced to 1.2 million kWh; the expected monthly billing demand becomes 3,600 kW which translates into an expected cut-off point of 1.08 million kWh. The total bill after the implementation of the ERO is $51,750. Table A.4b depicts the valuation of the new bill.

Using a consumption weighted average rate of $0.0431/kWh to value the 300,000 kWh savings results in a value of savings of $12,938 which indicates that the measure should be implemented as the cost of the measure is only $12,500. When compared to the actual value of savings, however, in Table A.4b, it can be seen that the weighted average rate has overestimated the value of savings. When the appropriate weighted average rate, $0.0381 per kWh, is determined using Equation A.3, the value of savings is calculated to be $11,415; the same value as that in Table A.4b. The ERO is therefore not cost-effective.

$$AVS = \frac{300 \times \Delta D}{\Delta E} \times (\$0.041) + \frac{\Delta E - (300 \times \Delta D)}{\Delta E} \times (\$0.0115) \qquad \text{(A.3)}$$

where AVS = value of energy savings rate
ΔD = demand savings
ΔE = energy (consumption) savings (E = 0).

Billing Demand Calculation

The G-10 schedule bases billing demand on the peak 30 minute kW draw within the billing month and the preceding 11 months. It also incorporates a seasonal ratchet as follows:

Table A.4. How the Floating Cut-Off Point Affects the Analysis

a) Initial Bill

Average monthly electricity consumption = 1,500,000 kWh
Average monthly billing demand = 4,500 kW
Cut-off point = 1,350,000 kWh

			total kWh consumed
billed at:	50,000 kWh @ $0.0600 =	$3,000	50,000 kWh
	150,000 kWh @ $0.0582 =	$8,730	200,000 kWh
	800,000 kWh @ $0.0442 =	$35,360	1,000,000 kWh
	350,000 kWh @ $0.0410 =	$14,350	1,350,000 kWh
	150,000 kWh @ $0.0115 =	$1,725	1,500,000 kWh
Total Bill:		$63,165	1,500,000 kWh

b) Expected Bill After ERO implementation

Expected monthly electricity consumption with ERO = 1,200,000 kWh
Expected monthly billing demand with new measure = 3,600 kW
Expected cut-off point = 1,080,000 kWh

			total kWh consumed
billed at:	50,000 kWh @ $0.0600 =	$3,000	50,000 kWh
	150,000 kWh @ $0,0582 =	$8,730	200,000 kWh
	800,000 kWh @ $0.0442 =	$35,360	1,000,000 kWh
	80,000 kWh @ $0.0410 =	$3,280	1,080,000 kWh
	120,000 kWh @ $0.0115 =	$1,380	1,200,000 kWh
Total Bill:		$51,750	1,200,000 kWh
Original Bill:		$63,165	1,500,000 kWh
Difference:		$11,415	300,000 kWh

For the billing months of October through May, the Billing Demand shall be the greater of:

1) Ninety-Five percent (95%) of the highest summer month (June through September), or,

2) Sixty percent (60%) of the highest winter month (October through May), including the current month.

For the billing months of June through September, the Billing Demand shall be the greatest of:

1) The current actual demand, or,

2) Ninety-Five percent (95%) of the highest actual demand occurring in any previous applicable summer month (June through September), or,

3) Sixty percent (60%) of the highest actual demand occurring in any previous applicable winter month (October through May).

At Fort Stewart, the seasonal ratchet in effect is the summer ratchet. Historical data indicates that demand usually peaks in at least three of the four summer months. The remaining eight months then have billing

demand set at 95% of the peak summer month. Consequently, the value of demand savings must be based on billing demand savings, and not demand savings. If an ERO was assumed to save energy during any or all of the summer months, it followed that the change in annual billing demand was equal to four months of actual demand change and eight months of 95% of the demand change, as shown in Equation A.4. This would be true even if the ERO reduced demand only in the summer months. Under the G-10 rate structure, any measure that reduces demand during the summer months affects billing demand through the winter months. Conversely, if an ERO was assumed to reduce demand in only the winter months, it would not affect billing demand, and therefore the demand savings would be zero for that particular ERO.

$$\Delta D = 4 \times DS + 8 \times (0.95 \times DS) \tag{A.4}$$

where ΔD = annual change in billing demand (kW)
DS = kW change per 30 minute period, summer month demand

While billing demand may not peak in all four summer months, historically it has peaked in at least three of the four, and the difference in the value of cost savings between demand based on a 4:8 or 3:9 month setting was assumed to be minimal.

The total cost savings associated with an ERO can be determined using Equation A.5, which is simply the derivative of the G-10 electricity bill calculation formula.

$$CS = \$8.85 \times \Delta D + (\$0.0115 + FCR) \times \Delta E \tag{A.5}$$

where CS = total cost savings
ΔE = annual change in electricity consumption (kWh)
ΔD = annual change in billing demand (kW), as determined in Equation A.4.
FCR = Fuel cost recovery rate, currently $0.013471 per kWh.

If it is not necessary to know the appropriate "electricity price" or average value of savings (Equation A.3), then the total cost savings associated with an ERO can be calculated using Equations A.4 and A.5. Equation A.4 will provide the annual change in billing demand; and Equation A.5 determines the total cost savings. Equation A.5 can also be used to determine the savings associated with demand (demand savings) and savings associated with consumption or usage (energy savings). In this case, demand savings are equal to $8.85 per kW and energy savings are equal to $0.025 per kWh.

Other Variable Costs Associated with GPC Schedule G-10

In addition to the cost per kWh charged in the declining block schedule, the G-10 rate schedule has "riders" attached which outline other charges that vary with the amount of electricity consumed. These are the fuel cost recovery factor and the economy energy sales adjustment. While it is a variable cost, the excess reactive demand (kVAR) charge is also not included in the calculation of most EROs (transmission and distribution EROs include kVAR) because of the difficulty in forecasting excess kVAR. The base charge is not included because it is a fixed charge for service and is therefore not affected by the amount of electricity consumed.

The fuel cost recovery (GPC schedule "FCR-11," or most recent FCR) is a per kWh rate adjustment set by GPC. The rate has varied from 1.6896¢ to 1.3471¢ per kWh during the past three years. The economy energy sales adjustment (GPC schedule "RA-1") decreases the bill after all adjustments have been made,

excluding state and local taxes, by the percentage stated in the schedule. The percentage has varied from 0.22524% to 0.01325% during the past three years. For the Fort Stewart analysis, the economy energy sales adjustment was not included as it was such a small percentage. Excess kVAR is billed at $0.27 per excess kVAR.

A.3.2 Other Factors Involved with Electricity Costing

In a forthcoming PNL report, "Determining Appropriate Energy Costs for Federal Residential Building Standards Analysis," by S.A. Shankle et al., the authors note that the appropriate cost of energy to use in determining the correct level of investment in energy-efficient construction should include the following elements:

1. Energy rates paid to the supplier by the federal facility;
2. Avoidable demand charges;
3. Avoidable distribution system losses;
4. Avoidable distribution system capital costs;
5. Avoidable external costs of energy supply and distribution.

The incorporation of the above elements is referred to as the "full cost" of energy. Current federal life-cycle costing methods do not include the cost of environmental externalities unless they are reflected in some manner within the utility bill. The external cost of energy will increasingly become internalized within the LCC process, however, due to such factors as utility least-cost planning, the 1990 Amendments to the Clean Air Act, and emissions trading. As these costs become internalized, they will be reflected in the actual cost of energy paid by the facility, and will no longer need to receive separate consideration.

A.4 References

10 CFR 436. 1992. U.S. Department of Energy, "Federal Energy Management and Planning Programs." *U.S. Code of Federal Regulations*.

Stucky, D. J., and S. A. Shankle. January 1993. *Natural Gas Cost for Evaluating Energy Resource Opportunities at Fort Stewart*. PNL-8490, Pacific Northwest Laboratory, Richland, Washington.

U.S. Department of Commerce, National Bureau of Standards (NBS). November 1987. *Life-Cycle Costing Manual for the Federal Energy Management Program*. NBS Handbook 135, Prepared for Federal Energy Management Program Staff Office, U.S. Department of Energy. U.S. Government Printing Office, Washington, D.C.

Appendix B

Level-2 Input and Output Files

Appendix B

Level-2 Input and Output Files

The two attached disks contain the Fort Stewart Level-2 input and output files. The majority of the files are compressed in a self-expanding executable format. Before attempting to expand them, make sure that there is adequate space available on your hard drive (approximate file size is described below). To expand any of the files with the ".EXE" extension, simply copy the file to the hard drive, then type in the file name at the DOS prompt and press <Enter>.

B.1 Input Files: STEW-INP.EXE and INDEX.WP5

The Level-2 input files are all included in one compressed file (STEW-INP.EXE) on Disk 1. When expanded, there are 18 files (STEW1.i2 through STEW18a.i2) which occupy approximately 9.5 MB. The complete Level-2 input file is the combination of all eighteen ".i2" files. The ".i2" files are split into groups of ten building sets for ease of editing and viewing. The files are ASCII text and should be readable by any text editor or word processing software package.

Each of the ".i2" files has ten building sets (except stew18, which has only five). Each building set contains specific information pertaining to that building set. Some of these include:

- Building type
- Number of buildings
- Average age
- Total square footage
- Available fuels
- Operating hours
- Dimensions and envelope data
- Lighting data
- Heating and cooling data
- Service hot water data

The file STEW1.i2 also contains the facility level information which pertains to all of the buildings at Fort Stewart. This includes the utility rate structures, weather city identification, current existing consumption, central plant information, and financial parameters.

The data in these files can be used to check the input assumptions to the Level-2 model. While many of these values are defaults from the software based on building type, size, age, etc., changes have been made based on specific site data gathered during building walk-through inspections. One of the advantages of using the FEDS software is that if any of the original input data change or if assumptions can be refined, it is a simple matter to enter the revised data and rerun the analysis.

The file INDEX.WP5 contains an index of which building sets are in each ".i2" file.

B.2 Output Files: FEDS-OUT.EXE, SPRDSHT.EXE, and BLDGNUM.WP5

There are three files on Disk 2, all related to the Level-2 output. FEDS-OUT.EXE is the full, detailed output of the Level-2 software. SPRDSHT.EXE is the ERO results in a single-row, multiple-column format for ease of viewing using a spreadsheet software package. BLDGNUM.WP5 is a summary file containing information related to the building sets. FEDS-OUT and SPRDSHT are compressed files, which expand to 2.5 MB and 1.2 MB, respectively.

FEDS-OUT is a text file which can be read by any text editor or word processing software package. It contains the full output of the Level-2 software. This includes a summary of the input file, total site savings potential, existing and post-retrofit energy consumption and cost by building set and end-use, and a detailed description of all life-cycle cost-effective EROs.

SPRDSHT is a ".WK1"-format file that should be readable be most spreadsheet software packages. This file contains the results from the Level-2 software, as well as the EROs evaluated manually, in a format similar to Table 3.6. This file is included so that the ERO results can be easily sorted in a number of ways to examine different implementation strategies. The table also includes columns for SIR and discounted simple payback which are not included in the FEDS-OUT file. All EROs are listed, including those with negative NPVs. The Level-2 software does not report results for negative options, so these EROs have "none" listed in the retrofit technology column. The notation "NA" and "-1" are used where data were either not available or not applicable to a particular ERO.

BLDGNUM.WP5 is a summary file containing a list of all of the building sets, with columns for the number of buildings, average age, total floor area, and a list of Fort Stewart building numbers in that building set. This file can be used to link specific EROs back to the actual buildings in which they might be implemented.

Distribution

No. of
Copies

OFFSITE

12 DOE/Office of Scientific and Technical Information

2 M. Ginsberg
Federal Energy Management Program
U.S. Department of Energy
CE-44
1000 Independence Avenue, S.W.
Washington, DC 20585

2 L. Harris
Federal Energy Management Program
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, DC 20585

V. Petrolati
DOE/In-House Energy Management
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, DC 20585

2 A. Gillespie
FORSCOM
Attn: FCEN-RDF
Building 200
Fort McPherson, GA 30330-6000

D. Fournier
U.S. Corps of Engineers
Construction Engineering Research Laboratory
P.O. Box 4005
Champaign, IL 61820-1305

No. of
Copies

5 B. Starling
U.S. Corps of Engineers
Engineering Division
Attn: CEHND-PM-CR
P.O. Box 1600
Huntsville, AL 35807-4301

2 R. Jones
Fort Stewart
HQ 24th INF DIV (M) & Ft. Stewart
Attn: AFZP DEV; Bldg 1139
Fort Stewart, GA 31314-5000

D. Kelley
Fort Stewart
HQ 24th INF DIV (M) & Ft. Stewart
Attn: AFZP DEE; Bldg 1139
Fort Stewart, GA 31314-5000

ONSITE

DOE Richland Operations Office

D. D. Green (K8-50)

47 Pacific Northwest Laboratory

P. R. Armstrong (K5-08)
J. W. Currie (K8-54)
F. V. Di Massa (K8-18)
J. A. Dirks (K8-18)
D. R. Dixon (2) (K8-17)
C. M. Griswold (K8-27)

No. of Copies		
	J. M. Keller	(K5-08)
	L. L. Larson (20)	(K8-18)
	G. B. Parker (3)	(K8-54)
	D. R. Payson	(K7-90)
	E. E. Richman	(K5-08)
	W. F. Sandusky	(K5-06)
	S. A. Shankle	(K8-15)
	D. J. Stucky	(K8-15)

No. of Copies		
	G. P. Sullivan	(K8-18)
	R. F. Szydlowski	(K5-08)
	R. R. Wahlstrom	(K5-08)
	Project File (2)	
	Publishing Coordination	
	Technical Report Files (5)	

DATE
FILMED
3/10/94

END