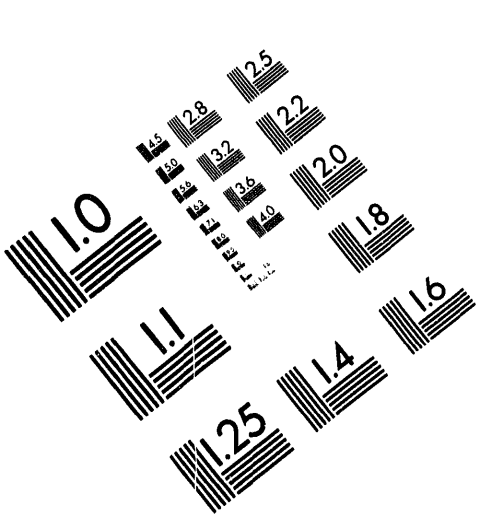

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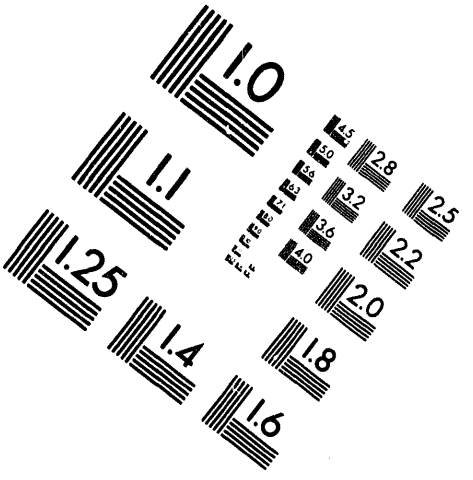

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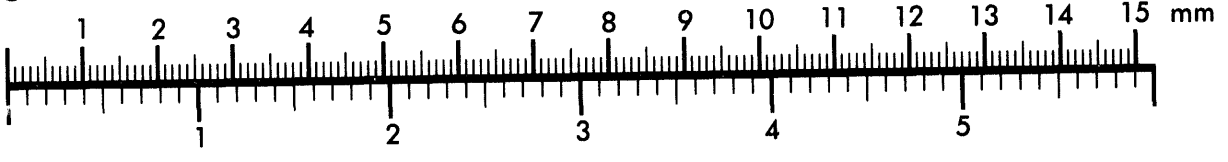

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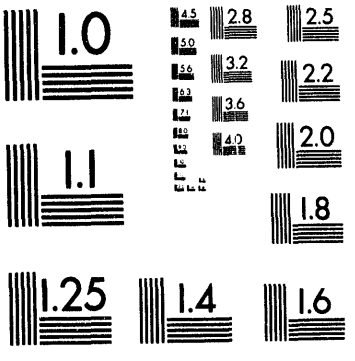

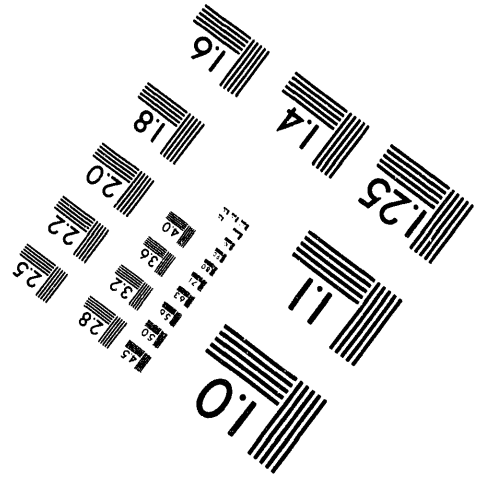

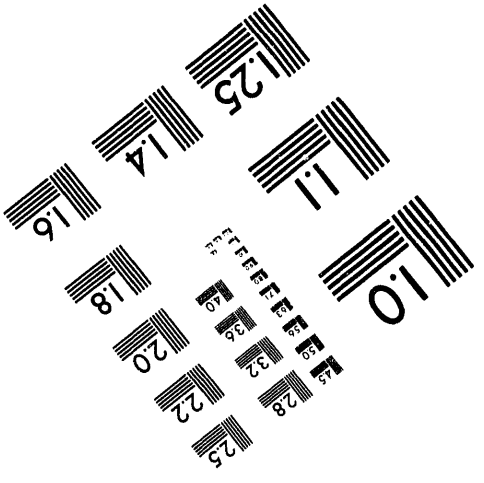

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Lessons Learned from New Construction Utility Demand Side Management Programs and Their Implications for Implementing Building Energy Codes

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Foreword

This report is one in a series of documents describing research activities in support of the U.S. Department of Energy (DOE) Building Energy Standards Program. The Pacific Northwest Laboratory (PNL) leads the program for DOE. The goal of the program is to develop and encourage the implementation of performance standards to achieve the maximum practicable energy efficiency in the design of new buildings. Such standards are required of DOE by Title III of the Energy Conservation and Production Act (42 USC 6831 et seq.) as amended by the Energy Policy Act of 1992 (Public Law 102-486).

The program approach to meeting the goal is to initiate and manage individual research and standards and guidelines development efforts that are planned and conducted in cooperation with representatives from throughout the buildings community. Projects under way involve practicing architects and engineers, professional societies and code organizations, industry representatives, and researchers from the private sector and national laboratories. Research results and technical justifications for standards criteria are provided to standards development and model code organizations and to Federal, State, and local jurisdictions as a basis to update their codes and standards. This effort helps to ensure that building standards incorporate the latest research results to achieve maximum energy savings in new buildings, yet remain responsive to the needs of the affected professions, organizations, and jurisdictions. Our efforts also support the implementation, deployment, and use of energy-efficient codes and standards.

This report documents a study of new construction demand-side management programs conducted by utilities. Readers with questions, comments, or suggestions about this document or the work it describes are encouraged to contact the author(s), program managers, or project managers.

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Summary

The Pacific Northwest Laboratory's Building Energy Standards Program (BESP) conducted this study to identify demand-side management (DSM) strategies for new construction that utilities have adopted or developed to promote energy-efficient design and construction. The study was sponsored by the U.S. Department of Energy (DOE) Office of Codes and Standards. PNL conducted a survey of utilities and used the information gathered to extrapolate lessons learned and to identify evolving trends in utility new-construction DSM programs. Our findings can be summarized as follows:

- DSM covers a wide range of programs.
- DSM programs can lead to better codes and standards.
- Builder and subcontractor training is the first step.
- Utilities should form working relationships with the building community.
- Incentives can be cut without killing the program.
- Aggressive marketing to the buyer yields bigger market impact.
- Energy codes are of little use without implementation and enforcement.
- Bankers and realtors are important additions to the designer-builder-owner team.
- Utilities can collaborate with each other and with other groups, such as state energy offices and builders associations, to increase energy savings and share costs.
- Utilities need to reassess DSM programs for more cost-effective savings.
- Utilities can work with state legislatures to adopt energy standards.

To increase the overall effectiveness of building energy codes, it is important to identify opportunities where states and utilities can work collaboratively to promote code adoption, implementation, and enforcement.

Contents

Tables

1.0 Introduction

This report was prepared for the U.S. Department of Energy (DOE) Office of Codes and Standards by the Pacific Northwest Laboratory (PNL) through its Building Energy Standards Program (BESP). The purpose of this task was to identify demand-side management (DSM) strategies for new construction that utilities have adopted or developed to promote energy-efficient design and construction. PNL conducted a survey of utilities and used the information gathered to extrapolate lessons learned and to identify evolving trends in utility new-construction DSM programs. The ultimate goal of the task is to identify opportunities where states might work collaboratively with utilities to promote the adoption, implementation, and enforcement of energy-efficient building energy codes.

1.1 Background

The first utility DSM programs in the 1970s were directed at existing homes, with utility-sponsored energy audits, retrofit activities, rebates, and low-interest loan incentives offered to encourage homeowners to retrofit their existing homes with various energy conservation measures.

With the success of these early programs, utilities turned their attention to other "markets" with conservation potential. This report focuses on the new construction market, both residential and commercial. Utility new construction DSM programs are unique in that they can often obtain "lost opportunity" energy savings. Energy-efficient measures not installed at the time of construction can be too costly or impractical to achieve at a later date through retrofit or renovation.

Residential new construction DSM programs can include technical assistance to the building community, training on energy-efficient construction techniques, financial assistance that allows energy-conscious builders to remain competitive, and marketing that educates the potential home buyer to the benefits of an energy-efficient home.

New construction commercial and industrial DSM programs can include design guidelines, education, and training programs for designers, architects and builders, and shared savings programs to cover the additional cost of installing energy-efficient equipment that are developed and implemented in response to the needs of commercial/industrial customers. Currently, the trend is for utilities to develop comprehensive DSM programs that offer all cost-effective efficiency measures and address issues such as commissioning, operation, and maintenance of installed energy-efficiency measures.

1.2 Identification of Utilities

A task to identify utilities recognized for their new construction residential and/or commercial DSM program(s) was undertaken. These utilities were identified based on a review of the new construction DSM literature. The primary resources for this review were the American Council for an

Energy Efficient Economy (ACEEE) Summer Study Proceedings (1990 and 1992), Proceedings from the First National New Construction Programs for Demand-Side Management Conference (ADM Associates Inc. 1992), and proceedings of the Fifth National Demand-Side Management Conference (Energy Investment Inc. 1991). Steven Nadel of ACEEE and Tom Eckman of the Northwest Power Planning Council also assisted us. After reviewing the initial list of identified utilities, other utilities from under-represented geographical areas of the United States were added. The utilities identified from the literature review were compiled in Table 1.1 by program type. This list of programs was updated based on information received during the telephone surveys.

1.3 Telephone Survey Design

A telephone survey was developed and conducted with utility representatives currently involved in new construction DSM programs. Twenty-seven telephone surveys were conducted. We surveyed individuals representing 14 utility residential DSM programs and 10 utility commercial/industrial DSM programs. We also conducted telephone surveys with representatives from the Bonneville Power Administration (BPA), the Tennessee Valley Authority (TVA), the Kansas Electric Utilities Research Program, and the California Energy Commission (CEC).

Interviews averaged 35 minutes in length. Individuals were asked to describe their utility's current new construction DSM program, identify changes that had occurred to the program or were anticipated to occur, identify other groups or organizations with whom they are involved, and describe lessons learned based on their experience with new construction DSM programs, e.g., what they would do again, what they would do differently. In addition, utility representatives were asked questions regarding training materials and were requested to provide copies of any materials they had developed. A sample copy of the telephone survey is provided in Appendix A.

1.4 Outline of Report

Chapter 2 describes lessons learned by the utilities surveyed as they developed and implemented their DSM programs. Chapter 3 lists conclusions and recommendations. Chapter 4 is references.

Appendix A is the survey questionnaire. Appendix B provides detailed findings for each utility surveyed. Appendix C provides a more complete listing of commercial and residential new construction DSM programs throughout the United States. The programs are listed by state and utility and a contact name is provided for each program. This listing was extrapolated from the President's Commission on Environmental Quality's *Energy Efficiency Resource Directory: A Guide to Utility Programs* (1992).

Table 1.1. Types of Utility New Construction DSM Programs

Target Audience	Type of Program			
	Incentives	Technical Assistance	Training	Marketing
Designer	Northern States Power Company - *New Commercial Program* [C][a]	Bonneville Power Administration - *Super Good Cents* [R]	Los Angeles Department of Water and Power - *Design Advantage* [C]	Austin Electric Department - *Energy Star Rating Program and Green Builder* [R]
	Ontario Hydro - *Savings by Design* [C]	Kansas City Power and Light - *Energy Efficiency Home Program* [R]	City of Tacoma and Bonneville Power Administration - *Energy Smart Design* [C]	
	Southern California Edison - *Design for Excellence* [C] (Awards, Competition)	Los Angeles Department of Water and Power - *Design Advantage* [C]		
	Wisconsin Power and Light - *Designer's Award Program* [C][a]	Northeast Utilities - *Energy Conservation Design* [C]		
	Wisconsin Power and Light - *Residential Rebates* [R]	Northern States Power Company - *New Commercial Program* [C][a]		
		Southern California Edison - *Design for Excellence* [C]		
Builder	Bonneville Power Administration - *Super Good Cents* [R]	Bonneville Power Administration - *Super Good Cents* [R]	Bonneville Power Administration -*Super Good Cents* [R]	Austin Electric Department - *Energy Star Rating and Green Builder* [R]
	Los Angeles Department of Water and Power - *Design Advantage* [C]	New England Electric - *Design 2000* [C]	Kansas City Power & Light - *Energy Efficiency Home Program* [R]	Bonneville Power Administration - *Super Good Cents* [R]
	New England Electric - *Design 2000* [C]	Northeast Utilities - *Energy Crafted Homes* [R]	Los Angeles Department of Water and Power - *Design Advantage* [C]	New York State Electric & Gas - *NYE-Star* [R]

Target Audience	Type of Program			
	Incentives	Technical Assistance	Training	Marketing
Builder (contd)	New York State Electric & Gas - *NYE-Star* [R]	Northeast Utilities - *Energy Conservation Construction* [C]	New England Electric - *Design 2000* [C]	Northeast Utilities - *Energy Crafted Homes* [R]
	Northeast Utilities - *Energy Crafted Homes* [R]	Puget Sound Power and Light - *Design Energy Plus* [C]	New York State Electric and Gas - *NYE-STAR* [R]	Ontario Hydro - *R-2000* [R]
	Northeast Utilities - *Energy Conservation Construction* [C]	Seattle City Light - *Residential Efficiency Standards* [R]	Northeast Utilities- *Energy Crafted Homes* [R]	
	Ontario Hydro - *R-2000* [R]	Southern California Edison - *Design for Excellence* [C]	Ontario Hydro - *R-2000* [R]	
	Pacific Gas & Electric - *California Comfort Home* [R]	City of Tacoma - *Energy Smart Design* [C]	Pacific Gas and Electric - *California Comfort Home* [R]	
	Puget Sound Power and Light - *Comfort Plus* [R]		Seattle City Light - *Residential Efficiency Standards* [R]	
	Puget Sound Power and Light - *Design Energy Plus* [C]		City of Tacoma - *Energy Smart Design* [R]	
	Seattle City Light - *Residential Efficiency Standards* [R]			
	Southern California Edison - *Design for Excellence* [C] (Awards, Competition)			
	Southern California Edison - *Welcome Home* [R]			
	City of Tacoma - *Energy Smart Design* [C]			

Target Audience	Type of Program			
	Incentives	Technical Assistance	Training	Marketing
Code Official			Bonneville Power Administration - *Super Good Cents* [R][b]	
			City of Tacoma - *Energy Smart Design* [R][b]	
Owner	New York State Electric and Gas - *Customer Rebates* [C/I] *Energy Analysis* [C]	Florida Power and Light - *Audit Program* [R]	Ontario Hydro - *R-2000* [R][c]	Bonneville Power Administration - *Conservation Education*[c]
	Ontario Hydro *R-2000* [R][b]	New York State Electric and Gas - *Customer Rebates* [C/I] *Energy Analysis* [C]	Ontario Hydro - *Savings by Design* [C][6]	Ontario Hydro - *R-2000* [R]
	Ontario Hydro - *Savings by Design* [C][b]	Tennessee Valley Authority - *Residential DSM* [R]		Seattle City Light - *Residential Efficiency Standards* [R]
	Wisconsin Power and Light *Residential Rebates* [R]			

(a) New Program under development, before regulators.
(b) Existing Program, currently being reassessed, may be discontinued.
(c) Small - new program emphasis.
[C] = commercial
[I] = industrial
[R] = residential

2.0 Lessons Learned

This chapter desribes major findings from our assessment of 27 utility DSM programs. With each finding we include several examples from the utilities, what worked and what didn't work, what utility staff learned along the way, and recommendations they would have for other utilities hoping to implement similar DSM programs.

2.1 DSM Covers a Wide Range of Programs

Utility new construction DSM programs cover a wide variety of activities. Programs may be aimed at the residential, commercial, or industrial sector. Some utilities offer performance-based rebates, some have prescriptive programs. Incentives may be offered to designers, builders, or owners. Some incentive programs are for whole-house energy savings but many utilities now offer rebates for installing specific energy-efficient systems or even for individual appliances. For example, Pacific Gas and Electric's California Comfort Home program provides incentive offerings for energy-efficient air conditioning, high-performance window products, natural gas, and lighting upgrades.

Many utilities offer training programs for designers and builders, but some of the utilities we spoke with also offer training for code officials, realtors, bankers, subcontractors, and utility staff. Training may take place in classrooms, on an individual basis, or in the field. Technical assistance is also offered to architects, engineers, and builders, and in some cases, to subcontractors for specific technologies. One utility, New York State Electric and Gas Corporation, sends technical assistants out to work one-on-one with commercial building owners to help them review new building plans for potential energy saving opportunities.

Utilities employ a myriad of marketing strategies to increase program awareness; again the audiences vary, from architects and builders, code officials and state energy office staff, to individual owners and the public at large. With its multi-family residential DSM marketing program, Seattle City Light markets to potential apartment building tenants as well as the apartment building owners. Ontario Hydro is providing a series of programs for potential home owners. The programs bring banking representatives and real estate brokers together with utility representatives and builders to offer potential home buyers a full range of services. Buyers can visit demonstration homes and view computer programs that model energy-efficiency.

While many utilities stressed the virtue of keeping things simple, larger utility DSM programs have continuously evolved to meet the needs of their customers. Southern California Edison Pacific Gas and Electric is a good example.

Southern California Edison's commercial and industrial DSM program, Design for Excellence, offers a wide range of assistance from the early design phase through the end of construction. The program began in 1985 as a daylighting program. In 1988 incentives were offered for efficient HVAC

equipment. As a result of both the program's successes and the requirements of California's Title 24, the building envelope, mechanical, and lighting portions of the program were added in 1989. Performance-based incentives were integrated into the program on a pilot basis in 1990 and permanently in 1992. In 1994, elements of the prescriptive and performance portions of the program will be integrated. The Design for Excellence program also sponsors an "Awards Competition" that offers special awards to builders and designers who employ cutting edge techniques, materials, or equipment in their construction design. Another unique feature of the program is that it specifies customer rebate levels by the climate zone in which the building is located. Hence, a building located along the coast would receive a lower rebate for an energy-efficient HVAC system than would a similar building located in the desert.

Southern California Edison's residential DSM program, Welcome Home, is also expanding its scope; the performance-based rebate program plans to add duct efficiency and manufactured housing rebate programs in 1994. While the utility offers builder and architect training it also emphasizes the importance of training utility personnel. SCE provides its staff with training that ranges from negotiation skills to Title 24 requirements as well as instruction on building practices.

2.2 DSM Programs Can Lead to Better Codes and Standards

Utilities, through their new construction DSM programs, can actually encourage a state to voluntarily *adopt* new code levels before they become mandatory. The Early Adopter Program (EAP) offered by the Bonneville Power Administration (BPA) is an example of one such program. The Northwest Power Planning Council (NWPPC) established the Model Conservation Standards (MCS). In an effort to encourage state and local governments to adopt the MCS guidelines into their building codes, BPA created the Early Adopter Program. The EAP provided the following incentives to jurisdictions that adopted the MCS requirements: 1) a cash payment to defray some of the associated adoption and start-up costs, 2) an annual training allotment for each code official who enforced the energy codes, 3) a fixed reimbursement per residence to offset any additional costs incurred by an energy code inspection, 4) technical support services, and 5) incentive payments to builders (Cantor and Cohn 1989).

In addition to EAP, BPA provided a marketing program called the Super Good Cents program. This program provided builders with training, incentives, and marketing assistance to encourage them to voluntarily adopt more energy-efficient building practices. The program's success led two states in BPA's service area, Oregon and Washington, to adopt codes equal to the energy-efficient building practices of the SGC Program. BPA has since increased the standards of the SGC Program to match the 1991 Model Energy Code.

In early 1992 Ontario Hydro began a commercial new construction DSM program called Savings by Design based on ASHRAE 90.1 standards. The very successful program is impacting 25% of new commercial construction in Ontario Hydro's 317-utility service region. The ASHRAE standards are

now being incorporated into the building code. Ontario Hydro is also working closely with code organizations to upgrade residential codes.

Some utilities have dropped their residential new construction DSM programs because the optional building energy standards supported by the program were adopted into the state code. Central Maine Power dropped its successful new construction residential DSM program after the state of Maine adopted more stringent building energy standards. The utility is now focusing its DSM programs on commercial and industrial customers. Wisconsin Power and Light also dropped its Good Cents Program in 1990 when the state adopted a stricter new construction energy code.

Puget Sound Power and Light discontinued its Comfort Plus residential DSM program in 1993 because the optional building energy standards supported by the program were adopted into the state energy code. Utility staff at Puget Power say that residential new construction DSM programs are important where energy codes are poor (or nonexistent) because the programs can improve local building practices, and, as they witnessed, influence code development.

2.3 Builder and Subcontractor Training is the First Step

Program staff of a New England residential DSM program put it bluntly, "Training builders and sub-contractors is the first step in implementing energy-efficient building codes because if the builder does not know how to implement the code, the code is meaningless." The program, Energy Crafted Homes, is a collaborative effort of eight Northeast utilities that provides training to builders in the field during home construction.

Utility staff at New York State Electric and Gas consider field training for builder and architects to be a critical component of their NYSE-STAR residential new construction DSM program. In addition to requiring homes to be 25% more efficient than code, the program also set an indoor air quality requirement of seven air changes per hour. Builders were initially unlikely to meet this requirement since the state code had no similar indoor air quality guidelines. However acceptance is growing as builders receive training through the program.

In its residential DSM program, Seattle City Light found that it is not enough to train just builders, but it is important to train and work with subcontractors. The utility now provides some project-by-project training; its goal is to provide training on a much larger scale, trade by trade. Kansas City Power and Light teaches builders how to install heat pumps and other energy-efficient features in new construction and major remodels.

2.4 Utilities Should Form Working Relationships with the Building Community

Many utilities have established working relationships with the design and building communities. Many utilities have involved both groups in DSM programs early on and have asked for and incorpo-

rated feedback into their training programs. PG&E staff acknowledged the importance of builders to the success of new construction residential DSM programs. Along with training and technical assistance, staff recommend participating in builders associations and providing opportunities via surveys, etc., to obtain feedback from builders on utility programs.

Listening to the building community prompted Los Angeles Department of Water and Power (LADWP) to make several adjustments to its Design Advantage new construction commercial and light industrial DSM program. The program was expanded to include major retrofit projects because of LA's sluggish new construction market. An energy accounting service was dropped in favor of design assistance, installation and commissioning services, rebates on equipment, and extensive training programs for builders and designers. Utility staff stress that DSM programs need to be flexible so that they can respond to changing market and customer needs. LADWP places a high priority on utility personnel who are experienced at working with designers and architects.

"Know your customer" is also a motto for New England Electric. Utility staff feel that being able to provide specialized assistance, rather than just a blanket program, to their customers is a significant part of the success of the utility's Design 2000 program for new and retrofit commercial construction. With feedback from customers, the design assistance and incentive program has grown to include replacement of failed equipment and governmental new construction customers. In the near future the utility hopes to add greater assistance in the area of engineering/design, especially in sustainable design focused on a total building system approach.

Ontario Hydro collaborated with the Ontario Home Builders Association on its residential DSM program R2000. Ontario Hydro provided incentive funding and the Builders Association provided builder training and certified that homes met the program standards. The two organizations have worked together to develop educational materials and training programs directed at increasing consumer awareness and demand for R2000 homes.

2.5 Incentives Can Be Cut Without Killing the Program

Several new construction DSM programs are using incentives as a secondary measure to encourage energy savings in buildings. Kansas City Power and Light emphasizes training over rebates to encourage consumers to use energy-efficient technologies for the sake of saving energy alone. More and more residential new construction DSM programs are discontinuing or cutting back on incentives. Bonneville Power Administration, which provides power to nearly 100 northwest utilities, is reevaluating and restructuring the incentives portion of its Super Good Cents Program and has decreased the maximum cash incentives per home.

Austin Electric is another example. Because it is a municipal electric utility, it places a high priority on running cost effectively to minimize taxes, so Austin Electric's program focuses on enhancing the reputations of energy-efficient builders rather than giving out monetary incentives. Through its Energy Star Rating Program, Austin Electric awards points for structures based on the

percent of energy savings over the base building code. Austin publicizes the names of the most energy-efficient builders and designers with an aggressive marketing program that is driving the demand for more energy-efficient housing.

Two factors - downsizing and a slow housing market - are causing Ontario Hydro to discontinue cash incentives to home buyers in both its residential and commercial DSM programs (though builder and designer incentives may continue). Ontario Hydro staff say that discontinuing the incentives has not been easy (particularly in this case where an outside channel, the Ontario Home Builders Association, was used to distribute the incentives); however, program expenditures should be more cost-effective. Ontario Hydro says it would use consumer cash incentives again, but their use would be more selective and would only occur with an understanding of exactly what demand reduction could be achieved in what time period as a result of the cash incentives.

2.6 Aggressive Marketing to the Buyer Yields Bigger Market Impact

Many utilities say that an aggressive marketing and education program aimed at the potential buyer/owner is critical to the success of new construction DSM programs. Kansas City Power and Light staff credit marketing efforts aimed at potential home buyers for the success of the DSM new construction residential program they have run since 1989.

When New York State Electric and Gas started its commercial DSM program in 1991, it was hard pressed to interest builders in expensive energy-saving technologies because builders were more concerned with cutting time and project costs in New York's low activity, high competition construction environment. So the utility took its energy-saving program directly to prospective building owners. Utility consultants and architects help owners review building plans and identify potential energy-efficient features. If the energy-saving features are incorporated the owner receives a rebate based on the amount of energy saved. New York's program is so successful it's in danger of overrunning its budget.

Austin Electric is a municipal utility that can't afford to offer incentives so it uses marketing to get the most out of its DSM budget. Through its Energy Star Rating Program, Austin Electric publicizes the names of the most energy-efficient local builders and designers with an aggressive marketing program that is driving the demand for more energy-efficient housing. Austin Electric is measuring success by the increased number of builders who want to participate in the program.

Ontario Hydro hopes that marketing strategies, such as increased training programs and partnering with industry, will pick up the slack as it drops incentives from its residential and commercial DSM programs. Staff say they would like to do more marketing to builders and engage in cooperative consumer advertising (with organizations such as the Ontario Home Builders Association). In marketing DSM programs, they would emphasize the fact that energy efficiency equates to environmental benefits (both directly and through such techniques as sustainable design).

Seattle City Light offers a unique marketing strategy targeted to both owners and occupants in its energy-efficient multi-family residential program. To tenants, the utility markets comfort and cost savings rather than energy efficiency (an energy-efficient unit is more likely to yield lower heating bills). To building owners, the utility points out that lower heating bills translate into more desirable units that are likely to have lower turnover and vacancy rates.

Some utility staff who did NOT use aggressive marketing acknowledge that marketing programs could have increased the impact of their programs. Staff of a consortium of small New England electric utilities say that an early marketing program to make known the benefits of energy-efficient buildings would have helped their commercial DSM effort, the Energy Conscious Construction program, where incentives were de-emphasized in favor of technical assistance. They also thought that early marketing would have increased the impact of their residential DSM program, Energy Crafted Homes.

Nearly three-fourths of Tennessee Valley Authority's 160 utilities participate in its residential DSM program. While TVA reimburses the utilities for the number of homes in their service area meeting the program energy use standards, TVA does not provide regional marketing. Program staff admit that more marketing and more coordination among the geographically disperse utilities would help increase public awareness and therefore the impact of the program.

2.7 Energy Codes Are Useless Without Enforcement

Energy-efficient codes are of little value unless they are implemented and enforced; some utilities are working with other agencies or utilities to address this issue. Florida Power and Light conducts audits of residential new construction; it informs homeowners if their homes fall within state guidelines and provides information on how to improve energy efficiency.

As Puget Sound Power and Light re-evaluates its DSM programs per Bonneville's focus on cost-effectiveness, utility staff have come to one firm conclusion: Energy savings result from codes that are enforced. Staff feel that more emphasis should be placed on training building code officials, and that energy code enforcement should be kept simple. They say that calculations and computer simulations are rarely used by building inspectors. Utility staff recommend providing energy code enforcement options to smaller cities and jurisdictions that have limited resources. The state of Washington is establishing a special inspector position, someone who will be certified to enforce non-residential energy codes and who will be available for hire by smaller cities/jurisdictions on an as-needed, consultant-type basis. Utilities need staff who are knowledgeable of and/or have experience with energy codes, i.e., staff who understand enforcement issues and problems. They believe that greater coordination between the builder, designer, and owner is a key to better buildings in terms of energy-efficiency and energy savings.

Washington state utilities will play a major role in implementing the state's recently revised energy-efficiency requirements for new and remodeled non-residential buildings. Utilities will pay

100% of the energy compliance permit costs for the first 18 months (beginning April 1994) and 50% of those costs for the next 18 months.

As early as 1984, the City of Tacoma recognized the need to develop and provide comprehensive training programs to code officials, as well as builders, on energy-efficient technologies (Fey and Lerman 1991).

Los Angeles Department of Water and Power (LADWP) emphasizes code training. LADWP offers training both for its own personnel and for architects and builders on interpreting and meeting code requirements and on code updates. LADWP plans to develop a series of seminars targeted specifically toward builders to train them in codes and efficient building practices. They also believe new construction DSM programs should be developed to coordinate with and support existing building energy codes.

2.8 Bankers and Realtors Are Important Additions to the Designer-Builder-Owner Team

Kansas City Power and Light utility staff acknowledge that real estate agents can play a significant role in educating potential homebuyers to the advantages of an energy-efficient home. The utility is exploring marketing efforts with realtors to expand a highly successful DSM new construction program that has involved over 17,000 homes since it began in 1989.

Pacific Gas & Electric staff also recommend training realtors on the advantages of energy-efficient homes. PG&E developed a training program to teach model home sales personnel how to become more effective in selling energy-efficient improvements to potential home buyers.

To promote its R2000 residential DSM program, Ontario Hydro is starting a new seminar program for customers in which banking representatives, real estate brokers, utility representatives, and builders will all participate to offer a full range of services to prospective home buyers.

The City of Tacoma achieved success in promoting awareness of its Energy Smart Design residential DSM program among builders and architects and is now looking at bringing bankers and realtors on board to expand its new construction programs.

In some cases, bankers are taking the initiative to promote energy savings. Lending institutions in Illinois use a home energy rating system to include calculated energy costs/savings in home loan eligibility.

2.9 Utilities Can Collaborate with Each Other and With Other Groups to Increase Energy Savings and Share Costs

Many utilities are beginning to look for opportunities to work with other organizations to develop more comprehensive energy-efficient programs that realize greater energy savings. New York State Electric and Gas (NYSEG) collaborated with the New York State Energy Office (NYSEO), the New York State Research and Development Association, and the New York State Builders Association to develop the NYSE-STAR program in 1991. Originally NYSEG was the only utility to participate in the program; in 1992 the program expanded to include all seven New York electric utilities as well as one natural gas utility.

In New England, five small utilities banded together to develop a commercial DSM program, Energy Conscious Construction. The Northeast utilities felt that by forming an alliance they could pool their resources to develop a more comprehensive program; they also realized it would easier to market one energy-efficient building standard than five different programs to the builders located across their five service territories. Eight other New England utilities collaborated on a residential program, Energy Crafted Homes.

Seattle City Light has the help of the Washington State Energy Office which provides builder training programs. Seattle City Light staff noted that utilities must seek out opportunities to work with other city and government agencies and with code officials to gain maximum energy savings from their programs. The Seattle Commons project is one unique example of this kind of collaboration. Seattle City Light and the City of Seattle are working together on the proposed project that combines energy efficiency, recycling and other environmental concepts in a new 18,000-residence planned community.

2.10 Utilities Need to Reassess DSM Programs for More Cost-Effective Savings

Utilities are reassessing their new construction DSM programs in terms of actual energy savings. BPA is currently questioning how much return it is getting on its investment, i.e., are the dollars spent on energy efficiency being actualized in energy savings? BPA will refocus its emphasis to get its customers to engage in more conservation strategies on their own by promoting conservation education. Other strategies BPA is trying: targeting audiences with higher savings potential like multi-family housing; targeting specific components with known energy savings like HVAC systems and home appliances; and focusing on regions experiencing high growth. Montana and Idaho are growing areas that currently have no minimum energy code and criticism has increased over the poor energy efficiency of the housing stock. BPA may begin to focus greater efforts on training builders in those states.

Puget Power & Light is re-evaluating all of its DSM programs in light of BPA's focus on the cost effectiveness of DSM programs in terms of energy savings. According to Puget Power staff, another

option utilities are exploring is the possibility of giving rebates for specific high-efficiency appliances, e.g., refrigerators, water heaters, horizontal access washers, etc.

Utilities are focusing more of their DSM resources on the commercial sector because energy savings are more predicable (e.g., there are definite hours of use) and the dollars spent on commercial DSM programs have a higher impact. New York State Electric and Gas has come to the conclusion that the 15 hours per home it spends on audit procedures, including blower door tests, thermal ratings, and equipment inspection, as part of its residential DSM program might be more cost effectively spent at commercial sites where these 15 hours could generate significantly greater energy savings.

Wisconsin Power and Light dropped its Good Cents residential DSM program in 1990 because the state adopted a stricter energy code and because the program became too expensive to run in light of the limited savings resulting from it. The utility is now developing a commercial program, the Designer's Award Program, that will award designers cash incentives based on the number of specific energy-saving systems and equipment they install in new commercial buildings. The goal for the first year of the program is to impact 50 commercial or industrial customers.

2.11 Utilities Can Work with State Legislatures to Adopt Energy Standards

Utilities can play a role in working with the state legislature to adopt building energy standards and codes. Influencing building code development so that DSM programs won't be needed in the future is a stated goal of a consortium of five small New England utilities. The utility staff feel that working with code groups and legislatures to influence energy code development is an important part of their DSM effort.

Staff at California's Pacific Gas and Electric also recommend working closely with code organizations and state energy offices. One objective of PG&E's California Comfort Home residential DSM program was to provide information and market acceptance that could lead to higher state energy standards for new home construction.

In Washington state, a Technical Advisory Group including builders and utility representatives was formed to prepare the most recent revision of the Washington State Energy Code.

The California Energy Commission (CEC), California's utilities, and other parties got together and formed the California Collaborative. California is implementing its energy conservation and efficiency policy by both economic incentives and regulations. The Public Utilities Commission implements the economic component by allowing investor-owned utility shareholders to earn a return on DSM programs. The CEC implements the regulatory component in the form of energy efficiency standards for new buildings and appliances (Johnson 1992). This approach coordinates efforts between regulators, states, utilities, and investors within the context of new construction.

3.0 Conclusions and Recommendations

As the Building Energy Standards Program assumes a more active role in the implementation of building energy standards and identifies opportunities to work with states in this area, it should also assess what opportunities exist to work with utilities in this area.

3.1 Conclusions

From the responses to our telephone survey, we found that:

- New construction DSM programs can and have played a role in the promotion of more energy-efficient building standards and codes, e.g., some residential new construction DSM programs were discontinued because the optional building energy standards supported by the program were adopted into the state code.

- A wide range of activities are supported under new construction DSM programs, from information exchanges to training building code officials.

- Training, especially training in the field, for builders and sub-contractors is viewed as an initial step to implementing energy-efficient building standards and is an area where many utilities have experience.

- Many utilities have established working relationships with the design and building communities, e.g., many utilities have involved both groups in DSM programs early on and have asked for and incorporated feedback into their training programs.

- New construction DSM programs are using incentives as a secondary measure to encourage energy savings in buildings, e.g., more and more residential new construction DSM programs are discontinuing or cutting back on incentives.

- For a new construction DSM program to impact the market, an aggressive marketing (educational) program aimed at the potential buyer/owner needs to be developed in conjunction with any training or technical assistance programs.

- Energy-efficient codes are of little value unless they are implemented and enforced; some utilities are working with other agencies or utilities to address this issue.

- Utilities are expanding their team approach to go beyond the designer-builder-owner to include bankers and realtors.

- Many utilities are beginning to look for opportunities to work with other organizations to develop more comprehensive energy-efficient programs that realize greater energy savings.

- Utilities are reassessing new construction DSM programs in terms of actual energy savings and looking to target their resources, e.g, utilities are allocating more DSM resources to commercial programs; some utilities are considering appliance rebates; residential new construction DSM programs often include major renovations or multi-family housing.

- Utilities can play a role in working with the state legislature to adopt building energy standards and codes.

3.2 Recommendations

Based on these findings, we would make the following general recommendations for working with utilities in the area of building energy codes.

Collect utility DSM information for each state. For targeted states, we should have basic utility information. For example, we should be able to identify the major utilities in a state and where they are in the DSM process. If they do offer DSM programs, we should know the kinds of programs offered and what impact these programs have had. We should also know if utilities have a position on and/or are involved in building energy standards and what the current and future regulatory DSM drivers are. We should also identify, from a utility perspective, those issues and players (historical and current) associated with building energy standards and codes. This effort might be expanded to obtain and compile general utility information to add to each state profile in the code database maintained by PNL's BESP.

Compile a DSM Lessons Learned Fact Sheet. Our telephone survey indicated that many utilities have limited involvement (or communication) with other utilities or agencies (e.g., state energy offices). We might consider compiling a one-page Utility DSM Lessons Learned Fact Sheet based on the findings from this task. For some states, like Iowa, who are being required to develop DSM programs within the year, a fact sheet might be a useful starting point and could provide linkages to other utilities that could help them develop DSM programs more responsive to the building energy standards needs of their state. States might also find such a fact sheet informative.

Promote interaction between state energy offices and utilities. Each state energy office (SEO) should be aware of how active the utilities in its state are, or can be, in promoting energy-efficient building standards. Opportunities should be provided to facilitate better and more frequent communication between SEOs and utilities. These interactions might be accomplished through regional or state workshops or technical working meetings. This forum might eventually be expanded to include designers, builders, and code officials. We should consider working with states to support the building of a team approach to promoting energy-efficient building standards.

Identify opportunities for collaborative marketing programs. For those states with utility new construction DSM programs, we may want to help identify opportunities to develop collaborative programs e.g., some new construction residential programs noted they had limited market penetration due to the lack of an aggressive marketing program. SEOs could play a role in educating the home buyers on the advantages of energy-efficient homes. There may be possibilities for training programs jointly sponsored by SEOs, utilities and code officials, realtors, or lenders.

Promote SEO-utility collaboration on projects that combine energy efficiency and environmental concerns. Both states and utilities separately have expressed interest in linking energy efficiency to environmental issues. Utilities might serve as a resource in identifying potential state or local projects where SEOs and utilities could collaborate (for example, the Seattle Commons project being developed by Seattle City Light and the City of Seattle). We should explore ways to promote these kinds of dialogues.

Help states identify ways to encourage local enforcement of energy codes. For states that have no energy code or where the energy code falls under the purview of local jurisdictions, utility DSM new construction programs might have a role in training the current building community to adopt more energy efficient construction practices. States need to explore how they might work with utilities in that area. Also, States may want to explore the possibility of jointly developing code enforcement programs/strategies with utilities. For example, Washington state is expanding energy code enforcement capabilities by developing a program that will certify someone to enforce non-residential energy codes. This person could be a consultant who could be hired by smaller cities and jurisdictions on an as-needed basis. Utilities in the state are partially funding this program.

These are but a few recommendations to encourage states and utilities to look for opportunities to work together. As we begin to work with individual states and utilities, other more specific strategies will unfold.

4.0 References

ADM Associates Inc. 1992. *Proceedings of the First National New Construction Program for Demand Side Management Conference*, May 3-5, 1992, South Lake Tahoe, California, ADM Associates, Inc., Sacramento, California.

American Council for an Energy Efficient Economy (ACEEE). 1990-1992. *Proceedings of the ACEEE Summer Study on Energy Efficiency in Buildings*, Pacific Grove, California, ACEEE, Washington, D.C.

Cantor, R. A. and S. M. Cohn. 1989. *Evaluation of Implementation, Enforcement, and Compliance Issues of the Bonneville Model Conservation Standards Program*, Vol. 1. ORNL/CON-263/V1, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Energy Investment Inc. 1991. *Proceedings of the Fifth National Demand-Side Management Conference: Building on Experience*, July 30-August 1, 1991, Boston, Massachusetts, Electric Power Research Institute, Palo Alto, California.

Fey, J. C. and D. I. Lerman. 1991. "Tacoma's Energy Code Experience: A Five-Year Review." *Proceedings of the Fifth National Demand-Side Management Conference: Building on Experience*, July 30-August 1, 1991, Boston, Massachusetts, Electric Power Research Institute, Palo Alto, California.

Johnson, J. 1992. "Changing the Efficiency in New Buildings: A Public Policy Perspective." *Proceedings of the New Construction Programs for Demand-Side Management Conference*, May 3-5, 1992, South Lake Tahoe, California.

President's Commission on Environmental Quality. 1992. *Energy Efficiency Resource Directory: A Guide to Utility Programs*, Barakat and Chamberlin Inc., Washington, D.C.

Appendix A

UTILITY QUESTIONNAIRE

Appendix A

UTILITY QUESTIONNAIRE

Utility New Construction DSM Programs: Issues of Interest

1. Describe your utility's New Construction DSM program(s): past, present
   Prompt with type of program, program customer(s)

   Have the goals of program(s) changed? How? education, training,

   Past and current drivers of new construction DSM programs

   Future new construction DSM programs: different emphasis? increased activity? work with regulators

2. Were certain new construction DSM programs more successful that others?

   To what do you attribute the success? Lack of success?

3. Do you believe new construction DSM programs should support/promote/be linked to more energy-efficient building codes?

   Have your new construction program(s) played a role in advancing building energy standards/codes?

   How was/is this accomplished?

4. In the context of your new construction DSM programs have you worked with/shared information with other organizations? Describe

   Other utilities

   Regulators

   Code organizations

   State energy offices

   Builders

   Designers/architects

Local cities/communities

Others: real estate brokers, bankers, Home Energy Rating System

5. What impact do you think the National Energy Policy Act may have on new construction DSM programs within your utility? across new construction DSM programs in general?

6. Have you developed any materials, tools, training in the context of new construction DSM programs?

   Type

   Audience

   Can copies of materials/tools be obtained?

   Do you plan to develop any materials, tools, training?

   Do you feel there is any need for materials, tools, training? What kind? For whom?

7. Do you believe there is a role for the U.S. Department of Energy in the context of new construction DSM programs? What is it?

8. Describe Lessons Learned from your utility's new construction DSM programs.

   Programs you would do again.

   Programs you would do differently.

   Programs/issues to avoid.

9. What other utility new construction DSM programs do you think we should contact?

10. Who do you contact when you want information about utility DSM programs?

Appendix B

UTILITY PROGRAMS

UTILITY: Austin Electric Department
PROGRAM: Energy Star Rating Program and Green Builder
SECTOR: Residential
CONTACT: Doug Seiter
(512) 499-3506

Austin Electric is a municipal electric utility. As a municipal utility, it is important that the utility run as cost effectively as possible to minimize taxes. For this reason, Austin Electric has developed a program that focuses on enhancing the reputations of energy-efficient builders rather than giving out monetary incentives.

The Energy Star Rating Program awards points to a structure based on the percent of energy savings over the base building energy code. A house can be awarded a maximum of three stars (points) for an energy savings of 15% over the base building energy code. In addition to a house being rated for energy savings, Austin Electric publicizes the names of the most energy-efficient builders and designers through an aggressive marketing program. This marketing program is driving the demand for more energy-efficient housing.

Lessons Learned:

- Market your program. Identifying "in print" the names of those designers and builders associated with energy-efficient housing is the major factor in the success of this program.
- Establish one-on-one relationships with builders; seek out builders to work with you to be part of the process; work with builders in the field.
- Early in the program, the focus should be on the customer and the builders.
- Minimize initial expenses associated with equipment purchases, e.g., avoid elaborate computer systems.

UTILITY: **Bonneville Power Administration**
PROGRAM: Super Good Cents Program
SECTOR: Residential
CONTACT: Suzanne Anker
(503) 230-5486

The Bonneville Power Administration (BPA) Super Good Cents (SGC) Program as a new construction DSM program exemplifies how energy-efficient building codes can result from more energy-efficient building practices. The SGC Program combined a marketing strategy (both local and regional) with an incentive program. In this case cash allowances were given for new electric housing built to the requirements of the 1986 Model Energy Code (MEC). The end result was that two states, Oregon and Washington, adopted codes equal to the energy-efficient building practices of the SGC Program.

On October 1, 1993, the SGC Program based on 1986 MEC levels was replaced by a SGC program based on 1991 MEC levels. In addition, the cash allowances were decreased from $2,000 per home to a ceiling of $1,800 per home and BPA no longer provides a regional ad campaign. If a utility chooses to market the SGC Long-Term Program, it must provide the resources to do so. To date, 57 of BPA's 99 utilities have signed up to this new program.

Potential Future Strategies:

1. Target specific audiences for DSM programs, e.g., multi-family.

2. Develop specific strategies for smaller utilities, e.g., smaller utilities could provide information only and work with larger utilities to provide training and enforcement.

3. Target specific components, e.g., ducts in HVAC systems.

4. Focus on regions experiencing the most growth. For example, Montana and Idaho currently have no minimum code and there is increased criticism over the poor energy efficiency of the housing stock. BPA may begin to focus greater efforts on training builders in those states.

General Trends within the Bonneville Power Administration

The BPA is currently questioning how much return it is getting on its investment, i.e., are the dollars being spent on energy efficiency being actualized in energy savings? BPA's emphasis will focus on getting customers in its service territory to engage in more conservation strategies on their own. Conservation education is a new program where the focus is on informing people about the need for conservation.

Conservation will continue to be important. However, over the next 2 years, it is anticipated that rebates will decline. A greater focus is likely to be placed on working with product manufacturers to produce more energy-efficient products and appliances.

PROGRAM: **California State Energy Commission**
CONTACT: Mike Messenger
(916) 654-4774

In the 1980s the CEC collaborated with the utilities, stakeholders, and regulators to develop an energy-efficiency plan. Based on experience with the California DSM Collaborative, it was felt that to be successful, a DSM collaborative must benefit all parties concerned, and that these benefits must be quantifiable. The potential financial and policy results are worth achieving; what is critical is how they will be achieved. How these programs will benefit shareholders is also a key to success. Now, due to the presence of shareholder incentives for investor-owned utilities, utilities want DSM programs.

UTILITY: **Central Maine Power Company**
PROGRAM:
SECTOR: Residential
CONTACT: Harley Cooper
(207) 623-3521 ext. 3006

Central Maine Power initiated a new construction residential DSM program in 1987 that did quite well, especially in the condominium market. That program has been discontinued since the state of Maine adopted more stringent building standards. These standards negatively impacted the use of electric heat in residences. Today the majority of new homes under construction will use gas heat.

Central Maine Power currently is focusing a number of its DSM programs on the commercial or industrial customer.

UTILITY: **Commonwealth Edison Co.**
PROGRAM:
SECTOR:
CONTACT: Jerry Hill
(312) 394-2764

Pete Jackson or Dave Kramer
Illinois Department of Energy and Natural Resources
(312) 814-4747

At this time Illinois is experiencing a slight energy excess; however, energy shortages are anticipated in the 1994-95 timeframe.

There are six utilities servicing Illinois. Commonwealth Edison Company is the largest, servicing approximately two-thirds of the population at this time.

The state of Illinois is responsible for developing a Statewide Electrical Energy Policy Plan. Such a plan is developed every 3 years. The plan is developed as follows: 1) the state drafts an electrical energy plan based on the Federal Energy Plan; 2) this state plan is presented to and discussed with the utilities; 3) from these discussions, a final Statewide Electrical Energy Policy Plan is created; 4) this plan is sent to the Commerce Commission for approval; 5) finally, the individual utilities develop their own programs to comply with the State-Wide Electrical Energy Policy Plan and these individual programs are sent to the Commerce Commission for approval.

A statewide Electrical Energy Policy Plan was created in the 1990s and this plan identified an aggressive demand side management (DSM) component. Utilities developed aggressive DSM strategies and programs in response to this plan. These DSM strategies and programs were submitted to the Commerce Commission. The Commission wanted the statewide plan to have less emphasis on DSM programs. Based on this response, Illinois utilities, except for Commonwealth Edison Co., have slowed down their efforts to develop and implement DSM programs.

Study of Stand Alone Standards

The State of Illinois contracted with the American Council for an Energy Efficient Economy (ACEEE) to conduct a study of stand alone standards. The purpose of the study is to look at the cost effectiveness of incorporating into residential and commercial energy building codes energy-efficient standards for stand-alone structures, such as small motors and large HVAC systems which are currently not covered under Federal energy standards. The study is currently being conducted and no documentation is available at this time.

Energy Lending Program

John Marley (217/785-2007) has compiled information on lending institutions in Illinois using a home energy rating system by which to include calculated energy costs/savings in home loan eligibility.

UTILITY: **Florida Power and Light**
PROGRAM:
SECTOR: Residential
CONTACT: Maria Arias
(305) 552-4152

Suzanne Shapero
Audit Program
(305) 552-2789

Florida Power and Light currently has two projects in the area of new construction.

The first is a research program exploring the effectiveness of different DSM residential programs. This program is in its formative stage and information is not yet available.

The second program is a residential new construction audit program. This program conducts audits of new construction homes after the home has been built, informs homeowners if homes fall within state guidelines, and provides information on how to improve energy efficiency.

UTILITY: **Kansas City Power and Light**
PROGRAM: Energy Efficiency Home Program
SECTOR: Residential
CONTACT: Greg Bullington
(816) 556-2941

Kansas City Power and Light has one DSM new construction DSM program the Energy Efficiency Home Program. This program began in 1989 and targets residential new construction and major remodels. It is estimated that 17,000 homes have been involved in the program.

The initial focus the program was to increase the use of electric heat pumps. The program works with designers and builders. Representatives from the utility work with designers to build more

energy-efficient homes and with builders to teach them how to install heat pumps and other energy-efficient features.

Lessons Learned:

- Rebates will not last forever - a program should focus on energy savings so that builders and homeowners will install energy-efficient technologies for the benefit of saving energy rather than for the rebate. Rebates can actually limit the number of people who participate in a program; if participation is limited to those who receive a rebate, then the resources allocated to the program will determine the number of participants in that program.

- Training of both designers and builders is an essential component to the success of a program. Designers and builders need to learn how to incorporate energy-saving measures and install energy-saving systems.

- The real estate industry should be part of any residential DSM program. The real estate agent can play an important role in educating potential homebuyers as to the advantages of an energy-efficient home.

- Residential new construction DSM programs should include marketing to educate potential home buyers on the advantages of an energy-efficient home.

PROGRAM: **Kansas Electric Utilities Research Program**
CONTACT: (913) 354-1821

The Kansas Electric Utilities Research Program is a subdivision of EPRI. It is one of 17 research sites jointly funded by the U.S. Department of Energy (DOE) and six utility companies. This research program is comprised of an individual from each of the six utilities. This group decides the nature and scope of research to be conducted by the program. At this time, the nature and scope of research to be undertaken is being redefined.

UTILITY: **Los Angeles Department of Water and Power**
PROGRAM: Design Advantage
SECTOR: Commercial/Industrial
CONTACT: Alvin Chan/Steve Matsuda
(213) 481-5724/(213) 481-3247

Los Angeles Department of Water and Power (LADWP)'s Design Advantage new construction commercial and light industrial DSM program was expanded to include major retrofit projects. The primary driver for the inclusion of major retrofits is the sluggish new construction market. Large commercial retrofits are currently this program's primary customer.

The Design Advantage program originally offered only an energy accounting (consumption history, load profiles) service. This service was discontinued (due to a lack of meters), and was replaced by design assistance (including audits of what measures can be undertaken through major renovations to improve building efficiency), installation and commissioning services (through private consultants who are screened through a proposal process), and rebates on equipment (based on the measure's incremental benefit over Title 24 code but never greater than the avoided capacity and energy costs).

The program originally offered assistance using only a performance approach. As this proved too expensive, the program now offers a prescriptive approach to commercial and industrial (and residential over five stories, curiously enough) customers with a floor area of less than 60,000 ft^2, and both prescriptive and performance approaches for customers with a floor area of greater than 60,000 ft^2.

LADWP offers training both for its internal personnel (code training, efficiency training, etc.) and for external parties (architects and builders training programs covering code changes, efficient building practices, and efficient equipment upgrade options). LADWP plans to develop a series of seminars targeted specifically toward builders to train them in codes and efficient building practices.

The emphasis on training is that there should be more practical end use training in specific practices that are relatively easy to implement and proven to work.

Lessons Learned:

- DSM programs need to be flexible so that they can respond to their changing market and customer needs.
- Training of designers, builders, and code officials is key to a program's success.
- New construction DSM programs should be developed in the context of or coordinated with energy building codes.

- Commissioning and maintenance are important components of new construction DSM programs to obtain long-term energy savings.

- Utility personnel need to be trained and/or experienced to work with designers and architects.

UTILITY: New England Electric
PROGRAM: Design 2000
SECTOR: Commercial
CONTACT: Mike Macatear
(508) 366-9011

New England Electric's Design 2000 program offers design assistance and incentives, baselines, and efficient equipment incentives for new construction and major renovation projects involving commercial buildings. Commissioning, building operation assistance and training are also offered. All incentives are based on incremental savings: the incentive is based on the degree to which the new feature or system exceeds code. Since its inception, the program has expanded to include replacement of failed equipment and governmental new construction and major renovations. In the near future, greater assistance will be offered in the area of engineering/design, especially in sustainable design focused on a total building system approach.

Lessons Learned:

- To be successful, DSM programs must be simple, e.g., it should be easy to replace equipment with superior technologies, and it should be easy to determine just what technology is the right one to upgrade.

- Know your customers, i.e., a utility must be able to provide specialized assistance, to its customers, not just blanket programs.

- Engineering, commissioning, and training programs are all essential ingredients to success.

UTILITY: New York State Electric and Gas Corporation
PROGRAM: Custom Rebates, C & I Energy Analysis
SECTOR: Commercial
CONTACT: Steve Blablac
(607) 729-2551

New York State Electric and Gas (NYSEG) Corporation's commercial DSM programs began in 1991. The current response to the program is tremendous, — the program is in danger of overrunning its budget.

At this time in New York state, there is little new construction. As a result, new construction projects are quite competitive, as contractors try to cut project costs and time. Energy-saving techniques are neither cost-effective nor time saving, thus energy-saving technologies are not a high priority for builders. For that reason, NYSEG's commercial new construction DSM program is focused on the prospective building owner.

The program provides technical assistance and incentives to owners. Technical assistants (utility consultants or architects) work with owners to identify energy-efficient features for a building. If those energy saving features are incorporated into the building, the owner receives a rebate based on the amount of energy that will be saved. The goal of the program is that new buildings exceed current state energy-efficient building requirements.

New York recently adopted performance-based codes (performance-based codes define how much energy a structure should consume unlike prescriptive codes which define what kind of lighting or equipment should be used). The performance-based approach provides the designer, builder, and owner with the greatest flexibility in terms of achieving energy savings.

Lessons Learned:

- Know your audience and address their needs and concerns.
- Be flexible, i.e., obtain feedback on your program and be willing to modify it.
- Work with designers and architects.
- Have energy-efficient codes that are simple to use and can be enforced.

UTILITY: New York State Electric and Gas Corporation
PROGRAM: NYSE-STAR
SECTOR: Residential
CONTACT: Lori Maggio
(607) 762-7398
Cori Traub - Training Materials
(518) 465-3115

The NYSE-STAR program was collaboratively developed by New York State Electric and Gas (NYSEG) Corporation, the New York State Energy Office (NYSEO), the New York State Research and Development Association, and the New York State Builders Association in 1991. Originally NYSEG was the only utility to participate in the program; in 1992 the program expanded to include all seven New York electric utilities as well as one natural gas utility.

The NYSEG program covers single-family and multi-family homes, heated by gas or electricity, provided the home exceeds code by 25% (on a performance standard). Any equipment installed in the home is covered by a rebate (covering the differential cost of upgrading) as long as it exceeds code. Other utilities participating in the NYSE-STAR program offer either different levels of cash incentives, or none at all and, instead use the program only as a marketing tool.

Indoor air quality (IAQ) is an issue with this program. The program specifies that, to qualify as a NYSE-STAR home, the home must exceed code by 25% and operate with seven air changes per hour. Most home ventilation systems do not operate at this level. In addition, no code guideline exists that specifies a minimum number of allowable air changes, thus IAQ requirements were seldom initially addressed. However, this is changing as more builders gain experience with the program.

Lessons Learned:

- The utility has learned that DSM programs can be expensive when blower door tests, thermal ratings, and equipment inspection are performed on every home. An average of 15 hours is spent, per home, on these procedures. Hence, there is a general feeling that residential programs aren't as cost effective as commercial programs. (The same 15 hours at a commercial facility could generate significantly greater energy savings.)

- Training (for builders and architects) is a critical component of a new construction DSM program. There is a need to provide builders with training in the field.

UTILITY: Northeast Utilities[a]
PROGRAM: Energy Conscious Construction
SECTOR: Commercial
CONTACT: Gary Johnson
(203) 665-2073

The Energy Conscious Construction program is a DSM commercial energy-efficiency program. The program has two goals: 1) to promote energy efficiency and 2) to influence building codes so that, in the future, the program will not be needed.

The program provides design teams (all people involved in construction of a building) with technical information and assistance. Also, the program provides cost incentives to cover any additional costs associated with energy-efficient alterations to the design.

Lessons Learned:

- Program staff should have technical knowledge (construction and/or engineering).
- Work with building owners to educate them on energy-efficient building options.
- Technical assistance needs to be accompanied by an aggressive marketing program.
- Use incentives as a secondary measure to encourage energy saving in buildings.
- Evaluate and be willing to modify your incentive program.
- Work with the entire design team, e.g., engineers, architects, construction companies, and the owner.
- Link the program to energy codes.
- Work with the code groups and legislatures to influence energy code development.
- The program needs to be centrally controlled.
- Issues to avoid in a DSM program: implementing unproven technologies; getting involved in disputes or organizational politics; trying to change utility rates.

(a) Five northeast utilities collaborated on this DSM program. They are Connecticut Light and Power Company, Western Massachusetts Electric Company, Public Service Company of New Hampshire, Holyoke Water Power Company, and Northeast Nuclear Energy Company.

UTILITY: Northeast Utilities[a]
PROGRAM: Energy Crafted Homes
SECTOR: Residential
CONTACT: Mike Carren
(508) 366-9011 ext 3323

Western Massachusetts
Duncan Prahl

The Energy Crafted Homes program is a residential new construction DSM program offered by five small New England utilities. The five utilities chose to develop a single residential DSM program in an effort to market one energy-efficient building standard to builders across the five service territories.

The program is incentive-based and focused on the builder. Utilities provide training and assistance to builders while a house is being built, and then provide monetary incentives to the builder for homes built in compliance with the Energy Crafted standards. These are standards for thermal efficiency for both heating and cooling, infiltration, moisture control, indoor air quality, fossil fuel, appliances, and lighting. More emphasis is being placed on training builders in the field rather than providing seminars.

At this time participation is low. The low participation is, in part, attributed to builder resistance, i.e., it is difficult to get builders to adopt and learn new building skills. The other component is the lack of a market for energy-efficient homes, i.e., the advantages of an energy-efficient home are not widely known or understood.

Lessons Learned:

- Where appropriate, utilities (gas and electric) should form alliances and pool their resources to develop more comprehensive programs.

- Training of builders and sub-contractors is the first step to implementing energy-efficient building codes, i.e., if the builder does not know how to implement the code, the code is meaningless.

(a) Eight utilities collaborated in this DSM program. They are Blackstone Valley Electric, Boston Edison, Eastern Edison, Granite State Electric, Massacusetts Electric, Narragansett Electric, Newport Electric, and Western Massachusetts Electric.

- An early marketing program to make known the benefits of energy-efficient homes is critical, e.g., the Energy Crafted Home program might have had a greater impact if it had developed an aggressive marketing component.

- Utilities need to form partnerships and establish liaisons with other organizations, utilities cannot do it alone.

- Involve builders early in the program. Address their concerns and, where possible, incorporate their input. Otherwise, builders can work against your program.

UTILITY: **Northern States Power Co.**
PROGRAM:
SECTOR: Commercial
CONTACT: Kris Leaf
(612) 330-6087

Northern States developed a commercial new construction DSM program and has presented it to the regulators for approval. The program will be an incentive-based program with design assistance. Computer models will be used to educate and train engineers and architects in new energy-efficient design techniques.

Before this program, a number of pilot projects were developed and tried. None of these projects went beyond the pilot stage; however, some lessons learned from these pilot projects are included below:

- Getting involved in the design process (e.g., by providing design assistance) is critical.

- Incentives are well received and are probably necessary to initially get people involved in the program.

- Any DSM new construction program must include quality assurance and evaluation components.

UTILITY: Ontario Hydro
PROGRAM: R2000
SECTOR: Residential
CONTACT: Julie Mitchel
(416) 506-7534

Ontario Hydro's R2000 program was designed by the Canadian Ministry of Energy and the Environment. The plan was made available to utilities for implementation in 1984. To date, Ontario Hydro is the only Canadian utility to implement the program.

The general goal of the program is to provide high-quality, energy-efficient, and environmentally friendly housing. Cash incentives were offered to the home buyer and to the builder (not to architects, unless they were the builders as well). The program initially targeted only electrically heated houses, although it now encompasses gas-heated homes as well. The Ontario Home Builders Association (OHBA) provides training to builders and certifies homes meeting the R2000 standards.

Two factors, Ontario Hydro being downsized and the slow housing market, will result in cash incentives being discontinued (at least to the consumer, incentives to builders may continue). The program intends to use more non-cash marketing techniques such as training programs and partnering with industry.

A variety of materials and training programs have been developed in conjunction with the OHBA directed at increasing consumer awareness and demand for R2000 homes. The utility works closely with code organizations to upgrade codes to the new standards. Both the utility and code officials participate in the builder and customer training programs. The training program is currently expanding to offer seminars for builders at which marketing and strategic planning assistance will be offered. A new training program for customers is also being designed in which banking representatives, real estate brokers, utility representatives, and builders will all participate to offer a full range of services to prospective home buyers. Models and demonstrations of energy-efficient homes are featured.

Lessons Learned:

- Ontario Hydro has discovered that cash incentives are difficult to discontinue once they have been implemented (particularly when an outside channel like the OHBA is used to distribute the incentives). Although cash incentives would be used again, their use would be more selective, and would only occur with an understanding of exactly what demand reduction could be achieved in what time period as a result of the cash incentives.

- Ontario Hydro would conduct more training, do more marketing to builders, and engage in additional cooperative advertising (with organizations such as the OHBA) to consumers. In

marketing such programs, the fact that energy efficiency equates to environmental benefits (both directly and through such techniques as sustainable design) would be emphasized.

UTILITY: **Ontario Hydro**
PROGRAM: Savings by Design
SECTOR: Commercial
CONTACT: Yves Lemoine
(416) 506-7974

Ontario Hydro supplies 317 utilities with power. In April of 1992 Ontario Hydro began a commercial new construction DSM program. The program was based on ASHRAE 90.1 guidelines. Designers (engineers, mechanics, etc.) and owners were given incentives for exceeding the ASHRAE standards.

Initially the program targeted designers and owners. Designers were given incentives to cover additional time and costs to research and build energy-saving homes. The Owners were given incentives to cover additional costs to build an energy-saving home. Owner incentives now have been eliminated and greater emphasis is placed on incentives for the designers.

In addition, to impacting 25% of the commercial new construction, there has been a tremendous impact on the design and building community. Also ASHRAE standards are now incorporated in the building code.

Lessons Learned:

- Involve designers in the process; ensure that communication with designers is ongoing.
- Develop linkages with local governments (equivalent to state government); make sure they know about the program; provide opportunities to involve them in the program.

UTILITY: **Pacific Gas and Electric**
PROGRAM: California Comfort Home
SECTOR: Residential
CONTACT: Jacob Naeb
(510) 866-5968

The Pacific Gas and Electric (PG&E) California Comfort Home program is designed to encourage residential builders to exceed state energy building standards (i.e., Title 24). Initially the program provided incentives for builders exceeding Title 24 requirements for cooling. Bonus incentives were available for high-performance window products. The current program has expanded its incentive offerings to include additional AC options as well as natural gas, no-air-conditioning (Low-Cost Cool), and lighting upgrades. The program offerings are currently under review.

Lessons Learned:

- Work closely with code organizations and state energy offices, e.g., one of the objectives of this program is to provide information and market acceptance that can lead to higher state energy standards for new home construction.

- Builders are important to the success of a new construction residential DSM program. In addition to training and incentive programs, consider participating in building associations and provide opportunities (e.g., surveys) to obtain feedback from them on your programs.

- Builders and subcontractors (e.g., HVAC installers) need to receive training on new methods and technologies.

- DSM programs need to be continually evaluated to assess their responsiveness to the market and actual energy savings.

- Expand marketing efforts to include training realtors on the advantages of energy-efficient homes, e.g., a training program was developed for model home sales personnel to enable them to become more effective in selling energy-efficient improvements to potential home buyers.

UTILITY: **Puget Sound Power & Light Co.**
PROGRAM: Comfort Plus
SECTOR: Residential
CONTACT: Shannon McCormick/Brett Irwin
(206) 462-3192/ (206) 462-3218

Comfort Plus was a residential new construction DSM program modeled after the Super Good Cents program. The program provided design and technical assistance (i.e., plan review) and offered rebates to builders. The program technically ended October 1993, although the utility will continue to pay builders incentive payments for the next 2 to 3 years). The reason the program was discontinued is that the optional building energy standards supported by the program were adopted into the state energy code.

Lessons Learned:

- Residential new construction DSM programs are important when energy codes are poor (or do not exist) and can be used as a vehicle to improve building practices in energy efficiency, e.g., educate and train designers and builders.

- Residential new construction DSM programs will likely evolve into programs dealing with components (e.g., heat pumps) and controls.

- Build partnerships with the building community by bringing them into the process, e.g., the Technical Advisory Group for the most recent Washington State Energy Code revision included builders on the board.

- Utilities are exploring the possibility of giving appliance rebates, e.g., refrigerators, horizontal access washers, etc.

- Utilities are likely to focus more of their DSM resources on the commercial sector because energy savings are more predicable (e.g., there are definite hours of use) and the dollars spent on commercial DSM programs have a higher impact.

UTILITY: **Puget Sound Power & Light Co.**
PROGRAM: Design Plus-Energy Smart Design
SECTOR: Commercial
CONTACT: Jan Louisse
(206) 462-3788

Puget Sound Power & Light's commercial DSM programs are currently in high demand. However, Puget Power & Light is re-evaluating all of its DSM programs in light of BPA's focus on the cost effectiveness of DSM programs in terms of energy savings. Design Plus-Energy Smart Design is a commercial new construction DSM program that provides design assistance for new commercial construction. The program identifies cost-effective energy practices for standard designs and provides cash incentives to cover the additional costs incurred.

Washington utilities will play a major role in the implementation of Washington state's recently revised energy-efficiency requirements for new and remodeled non-residential buildings. Utilities will pay 100% of the energy compliance permit costs for the first 18 months (beginning April 1994), and 50% of those costs for the next 18 months.

Lessons Learned:

- Energy savings result from codes that are enforced, so educate and train building code officials.
- Keep energy code enforcement simple, e.g., calculations and computer simulations are rarely used by building inspectors.
- Provide energy code enforcement options to smaller cities and jurisdictions that have limited resources. The state of Washington is establishing a special inspector position, someone who will be certified to enforce non-residential energy codes and who will be available for hire by smaller cities/jurisdictions on an as-needed, consultant-type basis).
- Utilities need staff who are knowledgeable of and/or have experience with codes, i.e., staff who understand enforcement issues and problems.
- More coordination between the builder, designer, and owner leads to a better building in terms of energy-efficiency and energy savings.
- Provide technical assistance early in the design phase, i.e., work with designers.

- Utility staff who provide technical assistance must be credible to designers, i.e., it would help if they had a working knowledge of/ or degree in architecture, mechanical engineering, or electrical engineering.

- New Construction DSM programs should be dynamic and responsive.

UTILITY: Seattle City Light
PROGRAM: Long-Term Super Good Cents Program
SECTOR: Residential
CONTACT: Deborah Akimo/John Forde
(206) 684-3874/684-4288

With fewer single-family electric homes being built in its service area, Seattle City Light expanded its residential new construction Super Good Cents program to include multi-family residential structures. Monetary incentives are provided to builders to build beyond the code. Some technical assistance is provided. Training programs are primarily provided though the Washington State Energy Office; however, their residential efficiency program does provide some project-by-project training. The goal is that training be done on a much larger scale, e.g., trade by trade. Seattle City Light found that it is not enough to train just builders but it is important to train and work with subcontractors.

Since Super Good Cents costs cannot be passed on to tenants, Seattle City Light offers a unique marketing strategy for the owners and occupants of energy-efficient multi-family residences. Comfort and energy savings are marketed rather than energy efficiency. An energy-efficient unit is more likely to yield lower heating bills. Lower heating bills translate into a more desirable unit, a unit that is likely to have a lower turnover and/or vacancy rate.

Lessons Learned:

- Marketing is an essential component of a new construction DSM program, e.g., if you have a good energy-efficiency program, you need to get the program known.

- Develop strong working relationships with architects/designers.

- Utilities need to work more closely with code officials to ensure that energy-efficient buildings are built.

- To realize energy savings, utilities must seek out opportunities by working with other city and governmental agencies.

- Energy-efficiency program should include environmental components, e.g., Seattle City Light is working with the City of Seattle on the Seattle Commons, a proposed energy-efficiency and recycling project that would include 18,000 new residences.

UTILITY: **Southern California Edison**
PROGRAM: Design for Excellence Program
SECTOR: Commercial and Industrial
CONTACT: John Pyles
(909) 394-8805

The Design for Excellence program offers a wide range of assistance from the early design phase through the end of construction. The program began in 1985 as a daylighting program only. In 1988 incentives were offered for efficient HVAC equipment as well. As a result of both the program's successes and the requirements of Title 24, the building envelope, mechanical, and lighting portions of the program were added in 1989. In 1990, performance-based incentives were integrated into the program on a pilot basis, coming up to full scale in 1992. In 1994, elements of the prescriptive and performance portions of the program will be integrated. The Design for Excellence program also sponsors an "Awards Competition" that offers special awards to builders and designers who employ cutting edge techniques/technologies in their construction design, materials, or equipment.

The program segments customer rebate levels by the climate zone in which the building is located. Hence, a building located along the coast would receive a lower rebate for an energy-efficient HVAC system than would a similar building located in the desert. This is a novel approach not seen elsewhere.

Lessons Learned:

- Develop simple and easy to implement programs; otherwise, opportunities will be lost.
- Bring designers into the process early to capitalize on opportunities for conservation.
- Provide training so that energy-efficient practices and measures can be implemented.
- Incentives should be based on the value they have to the utility (e.g., climate-specific rebate levels).

UTILITY: Southern California Edison
PROGRAM: Welcome Home
SECTOR: Residential
CONTACT: Michelle Thomas
(909) 394-8808

Currently, Southern California Edison (SCE)'s residential new construction program, Welcome Home, is a performance-based rebate program. Rebates are based on the extent to which the new construction exceeds California's Title 24 energy requirements, on a kilowatt-hour basis. New construction plans must exceed the code by 250 kWh/year to qualify in the Welcome Home program (multi-family new construction must exceed Title 24 by 150 kWh/year). Rebates are based on the number of kilowatt hours by which the plans exceed Title 24. Specific climate zones within SCE's service area are targeted more heavily by the program than others, although plans meeting the minimum requirements from any climate zone within SCE's service area qualify for the program. Certain climate zones (such as coastal) are not targeted, as little energy savings are expected from certain measures in these areas. Rebates offered cannot exceed the builder's incremental cost for the efficient measures.

In 1988 when the program began, little attention was paid to costs, i.e., to verifying that rebates were given for cost-effective measures. The program offered both performance and prescriptive approaches, each of which offered rebates based on whether the new construction surpassed Title 24 by 10%, 20%, or 30%.

SCE anticipates adding a duct efficiency and a manufactured housing rebate program to the Welcome Home program in 1994.

Lessons Learned:

- A successful program must also be a cost-effective one.
- Work with other agencies and utilities and borrow from their programs.
- Bring builders into the process; provide training for builders and architects (training may need to be decreased overtime).
- Train your personnel, e.g., SCE provided training that spanned negotiation skills to Title 24 requirements and even included instruction on building practices.

UTILITY: City of Tacoma
PROGRAM: Energy Smart Design
SECTOR: Residential and Commercial
CONTACT: Jacob Fey
(206) 383-9652

Residential. In 1983, the City of Tacoma adopted the Model Conservation Standard (MCS) as code. At that time, Tacoma's code exceeded the state building code. The MCS covered not only the city itself, but outlying areas that received energy from the city. The program originally included extensive training programs for builders and architects to improve awareness of and technical expertise in efficient building practices. Although the program's code-enforcing capacity continues, the scope of training efforts has been scaled back, as awareness and knowledge has increased. Today, the residential program is focused on multi-family homes.

The City of Tacoma also participates in the Bonneville Power Administration's (BPA) Super Good Cents program, which offers rebates for homes meeting this standard.

Commercial. The City of Tacoma's commercial new construction program also began in 1983, with the enforcing of the MCS on commercial buildings. A new, stricter code for commercial construction is expected to go into effect in the spring of 1994. This program offers design assistance and rebates for efficient construction and equipment. The program will include major retrofits in addition to new construction.

Lessons Learned:

- The most effective way to ensure that a new code is complied with is to make compliance as easy as possible.
- Provide training to builders on energy-efficient practices.
- Be careful that rebates do not result in fuel switching, e.g., potentially encouraging home buyers to demand and builders to install electric heating systems as a result of the rebate program, who would otherwise have installed gas systems.
- Work with other groups, e.g., utilities, builders, and code officials, when developing and implementing DSM new construction programs.
- Explore expanding DSM new construction programs to include working with bankers and realtors.

UTILITY: Tennessee Valley Authority
PROGRAM:
SECTOR: Residential
CONTACT: Ed Colston
(615) 751-2247

Tennessee Valley Authority (TVA) supplies energy to 160 utilities in a region covering parts of eight states (Alabama, Tennessee, Georgia, Mississippi, etc.). TVA has no commercial new construction program, but it does have a new construction residential program. At this time, approximately 127 utilities participate in the program.

TVA specifies the amount of power that can be used per square foot of a house for it to be considered an energy-saving house and works with the utilities to establish guidelines for an energy-saving house. The current guideline is slightly above the Model Home Standards and is applied to both retrofits and new construction. Utilities that participate in the program develop and implement their own program. Utilities are reimbursed by TVA for the number of homes in the serving area that meet TVA's standards. In turn, the utilities pay incentives and give assistance to home owners within their individual programs. In the past, up to 12 utilities have tried to work together in forming a program under the same motto to gain name recognition, but many of the utilities work individually.

Lessons Learned:

- The success of a new construction DSM program is somewhat dependent on public awareness of the program, e.g., TVA provides no regional marketing.
- Marketing of energy-efficient residences would have a greater impact if the various utility new construction DSM programs were more coordinated.
- Flexibility in the program has allowed specific community needs and varying weather conditions to be considered.
- Keep energy-efficiency guidelines simple and nonbureaucratic.
- Provide technical assistance to the builder out in the field.
- Explore opportunities to work with both electric and gas utilities.

UTILITY: Wisconsin Power and Light
PROGRAM: Designer's Award Program
SECTOR: Commercial
CONTACT: Mike Hodges
(608) 252-5093

Wisconsin Power and Light is initiating a commercial new construction DSM program, the Designer's Award Program, in the next year. This program is still in the planning phase, but the basic outline has been designed.

The Designer's Award Program will be based on a point system formed by the utility. Designers will be awarded points for installing energy-saving systems and equipment in new buildings. The designer will receive a cash incentive on the basis of the number of points accumulated.

This program targets designers in all areas of new commercial construction.

The goal of the program during the first year is to impact 50 commercial and/or industrial new construction customers.

UTILITY: Wisconsin Power and Light
PROGRAM:
SECTOR: Residential
CONTACT: Mike Hodges
(608) 252-5093

Wisconsin Power and Light does not have a formal new construction residential DSM program. What currently exists is an informal set of incentives and rebates targeted at designers and owners of residential homes. These rebates and incentives are based on installed energy-saving technologies. No technical assistance, communication, or cooperation between Wisconsin Power and Light and the new construction industry currently occurs.

Until 1990, Wisconsin Power and Light participated in the Good Cents Program. The program was eliminated in 1990 for the following reasons: 1) the state of Wisconsin adopted stricter new construction energy codes and the Good Cents Program standards added very little in additional energy savings; 2) it became too expensive to run due to the limited energy savings resulting from it; and 3) the four utilities that supply Wisconsin are in a price war, i.e., each utility is trying to cut rates for customers as much as possible and is trying to become as cost-effective as possible. Energy saving programs tend to increase the overhead cost.

Lessons Learned:

- A perceived flaw of the Good Cents Program is that it targeted the owner too late in the building process; what is needed is a program that targets the potential home builder before they start to build.

- Incentives should be only one part of a DSM program, not the entire program.

Appendix C

CONTACT LIST FOR NEW CONSTRUCTION DSM PROJECTS FROM THE PRESIDENT'S COMMISSION ON ENVIRONMENTAL QUALITY (1992)

	RESIDENTIAL			
STATE	UTILITY	PROGRAM NAME	CONTACT	PHONE NUMBER
Arizona	Salt River Project	Climate Crafted Homes	Bob Roper	(602) 236-4465
California	Modesto Irrigation District	Power Saver Home	Zane Williams	(209) 526-7458
	Pacific Gas and Electric	California Comfort Home	Jacob Naeb	(510) 866-5968
	Southern California Edison Company	Welcome Home Program - New Residential Construction	Michelle Thomas	(909) 394-8808
Connecticut	Northeast Utilities	Energy Crafted Homes	Bruce Wall	(203) 665-2715
Delaware	Delmarva Power and Light	Super E+ Energy-Efficient Homes	Bill Ferguson	(302) 429-3055
District of Columbia	Potomac Electric Power Company	New Home Design Program	Allison Slinchun	(202) 872-2547
Georgia	Oglethorpe Power Corporation	Good Cents Program	Judy London	(404) 270-7512
	Oglethorpe Power Corporation	Good Cents Improved Homes	Ken Morrison	(404) 270-7524
Idaho	Bonneville Power Administration	Super Good Cents Program	Susanne Anker	(503) 230-5486
Indiana	PSI Energy	Smart Saver	Customer Service	(800) 662-HEAT
Iowa	Iowa South Utilities	Residential New Construction	Mike Nutt	(800) 262-4478
Maryland	Delmarva Power and Light	Super E+ Energy-Efficient Homes	Bill Ferguson	(302) 429-3055
	Potomac Electric Power Company	New Home Design Program	Allison Slinchun	(202) 872-2547
Massachusetts	New England Electric System	New Residential Construction	Customer Service	(508) 366-9011
	Northeast Utilities	Energy Crafted Home	Mike Carren	(508) 366-9011
Michigan	Detroit Edison Company	New Home Program	Customer Service	(800) 482-2983

	RESIDENTIAL			
STATE	UTILITY	PROGRAM NAME	CONTACT	PHONE NUMBER
Missouri	Kansas City Power and Light Company	Energy Efficiency Home Program	Greg Bullington	(816) 556-2941
	St Joseph Light and Power	Gen Customer Energy Efficienty Assistance	Dick Sipe	(816) 233-8888
Montana	Bonneville Power Administration	Super Good Cents Program	Susanne Anker	(503) 230-5486
	Montana Power Company	Super Good Cents Program	John Ralph	(406) 723-5421
New Hampshire	New England Electric System	New Residential Construction	Customer Service	(508) 366-9011
New Jersey	Jersey Central Power and Light	Good Cents	Kevin Connelly	(201) 455-8580
	New Jersey Natural Gas	Efficient Design Program - Residential	Customer Service	(908) 938-1480
	Orange and Rockland Utilities, Incorporated	Good Cents Home Construction	Thomas E. Mahoney	(914) 577-2699
	Public Services Electric and Gas	Energy For Tomorrrow Homes	Energy Conservation Center	(800) 854-4444
New Mexico	El Paso Electric Company	New Apartment Construction	Al Gallardo	(915) 543-5964
	Texas-New Mexico Power	Good Cents Home Program	Doug Landry	(817) 737-1304
New York	Long Island Lighting	Housewarmer	Mark Bensen	(516) 364-7723
	New York State Electric and Gas	Multifamily New Construction	Lori Maggio	(607) 762-7398
	New York State Electric and Gas	One and Two Family New Construction	Lori Maggio	(607) 762-7398
	Niagara Mohawk Power	Residential New Construction Program	Customer Service	(800) NIAGARA
	Orange and Rockland Utilities, Incorporated	Good Cents Home Construction	Thomas E. Mahoney	(914) 577-2699
	Rochester Gas and Electric	NYESTAR	Lori Maggio	(607) 762-7398

	RESIDENTIAL			
STATE	UTILITY	PROGRAM NAME	CONTACT	PHONE NUMBER
North Carolina	Carolina Power and Light	Common Sense House	Russel Duncan	(919) 546-7901
	Virginia Power Company	Energy Saver Home	Jim Bennett	(804) 771-5063
Oklahoma	Public Service Company of Oklahoma	Commercial Good Cents Program	Jim Ezell	(918) 599-2180
Oregon	Bonneville Power Administration	Super Good Cents Program	Susanne Anker	(503) 230-5486
	Canby Electric Board	Super Good Cents Program	Jim Brands	(503) 266-1156
	Eugene Water and Electric	Super Good Cents Program	Bruce Lorencen	(503) 484-2411
Pennsylvania	Philadephia Electric Company	Excellence in Energy Efficiency New Construction	Al McDevitt	(215) 841-5625
South Carolina	Carolina Power and Light	Common Sense house	Russel Duncan	(919) 546-7901
	South Carolina Electric and Gas	Good Cents	Gene Martin	(803) 733-4227
	South Carolina Public Service Authority	Residential Good Cents Rate	Mark Tyoe	(803) 761-8000
Tennessee	Memphis Light, Gas and Water Division	Energy Advantage Apartments	Rebecca Garland	(901) 528-4748
	Memphis Light, Gas and Water Division	Comfort Plus Home	Rebecca Garland	(901) 528-4748
	Meriwether Lewis Electric Coop	Energy Saver Home Program	James Griffin	(615) 725-3558
	Tennessee Valley Authority	Residential New Construction	Craig Smith	(615) 751-2573
Texas	Austin Electric Department	Energy Star Rating Prog and Green Builder	Doug Seiter	(512) 499-3506
	El Paso Electric Company	New Apartment Construction	Al Gallardo	(915) 543-5964
	Houston Lighting and Power	Good Cents Apartment	Customer Service	(713) 228-9211

	RESIDENTIAL			
STATE	UTILITY	PROGRAM NAME	CONTACT	PHONE NUMBER
Texas (contd)	Lower Colorado River Authority	Good Cents Home Program	Ned Braun	(512) 473-4046
	San Marcos Electric Utility	Good Cents Residential Program	Kerry Hellums	(512) 396-2451
	San Marcos Electric Utility	Energy Fitness Program	Kerry Hellums	(512) 396-2451
	Texas Utility Electric Company	Energy Action-New Residential Program	Dal Fradsen	(214) 954-5160
	Texas-New Mexico Power	Good Cents Home Program	Doug Landry	(817) 737-1304
Vermont	New England Electric System	New Residential Construction	Customer Service	(508) 366-9011
Virginia	Virginia Power Company	Energy Saver Home	Jim Bennett	(804) 771-5063
Washington	Benton County Public Utility District	Long Term Super Good Cents	Tom Schumacher	(509) 582-2175
	Bonneville Power Administration	Super Good Cents Program	Susanne Anker	(503) 230-5486
	Lewis County Public Utility District #1	Super Good Cents New Construction	Jane Christianson	(206) 748-9261
	Port Angeles City Light	Good Cents Residential New Construction	Roger Vess	(206) 457-0411 ext. 181
	Puget Sound Power and Light	Comfort Plus/Options Program	Shannon McCormick	(206) 462-3192
	Puget Sound Power and Light	Cash Back for Mobile Homes	Shannon McCormick	(206) 462-3192
	Seattle City Light	Residential Efficiency Standards	Deborah Akimo	(206) 684-3874
	Seattle City Light	Home Energy Loan Progam	Ron Takemura	(206) 684-3355
	Washington Natural Gas	Residential and Commercial Design Assistance	Marketing Department	(206) 382-7878

	RESIDENTIAL			
STATE	UTILITY	PROGRAM NAME	CONTACT	PHONE NUMBER
Wisconsin	Madison Gas and Electric	New Home Services	Power Plus Representative	(608) 252-7222
	Madison Gas and Electric	Home Energy-Efficiency Rating	Power Plus Representative	(608) 252-7222
	Madison Gas and Electric	Power Plus Incentives for Residential Construction	Power Plus Representative	(608) 252-7222
	Madison Gas and Electric	Power Plus Rebate for Rental Property	Power Plus Representative	(608) 252-7222
	Madison Gas and Electric	New Home Services	Power Plus Representative	(608) 252-7222
	Wisconsin Electric Power	Smart Money-Rebates for Multifamily	Terry Orlick	(414) 221-3557

	COMMERCIAL			
STATE	UTILITY	PROGRAM NAME	CONTACT	PHONE NUMBER
Arizona	Tucson Electric Power Company	Energy-Efficient Rebate Program	Linda Douglas	(602) 745-3537
California	Los Angeles Department Water and Power	Design Advantage	Alvin Chan	(213) 481-5724
	Los Angeles Department Water and Power	Easy Energy Savings	Ernest Eperjesi	(213) 481-7562
	Pacific Gas and Electric	Commercial New Construction	EERC	(800) 468-4PGE ext. 890
	Sacramento Municipal Utility District	New Construction	Craig Hoellwarath	(916) 732-5301
	San Diego Gas and Electric	Savings Through Design	Chuck Angyal	(619) 537-0981
	Southern California Edison Company	Design for Excellence Program	John Pyles	(818) 302-4080
Colorado	Public Service Company of Colorado	New Denver Airport Design	Melinda Bise	(303) 571-7924
Connecticut	Northeast Utilities	Energy Conscious Construction	Fred Wajcs	(203) 665-2711
	United Illuminating	Energy Blueprint Construction Program	Mike Balinskas	(203) 499-2042
Delaware	Delmarva Power and Light	Commercial Building Award	Bill Ferguson	(302) 429-3055
District of Columbia	Potomac Electric Power Company	Commercial New Building Design	Lloyd Williams	(202) 872-2467
	Washington Gas Light	Building Design Program	Customer Service	(703) 750-7555
Florida	Gulf Power Company	Commercial Good Cents Program	Ellis Oswald	(904) 444-6743
Georgia	Oglethorpe Power Corporation	Manufactured Housing	Mary Caldwell	(404) 270-7505

	COMMERCIAL			
STATE	UTILITY	PROGRAM NAME	CONTACT	PHONE NUMBER
Idaho	Bonneville Power Administration	Energy Smart Design Optional Services	Jim Dowty	(503) 230-5873
	Bonneville Power Administration	Energy-Efficient New Constrction	Jim Dowty	(503) 230-5873
Iowa	Iowa South Utilities	New Construction Program	Lynn Green	(515) 437-5200
Louisiana	Valley Electric Membership Corporation	Energy-Efficient Building Standards	Robbie Moran	(318) 352-3601
Maine	Central Maine Power Company	Efficient New Construction	Dan Littlefield	(207) 623-3521
	Central Maine Power Company	Energy Audit Program	Ellen Woodward	(207) 623-3521
	Central Maine Power Company	Calculated New Construction Rebates	Dan Littlefield	(207) 623-3521
Maryland	Delmarva Power and Light	Commercial Building Award	Bill Ferguson	(302) 429-3055
	Potomac Electric Power Company	Commercial New Building Design	Lloyd Williams	(202) 872-2467
	Washington Gas Light	Building Design Program	Customer Service	(703) 750-7555
Massachusetts	Boston Edison	New Construction and Renovation Program	Frank Hendrigan	(617) 424-3377
	New England Electric System	Design 2000 - Commercial/Industrial New Construction Program	Customer Service	(508) 366-9011
	Northeast Utilities	Energy Conscious Construction	Gary Johnson	(203) 665-2073
Montana	Bonneville Power Administration	Energy Smart Design Optional Services	Jim Dowty	(503) 230-5873
	Bonneville Power Administration	Energy-Efficient New Construction	Jim Dowty	(503) 230-5873
	Montana Power Company	New Commercial Construction	David Haiser	(406) 723-5421
Nevada	Sierra Pacific Power	Good Cents New Commercial/Industrial	Denise Tsuda	(702) 689-4772
New Hampshire	New England Electric Service	Design 2000 - Commercial/Industrial New Construction Program	Customer Service	(508) 366-9011

	COMMERCIAL			
STATE	UTILITY	PROGRAM NAME	CONTACT	PHONE NUMBER
New Jersey	Jersey Central Power and Light	Commercial/Industrial Rebate Program	Laura Chavanne	(201) 455-8676
New Mexico	El Paso Electric Company	New Commercial Construction	Lori Maggio	(607) 729-2551
New York	Central Hudson Gas and Electric Corporation	Designing for Efficiency Program	Sam Rosenberry	(914) 486-5318
	Long Island Lighting	Smart Start Program	John Keating	(516) 364-7811
	Niagara Mohawk Power	Custom Incentive Program	Customer Service	(800) 642-4272
	Rochester Gas and Electric	Technical Assistance For Construction	Glen Davis	(716) 724-8152
	Rochester Gas and Electric	Energy Partners	Glen Davis	(716) 724-8152
North Carolina	Carolina Power and Light	Commercial New Construction	Doyle Hardison	(919) 546-7952
Oregon	Ashland Department of Commercial Development	Energy Smart Design	Stuart Smith	(503) 488-5306
	Bonneville Power Administration	Energy Efficient New Construction	Jim Dowty	(503) 230-5873
	Bonneville Power Administration	Energy Smart Design - Optional Service	Jim Dowty	(503) 230-5873
	Canby Electric Board	Energy Smart Design Program	Jim Brands	(503) 266-1156
	Coos-Curry Electric Cooperative	Energy Smart Design Program	George McMullen	(503) 247-7214
	Eugene Water and Electric	Energy Smart Design Program	Mike Logan	(503) 484-2411
	Eugene Water and Electric	Energy Smart Design Optional Service	Mike Logan	(503) 484-2411
	Pacific Power and Light	Commercial and Industrial New Construction Program	Marilyn Williamson	(503) 464-5000
	Portland General Electric	Energy Smart Design Optional Service	Gary Heikkinen	(503) 691-3984
	Utah Power and Light	New Bldg Standards-Incentives, Charted Savings	Joe Barra	(503) 464-6230

	COMMERCIAL			
STATE	UTILITY	PROGRAM NAME	CONTACT	PHONE NUMBER
Pennsylvania	Allegheny Power System	Residential Insulation for new Construction	John F. Hose	(412) 838-6049
	Allegheny Power System	Commercial Insulation Incentives	John F. Hose	(412) 838-6049
	Duquesne Light Company	High Efficiency Program	Linda Richardson	(412) 393-6384
	Philadelphia Electric Company	Excellence In Energy Efficient New Construction	Ken Black	(215) 841-5690
South Carolina	Carolina Power and Light	Commercial New Construction	Doyle Hardison	(919) 546-7952
	South Carolina Electric and Gas	Large Commercial/Industrial Design Award Program	Gene Martin	(803) 733-4227
Texas	Austin Electric Department	Commercial New Construction Efficiency Incentives	Alfredo Cobos	(512) 499-3548
	Austin Electric Department	New Commercial Construction Program	Michael S. Meyers	(512) 499-3508
	El Paso Electric Company	New Commercial Construction	Al Gallardo	(915) 543-5964
Vermont	Green Mountain Power	Efficient New Construction Incentives	Dave Grinason	(802) 655-8533
	New England Electric System	Design 2000 - Commercial/Industrial New Construction	Customer Service	(508) 366-9011
	Washington Gas Light	Buiding Design Program	Customer Service	(703) 750-7555
Washington	Bonneville Power Administration	Energy Smart Design Optional Services	Jim Dowty	(503) 230-5873
	Bonneville Power Administration	Energy-Efficient New Construction	Jim Dowty	(503) 230-5873
	Chelan County Public Utility District	Energy Smart Design	Mike Green	(509) 663-8121
	City of Richland	Energy Smart Design	Larry Dunbar	(509) 943-9161 ext. 202

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Washington (contd)	Clark County Public Utility District	Energy Smart Design	Mike Allen	(206) 253-8870
	Clark County Public Utility District	Energy Smart Design Optional Services	Mike Allen	(206) 253-8870
	Ellensburg Municipal Light Department	Efficient New Construction	Richard Wickwire	(509) 962-9863
	Grant County Public Utility District	Energy Smart Design	Rod Noteboom	(509) 766-2523
	Inland Power and Light Company	Energy Smart Design	Chris Aiken	(509) 747-7744
	Inland Power and Light Company	Energy Smart Design Optional Service	Chris Aiken	(509) 747-7744
	Puget Sound Power and Light	Design Plus-Energy Smart Design	Jan Louisse	(206) 462-3788
	Puget Sound Power and Light	Technical Assistance for New Construction	Jan Louisse	(206) 462-3788
	Seattle City Light	Energy Smart Design Optional Service	Alan Budman	(206) 684-3795
	Seattle City Light	Energy Smart Design Program	Alan Budman	(206) 684-3795
	Snohomish County Public Utility	Energy Smart Design	Motiryo Keambiro	(206) 347-1700
West Virginia	Washington Gas Light	Building Design Program	Customer Service	(703) 750-7555
Wisconsin	Madison Gas and Electric Company	Power Plus Energy Efficiency Financing	Power Plus Representative	(608) 252-7222
	Madison Gas and Electric Company	Power Plus Rebates for Business	Power Plus Representative	(608) 252-7222
	Madison Gas and Electric	Large Commercial/Industrial New Construction Conservation	Business Representative	(608) 252-7222

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STATE	UTILITY	PROGRAM NAME	CONTACT	PHONE NUMBER
Wisconsin (contd)	Madison Gas and Electric	Small Commercial/Industrial New Construction Conservation	Business Representative	(608) 252-7222
	Wisconsin Electric Power	Smart Money for New Non-Residential Construction	Chris Akkala	(414) 221-2377

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