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ENERGY MANAGEMENT AND TECHNOLOGY FOR URBAN GOVERNMENTS

A Program Overview of the Energy Task Force of the Urban Consortium, 1979 through 1985

URBAN CONSORTIUM
ENERGY TASK FORCE

Prepared by:
Public Technology, Inc.
1301 Pennsylvania Avenue, NW
Washington, DC 20004

DISCLAIMER

Urban Consortium for Technology Initiatives

THE URBAN CONSORTIUM FOR TECHNOLOGY INITIATIVES

The Urban Consortium for Technology Initiatives was formed to pursue technological solutions to pressing urban problems. The Urban Consortium is a coalition of 42 major Urban governments, 30 cities and 12 counties, with populations over 400,000. These 42 governments represent over 20% of the nation's population and have combined purchasing power of over $25 billion.

Formed in 1974, the Urban Consortium represents a unified local government market for new technologies. The Consortium is organized to encourage public and private investment to develop new products or systems which will improve delivery of local public services and provide cost-effective solutions to urban problems. The Consortium also serves as a clearinghouse in the coordination and application of existing technology and information.

To achieve its goal, the Urban Consortium identifies the common needs of its members, establishes priorities, stimulates investment from Federal, private and other sources and then provides on-site technical assistance to assure that solutions will be applied. The work of the Consortium is focused through 10 task forces: Community and Economic Development; Criminal Justice; Environmental Services; Energy; Fire Safety and Disaster Preparedness; Health; Human Resources Management; Finance and Personnel; Public Works and Public Utilities; and Transportation.

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Public Technology, Inc.

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Preface

This document presents an overview of work conducted by the nation's major urban governments to address their own energy problems. Together, the results from over 100 applied research projects managed by these cities and counties are sound evidence of an increasingly sophisticated capability for effective energy management by qualified local government professionals.

Each of the projects described in this overview was an attempt to resolve an energy management need or problem defined by local officials. Program priorities to guide project selection were determined by managers and staff from the 42 cities and urban counties in the membership of the Urban Consortium. Projects to address these priorities and specific energy management needs were selected by the members of the Consortium's Energy Task Force.

Results from the completed projects show the current state of the art for the integration of technology, management and financing to improve energy efficiency in large cities and counties. Urban governments, with their broad responsibilities and sound management skills, remain one of the nation's most effective resources for the testing of new technologies and the creation of new markets to accelerate their practical implementation.

This report is a testament to the depth of knowledge, the management skills, and the technical expertise of the professional staff of these urban governments. The projects conducted by staff in over 30 major cities and counties show a continuing professional growth and commitment to excellence that reflect their capabilities to understand, define and resolve their own energy concerns through the 1980's.

The accomplishments and benefits of this program could not have occured without assistance and support from the Secretary of the United States Department of Energy, the staff of the Department, its Operations Offices and its network of National Laboratories.

Herbert J. Fivehouse
Chairman, Energy Task Force
Baltimore, Maryland

Richard W. Zelinski
Director of Energy Programs
Public Technology, Inc.
Washington, DC

February, 1985

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Introduction and Overview

THE ENERGY TASK FORCE OF THE URBAN CONSORTIUM

The Urban Consortium for Technology Initiatives is composed of the 30 largest cities and the 12 largest urban counties by population in the United States. The Consortium provides a unique forum to define urban problems common to its member governments and to develop, apply, and transfer technologies and innovative management techniques to address those problems.

The Urban Consortium carries out its work through several Task Forces that focus on specific functional areas of local government management. The Energy Task Force is the nation's most extensive cooperative local government program to improve energy management and technology applications in cities and urban counties. The members of the Energy Task Force design annual work programs for applied research and technology transfer to improve the mix and efficiency of energy use in both local government operations and for the community as a whole.

Organization and Structure

Members of the Energy Task Force are municipal managers and technical professionals who bring a balanced perspective to guide the program's overall direction. To assure the development of in-house staff expertise, individual projects sponsored by the Task Force are conducted and managed by staff of participating city and county governments. Substantively related projects are organized into administrative Units of four to five projects each, with each Unit headed by a manager who is a member of the Task Force and a highly skilled professional city or county administrator.

The Energy Task Force program is guided by a Management Committee, selected from the membership of the Task Force, and directed by a Chairperson appointed by the Chairperson of the Urban Consortium. The city of Chicago, on behalf of the Urban Consortium, is the fiscal manager for primary financial support from the United States Department of Energy. The staff of Public Technology, Inc. provides technical, editorial and transfer assistance in support of the Energy Task Force.

"User-Driven" Strength

The strength of the Urban Consortium Energy Task Force lies in the ability of its membership to define specific energy management problems, to structure a practical research agenda to address those problems, and to transfer resulting solutions to other cities and counties facing similar problems. This "user driven" organization and structure assures that the program is directed and conducted primarily by city and county staff to produce results that effectively meet needs critical to local governments.

MISSION AND OBJECTIVES

The Urban Consortium Energy Task Force works to accomplish its applied research and technology transfer mission through projects conducted primarily by the staff of cities and counties. These individual projects emphasize innovative technologies and techniques to resolve energy management problems that can be applied in a local government and transferred to other cities and counties.

The program concentrates on three specific objectives defined by the members of the Energy Task Force:

1) **Definition of Urban Energy Problems.....**

- **Identifying** critical energy related issues and problems of common concern to a wide range of major metropolitan governments; and
- **Coordinating** among these identified technological needs to single out those best addressed through the Energy Task Force program.

2) **Support for Problem Resolution .....**

- **Developing** and **adapting** technologies and management practices to address these formally identified needs;
- **Building** and **enhancing** staff capability in major metropolitan governments to apply these technologies and practices;
- **Advancing** financial and institutional mechanisms to support implementation; and
- **Encouraging** effective public-private cooperation.

3) **Transfer of successful Results .....**

- **Determining** those technologies and management practices proven successful through the Energy Task Force program; and
- **Combining** and **consolidating** these proven results for transfer among the members of the Urban Consortium and other local governments.

These objectives guide the program's strategic direction and funding priorities to achieve effective results of practical benefit to local governments throughout the nation. Each project supported by the program undergoes an extensive peer review to ensure its consistency with these objectives.

MEMBERSHIP

The members of the Energy Task Force are chosen from nominations made by the Chief Executive Officers of member governments of the Urban Consortium. Current members of the Energy Task Force and its management committee are:

*Herbert Fivehouse
Chairman
Energy Coordinator
Baltimore, MD

*John Burge
Vice-chairman
Director of Special Facilities
Kansas City, MO

Terry Agriss
Director, Energy Office
New York, NY

Nicole A. Clay
Director, Resource Recovery
County of San Diego, CA

*Dr. E. K. Demos
Director, Environmental Services
Denver, CO

*Dewayne Huckabay
Director, Management Services
Houston, TX

Roger Ibarra
Director, Utilities Department
San Antonio, TX

Lloyd Jacobs
Director, Energy Office
Indianapolis, IN

Frank Kleinhenz
Chief Administrative Officer
Albuquerque, NM

*Dr. Anthony Laska
Environmental Officer
New Orleans, LA

Creighton Lederer
Director, Buildings and Engineering
Detroit, MI

Dr. I. M. Levitt
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Philadelphia, PA

Carole Massey
Director, General Services
Atlanta, GA

*David Mosena
Deputy Commissioner of Planning
Chicago, IL

Robert Miller
Supervising Planner
Hennepin County, MN

David Rivers
Director, Human Services
Washington, DC

*Ray Sullivan
Budget Director
San Francisco, CA

Darshan Teji
Energy Conservation Officer
Phoenix, AZ

Phillip Whittenberg
Director, Planning and Development
Memphis, TN

Charles Williams
Energy Manager
Chicago, IL

*1984 Management Committee

ORGANIZATION OF THIS REPORT

The balance of this report is organized to provide a comprehensive overview of the direction and accomplishments of the Urban Consortium Energy Task Force through its first six years of operation. Major sections of this "Program Overview" contain:

- **Priority Areas** -- describing the four major areas for applied research as defined by the members of the Energy Task Force. All work sponsored by the Energy Task Force must be consistent with the general directions described within these Priority Areas.

- **Accomplishments** -- presenting a summary of the accomplishments of the Energy Task Force program through its applied research projects, its project selection process, and its technology transfer activities.

- **Year Six Work-in-Progress (1984-85)** -- describing the four applied research units and the twenty city or county managed projects that form the current applied research program for the Energy Task Force.

- **Completed Projects and Reports (1979-84)** -- describing the projects and reports completed through the Energy Task Force program during its first five program years.

- **Index to Applied Research** -- providing a full index of all project titles and topics as a reference guide to the activities of the program.

Readers interested in obtaining additional copies of this "Program Overview" or full copies of any publication listed in this "Overview" should address inquiries with the publication title and publication number to:

Publications and Distribution
Public Technology, Inc.
1301 Pennsylvania Avenue, NW
Washington, DC 20004

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PRIORITY AREA: MUNICIPAL OPERATIONS

Problem Statement:

Urban governments consume substantial amounts of energy at significant public cost in the provision and support of essential public services and facilities. To improve energy use efficiency, to capture alternate energy resources and to stabilize energy costs, local governments need to adapt and accelerate implementation of improved technology and management procedures with a special focus on public works operations, buildings and buildings management, and transportation, vehicle and fleet management.

Research and evaluation efforts are needed to provide a full range of effective options for reducing energy costs, improving fuels flexibility and improving operating practices within all municipal operations. Positive results will aid the fiscal integrity of local governments, with almost universal applicability to city and county operations throughout the United States.

Research Emphases:

Applied research in this area has the strong potential for long-term benefits to local governments in their provision of essential public services and facilities. Special research emphases include:

- Compatible computerized energy management control systems for a full range of municipal operations, with a special focus on the control of energy-using equipment in multiple locations from a central point.

- Improved and extended applications of specific technologies for increased efficiency in building HVAC equipment, water and wastewater treatment equipment and controls, and street and traffic lighting networks.

- Effective and efficient management of wastewater sludges to include innovative methods for reducing energy required for sludge processing, transportation and disposal.

- Improved efficiency in the use of energy in municipal operations through effective recovery and use of waste heat in buildings, thermal energy storage, and other emerging technologies.

- Development of practically transferable systems for such activities as computerized tracking of municipal energy use and costs, and energy-conscious preventive maintenance.

- Improved systems and procedures for vehicle and fleet management to include workable and cost-effective methods for bulk purchase of fuel supplies.

Priority Areas

The priority areas of the Urban Consortium Energy Task Force are based on a formal assessment of needs in energy management and technology as expressed by the full membership of the Urban Consortium. The formal needs assessment is updated annually by the Energy Task Force to assure the best possible current picture of research needs among the nation's largest cities and counties.

While specific needs for applied research may vary from year to year, the basic areas for attention are anticipated to remain constant. These four major priority areas are:

- **Municipal Operations** -- to improve energy use efficiency in the provision of public services and in the operation of public facilities.

- **Community Energy Management** -- to stabilize energy costs and increase energy use efficiency for the community as a whole, aiding economic vitality and public welfare.

- **Alternate Sources and Integrated Systems** -- to accelerate the use of alternate energy technologies and to encourage the use of integrated energy systems in both municipal and community applications.

- **Public/Private Implementation Strategies** -- to support effective means to implement sound energy management initiatives in private-public partnerships for innovative financing and financial management.

Each of these four major priority areas is described following this page. Projects selected for support by the Energy Task Force must be consistent with these priority areas.

PRIORITY AREA: COMMUNITY ENERGY MANAGEMENT

Problem Statement:

Adequate energy supplies at affordable energy prices are essential to the long-term economic vitality and social welfare of urban communities. Cities and counties need sound methods to evaluate the real relationships between energy efficiency and economic growth, and practical management practices to support this relationship. For example, communities may significantly aid their prospects for central city revitalization, business retention and business attraction through conservation, alternate energy sources or preferential utility rates targeted to areas of substantial economic distress.

Applied research needs are particularly apparent in the definition of means to improve economic revitalization of depressed urban areas, energy cost and efficiency improvement strategies for new business/industry attraction, and reduction of energy cost burdens on low and moderate income urban residents.

Research Emphases:

Research emphases to address this long-term urban need will require strong cooperation and coordination with the business/industrial sector, with energy utilities and suppliers, and with other appropriate community groups. Specific research emphases include:

- Definition of the real effects of energy supply reliability and energy costs on business/industry retention, expansion, attraction and location decisions.

- Definition of effective procedures and techniques to reduce energy costs, improve energy use efficiency and support alternate energy use in a community's low and moderate income residential areas and in its business and industrial sectors.

- Development, with energy utility and supplier participation, of improved procedures for energy supply forecasting and planning, and methods for joint utility/municipal coordination in local energy management programs.

- Refinement and improvement of energy use standards and regulation for new and rehabilitated structures, with special emphasis on construction subsidized by public funds and/or economic development incentives.

- Development of practical and transferable procedures to improve transportation system efficiency and the thermal efficiency of building envelopes.

PRIORITY AREA: ALTERNATE SOURCES AND INTEGRATED SYSTEMS

Problem Statement:

Urban governments can significantly aid the application of alternative energy technologies and integrated central energy systems to replace premium fuels and improve energy utilization efficiency. In order to realize this potential, however, local governments require research support to guide the evaluation, financing management and practical application of both alternative and integrated energy technologies that meet local government needs.

Assistance needs are especially evident for research and evaluation support in three broad areas: (1) practical use of alternate energy resources including solar, wind, geothermal, fuel cells and municipal solid waste; (2) improved methods to assess workable and appropriate technologies for both alternate and integrated energy systems; and (3) definition of workable management, financial and legal arrangements for implementation, including issues of ownership and operating responsibilities, customer attraction/retention, financial packaging and contractual structures.

Research Emphases:

Research emphases will focus on the application of emerging technologies, available through the national laboratories, private corporations and energy utilities to specific and practical urban situations. Specific research emphases include:

- Practical and cost-competitive use of such alternate energy resources as solar, wind, geothermal, hydro and municipal solid waste, with research efforts that build on strong existing technical and experience bases.

- Development of practical transferable procedures to accelerate the use of alternate vehicular fuels, recycling of energy-containing materials, and the capture of regionally available energy resouces.

- Improved technologies for fluidized bed combustion systems and district heating and cooling, along with research to resolve the management, marketing and financing issues associated with these and similar integrated systems.

- Effective and transferable procedures to address institutional, regulatory and pricing issues; e.g., means for appropriate practical support to encourage commercially developed cogeneration systems and other small power producers.

- Evaluation of other emerging technologies currently in the development phase in the national laboratories, in private corporations, and in the utility industry for their practical application potential in urban settings.

PRIORITY AREA: PUBLIC/PRIVATE FINANCING AND IMPLEMENTATION

Problem Statement:

City and county governments often have difficulty in carrying out otherwise sound energy efficiency or alternate energy projects due to constraints in the acquisition of initial investment capital. This constraint is especially severe for capital-intensive projects (with waste-to-energy facilities as a prime example) that promise substantial long-term benefits, but which also possess significant shorter term financial and technical risks. Many of these investment and implementation constraints can be overcome through improving means for private sector participation in innovative financing and financial management strategies.

Applied research is needed to improve financial management and private support in three general areas: (1) performance contracting and other joint venture arrangements that provide public access to private capital; (2) publicly sponsored incentives to encourage private action and financial investment in energy conservation and alternate energy projects; and (3) local government procurement and management procedures to encourage the acquisiton and maintenance of energy-efficient municipal equipment and facilities.

Research Emphases:

Research emphases to address long-term financing and implementation needs will focus on procedures to encourage private-sector and utility financial participation and the leveraging of available public funds. Specific research emphases include:

- Definition of innovative and practical financing options for capital-intensive, high-risk energy facilities such as fluidized bed combustion systems, advanced waste-to-energy plants, and district heating and cooling facilities.

- Case specific applied research to define what data and energy supply/cost effects justify a given investment, and how negotiations should proceed if private sector and/or utility participation is desired.

- Identification of technical, financial and legal criteria to aid a local government staff in deciding if and when a given financing approach is appropriate and workable.

- Improvement of innovative and transferable local government public financing techniques to include special purpose revolving funds, internal "shared savings" programs, and effective employee incentives.

- Definition of effective financing procedures for community-wide energy efficency improvement, including utility loan/grant programs, corporate and foundation support, and other means to leverage constrained public funds.

Accomplishments

The primary objective of the Urban Consortium Energy Task Force is to support applied research that fosters the practical application of innovative technologies and management practices to improve energy management in urban governments. Accomplishments from the program include direct energy and cost saving benefits to project jurisdictions, as well as staff capacity building and the transfer of project experience to other jurisdictions.

Projects supported by the Energy Task Force are chosen to address the common needs of major cities and counties across the United States. Final project reports document the **concept, conduct** and **lessons learned** from each project to aid transfer of results to other local governments.

APPLIED RESEARCH PROJECTS

Between 1979 and 1984, the Urban Consortium Energy Task Force sponsored ninety-one major applied research projects in urban energy management and technology in thirty-two cities and counties. Topics addressed through these projects covered a wide range of concerns in municipal operations, community energy management, alternate/integrated technologies, and public/private implementation strategies.

The examples below illustrate the program's variety and scope as well as the practical benefits from its applied research projects.

Municipal Operations

Local governments use energy for the operation of facilities, such as schools, fire and police stations, hospitals and administrative buildings; and for the provision of public services, such as water and wastewater treatment, garbage collection, outdoor lighting, and fleet operations. Energy expenditures are commonly second only to staff salary costs in a municipal operating budget and have increased by as much as 400 percent during the past decade when total budgets have been forced to remain relatively constant.

Energy used to support public facilities and services by the nation's local governments totalled approximately 1.4 quadrillion BTU's in 1983. By focusing on work to improve energy efficiency in municipal operations the Energy Task Force helps reduce operating costs and improve public services without increasing tax burdens on residents and commercial establishments.

- An innovative **variable air volume** distribution system developed and installed in the **Phoenix, Arizona,** Municipal Building conserved sufficient energy to pay back its initial design and installation cost in only one year. This project was one part of a total energy management program that has saved the city of Phoenix over $3 million in the past four years.

- An **Energy Management Tracking System (EMTS)** developed and applied in **San Jose, California,** documented avoided municipal energy costs of over $600,000 during its first year of operation. Staff from San Jose are currently translating this mainframe computer system into a series of microcomputer programs easily usable by other cities and counties.

- A guide to energy efficient **vehicle fleet management** produced by **San Antonio, Texas,** highlighted San Antonio's extensive use of propane as a vehicular fuel. The project also produced operational guidelines, policies and procedures to include energy efficiency as a standard criterion for use by municipal procurement directors and purchasing officials. Direct fuel use savings in San Antonio from propane conversions average over $500,000 per year.

- A microcomputer-based **preventive maintenance** inventory and scheduling system developed in 1984 by **Boston, Massachusetts,** will provide the city's preventive maintenance staff with current equipment performance status and maintenance needs. Developed initially for city owned buildings in one department, the system will be expanded for coverage of other facilities and departments.

Community Energy Management

Residents, businesses and industries draw together in urban areas to take advantage of commercial, cultural and infrastructure resources not available in a non-urban setting. Local governments have clear and vital responsibilities in assuring a balanced mix of energy resources at affordable prices to continue and enhance the social and economic advantages offered by this urban environment.

Of the nation's estimated population of 232 million, approximately 60 percent reside or work in urbanized areas. The 543 cities and counties that contain populations greater than 100,000 consumed a total of 49 quadrillion BTU's in 1983. Projects supported by the Energy Task Force improve the economic vitality of this urban community by aiding energy efficiency and reducing energy costs for the community as a whole.

- A simplified methodology for **community energy management** developed by **Columbus, Ohio,** defines eight primary decision points inherent in any successful community planning effort. Staff compared the Columbus energy planning process with those of other communities. The choices, successes and failures in Columbus' response to each of the eight decision points were described with "lessons" to improve the planning effort.

- Recognizing the cost saving potential of **superinsulated housing,** the city of **St. Louis, Missouri,** developed and tested a marketing strategy to induce residential developers to employ superinsulation techniques as standard construction practice. Topics covered in this project included superinsulation technologies, construction practices, savings estimates, mortgage and lender impacts, and computer software for design and cost analysis.

- To permit better energy assistance targeting, coordination and resource allocation, an **Energy Assistance Program Information System** (EAPIS), is under development in **Philadelphia, Pennsylvania.** This computer-based, community-directed system will provide detailed and timely client information on at least ten distinct energy assistance programs to support Philadelphia's interagency Residential Energy Efficiency Plan.

- An in-house, multi-user, microcomputer based information system to improve **transportation rideshare matching** and marketing was developed and implemented in **Memphis, Tennessee.** This innovative system has received national attention for its improved accuracy, cost savings and its ability to encourage van pool and transit use as compared to more conventional "batch-mode" matching systems.

Alternate Sources and Integrated Systems

Urban governments can aid the development and adaptation of advanced technology for improved efficiency from conventional energy resources and for increased use of alternate energy resources in both municipal and community applications. A key aspect in the application of advanced technology is the ability to view a community as an integrated system from energy supply, through its distribution, to its eventual end use.

Effective application of advanced technology and integrated energy systems in urban areas could save 4 to 8 quadrillion BTU's by the year 2005. Projects supported by the Energy Task Force provide the effective tests necessary for the practical use of advanced technology and integrated systems.

- An analysis of the potential for **methane gas recovery** from a sanitary landfill in **Baltimore, Maryland,** resulted in a gas recovery project expected to return to the city approximately $600,000 in the next ten years. The Baltimore analysis methodology has been refined in King County, Washington, and San Antonio, Texas, to aid its transferability to other jurisdictions.

- As a center of activity for the nation's **alternative energy** industry, the city of **Denver, Colorado,** focused on means to encourage alternative energy use by improving incentives in building codes, in development review processes, and for the retrofit of public buildings. Municipal actions for each of these areas and structures for institutional coordination were defined for use by Denver and other local governments.

- Faced with rising costs and a declining customer base for an existing **district heating** system, the city of **San Francisco, California,** joined with its local energy utility in an efffort to reduce system costs. Key to the success of the project will be the feasibility of utilizing waste heat from small **cogeneration** units to supplement the steam produced from a central thermal plant.

- **Hot water-based district heating** and cooling appears feasible in certain sites within the service area of the Consolidated Edison district steam system in **New York City.** Staff from the city and the utility are defining technical and economic measures necessary to support system expansion with this more efficient hot water technology.

Public/Private Financing and Implementation

City and county governments often have difficulty in carrying out otherwise sound energy efficiency or alternative energy projects due to constraints in the acquisition of initial investment capital. This constraint is especially severe for capital-intensive projects (such as waste-to-energy facilities) that promise substantial long-term benefits, but which also possess significant shorter term financial and technical risks .

Many of these investment and implementation constraints can be overcome by providing means for private sector participation in innovative financing and financial management strategies. The Energy Task Force emphasizes innovative and effective implementation support as a major part of its program.

- Faced with declining federal programs for **residential energy conservation** assistance, **Kansas City, Missouri**, developed substantial non-federal financial support. With current resources of over $5 million from utility, foundation and corporate contributions, the city's residential audit, training and loan/grant program exemplifies the effectiveness of public action for energy management at the community level.

- To support innovative, public/private financing arrangements for **waste-to-energy facilities**, the **County of San Diego, California**, defined factors essential to provide sufficient incentives to private industry while maximizing the cost and waste management benefits to public agencies. Computer software was developed to support analysis of optional financing approaches.

- To aid the financing of conservation projects in internal municipal operations, **Dade County, Florida**, established an **Energy Investment Fund** through which department managers can "borrow" and "pay back" capital necessary to implement energy-saving projects. During its first year of operation the Fund enabled the county to save energy costs of $70,000, and accelerated attention to additional projects funded from other non-Fund supported initiatives.

- The single family residential market is generally perceived as unattractive for **shared savings financing** for energy conservation because of relatively low savings potentials and high administrative costs. **Hennepin County, Minnesota**, acting as a broker for private energy service firms, is addressing these perceptions to determine what, if any, special incentives are necessary to assure investment resources and consumer participation.

CAPACITY BUILDING AND TRANSFER

The tangible results of the Energy Task Force program are most evident for improvements in energy use efficiency and for energy cost savings in those urban governments directly participating in the program. Less immediately visible are the significant contributions made by the program to municipal staff expertise and for the transfer of experience to other jurisdictions.

In addition to its focus on applied research and implemented results, the Energy Task Force program is also designed with a special emphasis on staff development and technology transfer to strengthen local capabilities for sound urban energy management.

Staff Capacity Building and Project Selection

A major goal of the Energy Task Force since its creation in 1978 has been to expand the technical and managerial strength of energy managers on the permanent staffs of city and county governments. By building staff capabilities, the program emphasizes the continuing benefits of broad local expertise for improved municipal and community energy management in concert with practical, project-specific results.

The program structures its procedures for project selection, conduct and transfer to directly support the expansion of city and county staff capabilities. Each program year of the Energy Task Force is designed in response to an updated **assessment of needs** in energy management and technology voiced by staff in all Urban Consortium governments. This identification of common needs forms the basis for the sharing of common solutions as the program continues.

- The members of the Energy Task Force translate this formal needs assessment into substantive research priorities and an annual request for **project proposals** that is distributed to all forty-two member governments of the Urban Consortium. Each city or county may submit up to three applied research project "ideas" that address the defined common priorities while meeting their individual needs.

- Approximately twenty applied research projects in individual cities and counties are selected for funding annually through an extensive **peer review** process. **Technical support** is provided during work program development to assure that each project is well designed from both technical and managerial perspectives.

- Projects selected for funding are organized into research units of four to five related projects each. This management structure encourages **small group exchange** with two formal meetings of each Unit per year. Tri-annual **Energy Task Force meetings** with special seminars and workshops further stimulate creativity and exchange of practical ideas among all members during each program year.

- Significantly, the program limits the amount of any project grant that may be used for consultant services, thereby fostering the greatest participation by in-house staff and the development **permanent staff expertise.**

Technology Transfer

Results of work conducted through the Energy Task Force program must be effectively communicated to other local governments to encourage broad local replication. The practical transfer of technically and managerially sound procedures for urban energy management occurs among Task Force members, from the program to other cities and counties that are not direct program participants, and into the Energy Task Force from other organizations.

Since the inception of the program, a major emphasis of the Energy Task Force has been on technology transfer. The Task Force's peer group network of individuals with hands-on experience in energy technology and management in urban jurisdictions is a direct and demonstrably successful means of encouraging technology transfer tailored specifically to the needs of urban government.

The transfer of lessons learned has been built into the Task Force program through written reports, specially focused workshops and continual networking among its participants.

- Interim and final **project reports** for each project supported by the Energy Task Force document the project's concept, conduct and lessons learned for transfer to other local governments. Reports and publications are disseminated to other cities and counties through Public Technology, Inc.

- Especially valuable projects are often chosen for **replication** or refinement in a second jurisdiction to aid their transferability. Close contact among the members of the Task Force supports further replication through an effective networking structure encouraged by regular meetings of all program participants.

- Hosted by member jurisdictions and supported by Public Technology, Inc., **regional energy management workshops** are designed to transfer the experience of the Task Force to other cities and counties across the nation. Approximately 300 key municipal staff persons from about 75 cities and counties have already attended these workshops.

- As efforts to broaden the reach of the Task Force, formal initiatives were begun during 1983 to strengthen working relationships with **municipal counterparts** in Western Europe and with selected **National Laboratories** in the United States. Both of these initiatives will be emphasized to increase their practical value in future years of the Energy Task Force program.

SUMMARY

The Urban Consortium Energy Task Force program is designed to define urban energy problems of wide and common concern to large city and county governments; to support the use of innovative technology and management practices to resolve those problems by local government staff; and to transfer successful results to staff in other local governments throughout the nation. The brief discussion above illustrates how the Energy Task Force has implemented this design through an effective program of applied research, staff capacity building and technology transfer.

The Energy Task Force is a vital organization that builds on its accomplishments as a base for new challenges. Accomplishments during the first five years of the program demonstrate the practical benefits of allowing major municipal governments to define their own problems and to develop their own solutions in energy technology and management. Future years of the program will use these accomplishments and proven management structure to support an even more effective strategic direction to support urban energy management.

Year Six Work-in-Progress (1984-85)

APPLIED RESEARCH PROJECTS

Priority Areas for applied research in urban energy management and technology are collectively addressed through applied research projects conducted by staff from cities and counties participating in the Energy Task Force program. These individual projects are organized into research Units that correspond to the four major Priority Areas. This administrative organization encourages peer-to-peer assistance and experience transfer on a continuing basis throughout each program year.

The Sixth Year applied research program of the Energy Task Force consists of twenty selected projects organized in four administrative units. Begun formally in the Fall of 1984, the four units for the Sixth Year Energy Task Force program are:

- **Municipal Operations Unit** -- composed of six projects to improve energy use efficiency in municipal buildings, water and wastewater treatment, and paratransit operations. Unit Manager -- Dr. Anthony Laska, Environmental Section, New Orleans, Louisiana.

- **Community Energy Management Unit** -- composed of four projects to improve community energy efficiency and economic activity through better conservation practices, enhanced use of alternate energy sources, and effective land develvelopment planning. Unit Manager -- Dr. E.K. Demos, Director of Environmental Services, Denver, Colorado.

- **Alternate/Integrated Systems and Technologies Unit** -- composed of five projects that include an innovative approach to district heating and cooling and three distinctly differing treatments of alternate energy resource development. Unit Manager -- Raymond Sullivan, Budget Director, San Francisco, California.

- **Public/Private Financing Unit** -- composed of five projects that encourage private investment in community energy efficiency, improved building practices, and better accountability for municipal energy costs. Unit Manager -- John K. Burge, Director of Special Facilities, Kansas City, Missouri.

Projects within each of these applied research units are summarized following this page. Each of the projects is scheduled for completion and full documentation by the end of 1985.

MUNICIPAL OPERATIONS UNIT

Phoenix -- "Thermal Storage Strategies to Reduce Heating and Cooling Costs"

The City of Phoenix will asess thermal storage strategies for use in its municipal buildings to reduce energy use and energy costs. Alternate thermal storage technologies will be inventoried to identify the most appropriate storage strategies. Municipal buildings will be surveyed to select a best candidate for initial retrofit. Results from this retrofit will be monitored to measure effects on the building's energy use profile and energy costs.

Detroit -- "Energy Cost Savings Via Computer Control of a Large Metropolitan Water Distribution System"

The City of Detroit will assess the feasibility for development of a computer based program to reduce overall energy consumption in its water distribution system. Focusing primarily on energy used in pumping operations, results from the project will be used to develop a system wide computer program to control pumping operations for high energy efficiency in meeting both normal and irregular water supply demands. Savings are anticipated on the order of 15% to 20% over current electrical energy use.

Baltimore -- "Process Integration of a Wastewater Treatment Facility to Improve Energy Efficiency"

The City of Baltimore will assess opportunities for energy use efficiency and the utilization of alternate energy resources through the integration of various treatment processess in a large municipal wastewater facility. Eight distinct processes, ranging from incinerator waste heat recovery to digester gas utilization, have been identified as initial starting points for the project. Potential energy savings in excess of $750,000 per year are possible as a result of this project.

Philadelphia -- "Development of a High Density Incinerator Residue Transfer Trailer"

The City of Philadelphia will design and test a high density compaction semi-trailer for the specific purpose of hauling municipal incinerator residue over long distances. Secondary objectives include the development of additional data on water retention characteristics and compaction performance of incinerator residue. Results from the project will aid energy use efficiency in the management and disposal of water-quenched incinerator residue.

Washington, DC -- "Municipal Operations Cooperative: A Controlling and Monitoring System"

Energy used in 1983-84 by the City of Washington, DC's Department of Human Services cost in excess of $5.2 million. To reduce these costs, this project will examine various means to expand the city's current energy management, monitoring and accounting system into a controlling and monitoring system. The project will focus on eventual control of the highest energy-use equipment at several site locations with the aid of microcomputer and/or telecommunications technology.

Memphis -- "Ridesharing Strategies for Business Relocations and Expansions"

The City of Memphis project includes participation of the Federal Express Corporation, the Oak Ridge National Laboratory, and the Memphis Area Transit Authority. This cooperative project will develop, implement, monitor and evaluate a comprehensive and continuing employee transportation management program in an environment of a major corporate relocation and expansion. The project is designed to demonstrate that energy efficient employee transportation management strategies, with reduced levels of public and private investment, can be implemented as effective public/private efforts that accomodate rapid economic growth.

COMMUNITY ENERGY MANAGEMENT UNIT

New York City -- "Retention and Expansion Program for High-Energy Use and Cost-Intensive Businesses"

High energy costs in New York City have a significant impact on the competitiveness of the City's businesses. This project is intended to design a package of effective and efficient energy assistance measures for a target group of New York City businesses that will induce them to stay, expand and locate in the City. The New York City Energy Office has already begun to define those factors that are significant in such locational decisions.

Chicago -- "Neighborhood Energy Conservation Program"

Rising energy costs drain the disposable income of community residents, diminish the profitability of local businesses, and play a critical role in the deterioration and eventual abandonment of affordable rental housing. Community Based Organizations (CBO's) have the established relationships and rapport essential to deal with the impacts of energy costs. This project will enhance the technical and financial capabilities of CBO's to act as effective energy service providers within their own communities. Particular attention will be placed on actions to improve the energy efficiency of multifamily rental housing units.

Denver -- "Integrating Economic Development and Energy Use in a Public/Private Venture: The Central Platte Valley Development Project"

The Central Platte River Valley is the last remaining large parcel of land available for high density development in Denver's inner urban area. The potential for investment in this area is approximately $5-7 billion. This project is structured to define measures to encourage that this development occurs with strong attention to energy efficiency and the use of alternate energy resources. Alternatives considered will include DHC, cogeneration, solar energy, and the potential for integration with a currently planned waste-to-energy facility.

New Orleans -- "Computerized Information/Data Base Management System for Hazardous Materials Incindent Prevention and Response"

The energy industry is a major sector of New Orleans' economy. More than 80% of all materials that are classified as "hazardous" and are transported, stored or used in the port city of New Orleans are energy related (crude petroleum, jet fuels, fuel oil and natural gas). This project will develop and begin implementation of a computerized information system to improve safety in the management and transport of these materials in order to prevent accidents and improve accident response capabilities.

ALTERNATE SOURCES AND INTEGRATED SYSTEMS UNIT

San Francisco -- "Computer Assessment of Energy Consumption in New Commercial Buildings"

In 1981, San Francisco's Department of City Planning adopted an energy component in its discretionary review process for major new development projects. This Energy Task Force project is intended to use a microcomputer based program that will allow city staff to realistically and easily evaluate conservation measures through this discretionary review process. Results from the project are also anticipated to enhance closer adherence by building designers to energy efficient standards and performance.

Milwaukee -- "Recovery of Vehicle Fuel Methane and Space Heating Fuels from Household, Forestry and Agri-Business Waste"

This project will determine the feasibility of generating high yield methane for vehicular fuel and space heating from typical urban area household and commercial organic wastes, such as grass clippings, leaves, food processing discards and the like. The project builds on efforts currently underway with the unique Milwaukee Refuse to Methane Consortium, tying together both private corporations and municipal new agencies to share up-front development costs and eventual rewards from energy technology.

Houston -- "The Impact of Source Separation on Municipal Waste-To-Energy Project Feasibility"

The City of Houston will determine the impact of small commercial and residential waste source separation actions on a municipal waste-to-energy project to define the optimal use of separation and combustion strategies for effective waste management. Results from the project will provide a comparative analysis of costs and compatibility of recycling and source separation as integral parts of a community's waste-to-energy project efforts.

Albuquerque -- "Assessment of Energy Production Using Wood/Coal and Other Residential Combustion Units (RCU's)

Wood, coal and other types of similar fuels burned in individual residential stoves constitute a substantial portion of the energy used in the City of Albuquerque. This project will examine the economics of using such RCU's in an urban environment, and their potential to aggravate local air quality. Results from the project are anticipated to define benefits and problems associated with RCU's as a basis for public policy or control strategies to better manage their use.

Columbus -- "Modular District Heating Planning for Decentralized Redevelopment Projects"

The City of Columbus will develop a concept and plan for implementation of a modular district heating system along its redeveloping downtown riverfront. In addition to its energy conservation potential, the plan is anticipated to provide an incentive to spur development activity in the area through reduced energy costs. The project will build strongly on related activities in the Columbus area recently completed with support from a Danish engineering firm.

PUBLIC/PRIVATE FINANCING AND IMPLEMENTATION UNIT

Hennepin County -- "Shared Savings and Low Income Homeowners"

This project will examine the potential for applying shared savings (performance contracting) approaches to finance energy conservation improvements for low income homeowners. The project builds on the success of efforts begun during the Year Five program and anticipates that lessons learned during this past project will aid expansion of the shared savings concept successfully to the low income market. The initial demonstrations will focus on conservation improvements to at least 30 low income homeowners.

St. Louis -- "Shared Savings Financing of Superinsulated Housing"

This project is directed toward the development of an effective shared savings financial mechanism that can accelerate the use of superinsulated construction as standard practice in the residential market in the City of Saint Louis. The project builds on and extends the work begun in the Year Five Saint Louis project, which will result in 25 superinsulated units of various types built by early 1985. Results from the project are anticipated as a valuable aid in keeping a viable urban center housing market in Saint Louis, as well as in other urban areas.

Kansas City -- "Kansas City Warm Room and Superinsulation Project"

This project will define and demonstrate the technical and economic feasibility of superinsulation technology in three areas: new construction, rehabilitation, and "warm room" applications. One house, each, will be treated as new construction and rehabilitation; five houses will use the "warm room" approach. Monitored results will include BTU loss and gain, energy usage, air quality, and vapor penetration. Cost benefit analyses will be made for each house treated during the project.

San Jose -- "Energy Management and Tracking System as a Software Package"

In its 1981-1982 Energy Task Force project, the City of San Jose developed a mainframe computer-based Energy Management and Tracking System for municipal buildings. This project is structured to aid the transfer of this system through conversion to a flexible microcomputer package. Results are anticipated as a set of software packages to track and compare energy use over time with performance objectives, investment costs, and retrofit options. The system will be applied by other communities during the project period.

San Antonio -- "Community Energy Conservation Investment Funding Strategy"

This project will define the basis for the development of an energy conservation investment strategy to support the funding of community wide energy conservation activities. The project will build strongly on results from the 1983 "San Antonio Energy Study" supported by the city's municipally owned power utility. The 1983 Energy Study defined appropriate conservation measures; this project will address the means to pay for those measures through an effective private/public investment funding strategy.

Completed Projects and Reports (1979-84)

APPLIED RESEARCH PROJECTS

Projects and reports completed during the first five years of the Energy Task Force program are described in the balance of this "Program Overview". Project reports are summarized according to the four major priority areas of municipal operations, community energy management, alternate sources and integrated systems, and public/private financing and implementation.

Subcategory listings within each of the four major priority areas are described below. An index for the project reports is contained following these summaries.

Priority Area: Municipal Operations

Projects in the Municipal Operations area are designed to aid the reduction of energy use and cost in the provision of a local government's essential services and its operation of public facilities. To improve energy use efficiency, to capture alternate energy resources and to stabilize energy costs, work in this area has a special focus on public works operations, buildings and buildings management, and vehicle fleet operations.

Research and evaluation results are presented in six subcategories to cover a wide range of activities to improve energy use efficiency in municipal operations. Subcategories include:

- General Planning and Management
- Vehicle and Fleet Management
- Buildings Management
- Water and Waste Management
- Operations and Maintenance
- Monitoring and Controlling

Priority Area: Community Energy Management

Projects in the Community Energy Management area are designed to help assure adequate energy supplies at affordable prices to continue the long-term economic vitality and social welfare of urban communities. Work in this area has a special focus on means to improve economic revitalization of depressed urban areas, strategies to improve energy efficiency for new business/industry attraction, and methods to reduce energy cost burdens on low and moderate income urban residents.

Research and evaluation results are presented in seven subcategories to address the broad range of actions available to a local government. Subcategories include:

- General Planning and Management
- Economic Development
- Energy Emergency Preparedness
- Residential Programs
- Commercial Programs
- Transit and Paratransit Programs
- Regulatory and Utility Issues

Priority Area: Alternate Sources and Integrated Systems

Projects in the Alternate Sources and Integrated Systems area are designed to provide assistance to local governments in their use of these sophisticated technologies to replace premium fuels and improve conventional energy use efficiencies. Work in this area has focused both on the technologies appropriate for use within a local government, and on the management arrangements essential for implementation.

Research and evaluation results are presented in five subcategories that cover both alternate energy resources and the use of integrated central energy systems. Subcategories include:

- Buildings and Facilities
- Fleets and Transit
- Waste-to-Energy Systems
- District Heating and Cooling Systems
- Cogeneration Systems

Priority Area: Public/Private Financing and Implementation

Projects in the Public/Private Financing and Implementation area are designed to support the financing, financial management, and implementation of local government actions to improve energy use efficiency in municipal operations, in community energy management, and in the use of alternate and integrated energy systems. Work in this area has addressed methods for implementation through both direct public financing and cooperative public/private financial support.

Research and evaluation results are presented in three subcategories that correspond to the major priority areas identified by the members of the Energy Task Force. Subcategories include:

- Municipal Operations
- Community Energy Management
- Alternate Sources and Integrated Systems

MUNICIPAL OPERATIONS REPORTS

GENERAL PLANNING AND MANAGEMENT

ENERGY MANAGEMENT: THE PUBLIC SECTOR

Conducted by Prince George's County, Maryland, this project addressed procedures for energy management and energy cost reduction primarily in internal municipal operations. The report describes practical municipal energy conservation guidelines, emergency contingency preparedness measures and energy data development and monitoring procedures implemented in Prince George's County. The project's short term goal was the reduction of municipal energy consumption by 10% during a two year period. DG/81-309

ENERGY PLANNING AND MANAGEMENT: DEVELOPING IN HOUSE CAPABILITIES

With relatively little experience in coordinated internal municipal energy management, the city of Cleveland, Ohio, combined the resources of a small, newly formed city energy office with experience from other jurisdictions to develop an effective interdepartmental structure for energy use and cost reduction. The project report details this beginning effort which, at the end of the project, was further supported by municipal funds allocated for energy conserving capital improvements. DG/82-301

ELEMENTS OF SUCCESSFUL ENERGY MANAGEMENT: A COMPARATIVE STUDY OF SIX LOCAL GOVERNMENTS

Conducted by Columbus, Ohio, this project analyzed and compared administrative structures for energy management in six cities and counties which have reputations for effective conservation programs for government buildings and fleets. Each of the six administrative structures were analyzed according to seven common management functions to provide practical, experientially based advice to other local governments in their development of procedures to administer and implement programs for municipal energy management. DG/82-304

AN ASSESSMENT OF MUNICIPAL ENERGY TECHNOLOGIES FOR THE CITY OF CHICAGO

Conducted by the City of Chicago, Illinois, this project assessed cost reduction techniques and technologies in fuel management and alternate fuels for vehicle fleets as well as automated energy management and control systems for public buildings. The project report describes inventory methods, associated departmental energy costs, procedures to evaluate technologies best suited for cost reduction in vehicle fleets and building systems, and defines general financing strategies for implementation. DG/82-310

FACILITIES ENERGY MONITORING SYSTEM: APPLICATION IN A LARGE MUNICIPAL GOVERNMENT

This project was structured to develop a process to integrate energy management with a local government's normal budget, management and opera-

GENERAL PLANNING AND MANAGEMENT (Cont'd)

tions functions. Major elements in the project included the development of a practical Energy Management Information System (EMIS) with coordinated training, defined conservation measures, and appropriate financing resources. The program was developed and applied within the largest department of the Washington, DC, municipal government to serve as a pilot application for later expansion city-wide. DG/84-315

VEHICLE AND FLEET MANAGEMENT

ENERGY EFFICIENT VEHICLE FLEET MANAGEMENT AND PROCUREMENT GUIDE

Conducted by the City of San Antonio, Texas, this report presents a guide to effective vehicle fleet management, highlighting San Antonio's extensive use of propane as a vehicular fuel. The report also provides operational guidelines, policies and procedures to include energy efficiency as a standard criterion for use by municipal procurement directors and purchasing agents. DG/81-317

OPPORTUNITIES FOR ENERGY CONSERVATION IN FLEET MANAGEMENT

This PTI information bulletin describes available methods and technologies to reduce the energy consumption and costs of operating municipal vehicle fleets. It identifies current products available on the private market which can improve vehicle efficiency and performance. IB/80-300

FUEL MANAGEMENT AND PLANNING SYSTEM (FMAP)

Conducted by Public Technology, Inc., this project provided a User's Manual, Computer Operating Instructions and software for a micro-computer based vehicle fleet fuel management and planning system. FMAP is designed to assist fleet fuel planning by municipal departments during both normal and energy shortfall conditions. The system can accept 2,000 (+) vehicles and 8 fuel types. DG/81-318

VEHICLE FUEL EMERGENCY PREPAREDNESS

Conducted by Atlanta, Georgia, this project defined a fuel allocation plan for municipal vehicles that will assure the continuation of vital public services during a sudden petroleum shortfall. The plan assigns vehicles to one of four priority categories based on the importance of their service functions. The plan was initially applied to vehicles within one city bureau. DG/81-314

BUILDINGS MANAGEMENT

VARIABLE AIR VOLUME SYSTEM

A conventional dual duct constant volume air supply system for a twelve story municipal building in Phoenix, Arizona, was fitted with more efficient variable air supply equipment in this project. This report describes the design and installation of the variable air volume system that showed an annual cost avoidance of almost $115,000 and an equipment payback period of 9.5 months after installation. DG/81-319

CAPACITY OPTIMIZATION OF HYDRONIC FLOWS: ENERGY SAVINGS IN HVAC SYSTEMS

This Phoenix, Arizona, project demonstrated a practical method to reduce energy consumption in the heating, ventilating and air conditioning systems of municipal buildings. Results from the project describe means to reduce the energy load for chilled water pumping systems by adjusting flow rates to provide only the actual rate of flow required for space heating and cooling. Pump speeds are controlled with a variable frequency inverter to ensure the minimum use of energy. Analysis software is available. DG/84-302

IMPROVING THE EFFICIENCY OF MUNICIPAL BOILERS

This PTI information bulletin describes the various energy conserving operations and maintenance procedures available for improving the energy efficiency of municipal boilers. It stresses the importance of an on-going maintenance and monitoring program and lists test equipment and information sources. IB/80-312

EMERGING TECHNOLOGIES: HEAT PUMPS AND ENERGY EFFICIENT MOTORS

This PTI information bulletin provides basic descriptions of each of these technologies, to include areas for best application, installation and maintenance considerations and availability. It discusses financial risks and benefits, anticipated technology improvements and demonstration sites and lists vendors and information sources. IB/80-304

WATER AND WASTE MANAGEMENT

ENERGY CONSERVATION IN WATER TREATMENT: AN ANALYSIS OF FOUR PLANTS

Conducted by the City of Phoenix, Arizona, this project defined procedures to analyze energy consumption in water treatment processes and to determine feasible methods and equipment to improve energy efficiency. The project report includes discussions of equipment design and performance efficiencies, effective maintenance procedures, the impacts of power factor controls and the effects of off-peak pumping and storage. An appendix lists vendors and equipment for especially significant technologies. DG/82-306

WATER AND WASTE MANAGEMENT (Cont'd)

ENERGY CONSERVATION THROUGH COMPUTERIZED AUTOMATION OF A WASTEWATER TREATMENT PLANT

Focusing on energy conservation through advanced, computer based technology, this Phoenix, Arizona, project addressed techniques for the economical use of electrical energy in a wastewater treatment facility on a 24-hour, 7-day basis. The project identified effective computerized energy management procedures and controls to reduce both average and peak energy demand in the wastewater system's pumps, reservoirs and process equipment. DG/83-311

MUNICIPAL RECYCLING PROGRAMS: POTENTIAL FOR WASTE MANAGEMENT AND ENERGY SAVINGS

This project investigated the process and potential for integrating a recycling program into Denver, Colorado's, current municipal solid waste collection practices. Key components of the project included market surveys, feasibility and operational analyses, financing options and a comparison of recyclying proposals to existing and other proposed waste management systems. The project also addressed political/institutional aspects and public/private cooperation potential to support implementation of a first "pilot" program. DG 84-313

FEASIBILITY OF DEHYDRATED SEWAGE SLUDGE AS AN ALTERNATIVE ENERGY RESOURCE

The most difficult technical obstacle to the use of wastewater sludge as an energy source is its high water content. The purpose of this project, conducted by Baltimore, Maryland was to demonstrate the feasibility of the clathrate hydration process, using propane as the hydrating agent, to dewater municipal sludge and to determine operational scale-up data. This technology has a strong potential to reduce the problems of sludge disposal and to aid use of the product as a renewable energy resource. The project is presented in two volumes to discuss the technical feasibility and commercialization potential of this technology. DG/83-316 and DG/84-321

OPERATIONS AND MAINTENANCE

COORDINATING PREVENTIVE MAINTENANCE WITH ENERGY MANAGEMENT

Recognizing that a comprehensive preventive maintenance program is an essential ingredient in any energy management program for municipal buildings. This Cleveland, Ohio, project investigated ways to institutionalize preventive maintenance in normal operations. Efforts were directed toward coordination between maintenance and energy management programs, to include personnel training and the development of specific preventive maintenance schedules and guidelines. DG/84-301

OPERATIONS AND MAINTENANCE (Cont'd)

COMPUTER BASED PREVENTIVE MAINTENANCE

This project was structured to design, test and evaluate a computer-based preventive maintenance inventory and scheduling system for use in the City of Boston. The system provides the city's preventive maintenance staff with current equipment information, future maintenance needs, day-to-day scheduling support, and updated information to guide trouble shooting activities. DG/84-305

OPERATIONAL AND MAINTENANCE GUIDELINES FOR REDUCING ENERGY CONSUMPTION

Conducted by Dallas, Texas, this project presents guidelines developed, implemented and evaluated by the Dallas Building Services Department to improve energy efficiency and reduce energy costs in municipal buildings. Effects of the O&M guidelines were evaluated through a computerized energy monitoring system. Changes in energy consumption in ten test buildings realized an annual cost avoidance of over $21,000. DG/81-326

STREET LIGHT INVENTORY MAINTENANCE SYSTEM

Conducted by Kansas City, Missouri, this project develop a computerized street light and traffic control light inventory and maintenance system. The system was designed to facilitate maintenance operations for lighting equipment, to aid monitoring service life of components, and to analyze the effectiveness of various available street lighting configurations. DG/84-320

MONITORING AND CONTROLLING

DEVELOPING AN ENERGY MANAGEMENT TRACKING SYSTEM

Faced with annual energy expenditures of over $16 million, the City of San Jose, California, developed a computerized Energy Management Tracking System (EMTS) to track energy expenditures and energy related improvements in its publically owned and operated buildings. Built around two existing computerized data files, the implemented tracking system provides a sound and responsive tool to guide energy conservation investments and to evaluate their cost effectiveness. The development, evaluation and use of EMTS is detailed in the San Jose project report. DG/82-300

ENERGY DATA GATHERING, ANALYSIS AND REVIEW (EDGAR) SYSTEM

Conducted by Houston, Texas, the "EDGAR" system was designed to measure the effectiveness of implemented municipal facility conservation actions and to allow the effective comparison of actual energy use against prescribed standards. Reports generated by the system can be used to determine what buildings require special attention, to evaluate the feasibility of a con-

MONITORING AND CONTROLLING (Cont'd)

servation investment and to measure the results of implemented actions. Developed in Houston as a computer based system, the project report also presents a manual version for use by jurisdictions without extensive computer capabilities. DG/81-320

ENERGY CONSUMPTION MONITORING FOR PUBLIC BUILDINGS

Conducted by Kansas City, Missouri, this project developed a monitoring system that aided the definition of baseline energy consumption profiles and control limits for eight high energy using facilities, prescribing optimum energy use standards for various seasons. The report covers building manager training procedures to assure that these standards are met. Kansas City anticipated first year savings from $5,000 to $20,000 per building as a result of system implementation. DG/81-322

PLANNING FOR TELECOMMUNICATIONS IN LOCAL GOVERNMENTS: ENERGY MANAGEMENT ASPECTS

Conducted by the Department of Energy and Telecommunications in Columbus, Ohio, this project addressed a "leading edge" issue in urban energy management. The project focused primarily on potential applications of emerging communications technology to aid urban energy management. Primary results from the project are an in-depth review of the techniques and potential for energy savings in service delivery, energy monitoring and energy management through communications technology. DG/83-304

BUILDING AUTOMATION SYSTEMS

This PTI information bulletin provides a description of what a building automation system is, what it does and how it works. It describes the state of the art and discusses the selection of candidate buildings and appropriate control systems. IB/80-302

COMMUNITY ENERGY MANAGEMENT REPORTS

GENERAL PLANNING AND MANAGEMENT

A PRIMARY URBAN ENERGY MANAGEMENT PLANNING METHODOLOGY

Conducted by Dade County, Florida, this Management Guide presents an energy planning method that can be implemented incrementally with in-house staff and initially limited data. The methodology provides guidance for initial organization, data development, formulation of goals, objectives and actions, implementation and monitoring. The methodology was based on Dade's County's established planning process and experience from other communities, nationwide. DG/80-308

A SIMPLIFIED METHODOLOGY FOR COMMUNITY ENERGY MANAGEMENT PLANNING

Conducted by Columbus, Ohio, this project used as one base the work previously completed by Dade County ("A Primary Energy Planning Methdology"). The report compares the Columbus energy planning effort with those of other communities, including the seventeen community energy plans funded through the Federal Comprehensive Community Energy Management Program, and suggests eight decision points inherent in any energy planning process. Choices, successes and failures in Columbus' response to each of these decision points are described. DG/81-310

A COURSE ON THE ADMINISTRATION OF PUBLIC ENERGY PROGRAMS

Conducted by Seattle, Washington, and its electric utility, Seattle City Light, this loose-leaf Guide presents a graduate level curriculum for instruction of local government staff in the management of public energy programs. The course covers national energy issues and policies, governmental mechanisms for encouraging energy conservation, methods for facilitating community involvement, and the structure and function of energy utilities. The curriculum was used in courses taught by staff from Dade County, Florida, and New Orleans, Louisiana. PT/80-310

ENERGY CONSUMPTION IN NEW YORK CITY -- PATTERNS AND OPPORTUNITIES

Published by the New York City Energy Office, this report presents a detailed inventory of energy consumption, by fuel type and end use, for all sectors of the City. Designed to provide a sound basis for refining the city's comprehensive energy management programs, the inventory presented in this report provides an excellent illustration of how energy is used in a large urban area. DG/80-315

DEVELOPMENT OF AN ENERGY ACTION PLAN: A PARTICIPATORY APPROACH

Conducted by Hennepin County, Minnesota, this project addressed the increasingly common problem of how a county government can effectively develop and implement a community-oriented energy action plan in the face of tightening public budget constraints. County leadership generated private sup-

GENERAL PLANNING AND MANAGEMENT (Cont'd)

port for the action plan developed during the project by linking individuals and organizations in a common county energy "network" with a strong potential for continuing interest and support. DG/82-305

STRATEGIES FOR IMPROVING COMMUNITY ENERGY PRACTICES

This community-oriented project, conducted by Jefferson County, Kentucky, formed and worked with a combined public/private Task Force to coordinate community energy programs, to provide a private funding base for selected programs and to develop an energy information system to guide the direction of the programs. The project report documents the work of the Task Force in developing and providing financial resources for an energy action plan as well as detailing the structure and use of the energy information system. DG/82-307

ECONOMIC DEVELOPMENT

ENERGY ECONOMIC DEVELOPMENT

This project, conducted by Dade County, Florida, was based on the premise that growth in economic activity does not necessarily require proportional increases in energy consumption. The project estimates marginal energy costs associated with increases in water/wastewater and electrical service demand and assigns those costs between the land developer and the ratepayer/taxpayer. The project report describes options to reduce these costs and economic incentives to encourage their adoption. The defined incentives were anticipated for incremental inclusion in the County's overall growth management process. DG/82-303.

INTEGRATING ENERGY MANAGEMENT WITH ECONOMIC DEVELOPMENT

Recognizing that local economic development programs are not often utilized to support energy efficiency, New York City inventoried current economic development programs for their appropriate potential use for energy cost reduction, developed a pilot assistance program for small businesses in commercial revitalization areas, and structured a continuing business energy assistance service. The project report describes the results of each of these components as well as approaches to finance energy improvements and to coordinate with local energy utilities. DG/82-314

ENERGY MANAGEMENT AND ECONOMIC DEVELOPMENT: COMMERCIAL/INDUSTRIAL LAND-USE STRATEGIES

With a rapidly growing commercial and light industrial economy, the city of San Antonio, Texas, focused on means to improve energy efficiency in new businesses through a combination of land use controls and development incentives. A key aspect of this project was a quantified analysis of the anti-

ECONOMIC DEVELOPMENT (Cont'd)

cipated effects of four general categories of energy management techniques and the use of these analyses to select those most effective. The project report discusses potential energy savings from each technique as well as methods for implementation. DG/82-313

DEVELOPMENT OF AN ENERGY PARK IN KANSAS CITY

Conducted by Kansas City, Missouri, this project developed a process to identify energy related industries, and used the process to guide the development of a demonstration energy park. The Energy Park is anticipated as a mixed land use enterprise which will emphasize energy efficiency concurrent with an aid to economic development in Kansas City. DG/83-309

ENERGY EMERGENCY PREPAREDNESS

DEVELOPING ENERGY EMERGENCY PREPAREDNESS: A COMMUNITY ORIENTED APPROACH

Conducted by Hennepin County, Minnesota, this project developed an Energy Emergency Operations Plan (EEOP) for services controlled by a large county government and a series of model plans that can be applied to other sectors and organizations within the County. Model plans address other local governments, businesses, community organizations and County residents. The County EEOP was formally adopted in 1982. DG/81-311

ENERGY EMERGENCY OPERATIONS PLAN

Conducted by Philadelphia, Pennsylvania, this project developed a guide for use by the city government and its operating departments in the event of a sudden energy shortfall. The guide consists of interrelated community response plans (to minimize community impacts) and municipal operations contingency plans (to maintain vital government functions and services). Plans are based on analyses of both the energy supply system and existing private and public policies for energy curtailment and allocation during a shortfall. DG/81-312

METROPOLITAN DADE COUNTY COMPREHENSIVE ENERGY EMERGENCY PLAN

Conducted by Dade County, Florida, this project presents a plan for Metro-Dade County to address motor fuel and electrical emergencies, focusing primarily on fleet and facilities. The plan significantly expands emergency preparedness efforts begun by Metro-Dade in 1973. DG/81-313

LOCAL GOVERNMENT ROLE IN ENERGY CONTINGENCY PLANNING

This PTI information bulletin presents a general discussion of how local governments can reduce the impacts of a sudden energy shortfall. It includes four case studies of local government contingency plans developed in

ENERGY EMERGENCY PREPAREDNESS (Cont'd)

response to potential energy shortages and lists additional information sources. IB/80-311

RESIDENTIAL PROGRAMS

CONVERSION TO SEPARATE ELECTRIC METERING: GUIDELINES FOR MULTIFAMILY BUILDINGS

Conducted by Montgomery County, Maryland, this project developed and applied a step-by-step financial analysis process designed to aid building owners in the conversion of master-metered units to individual metering. Discussing the benefits of individual metering as well as the legal, technical and financial considerations of conversion, the project report provides a transferable process and analysis guidelines applicable to other communities in the United States. DG/82-312

ENERGY ASSISTANCE PROGRAM INFORMATION SYSTEM (EAPIS)

This project developed and demonstrated phase one of a computer- based, community-directed Energy Assistance Program Information System (EAPIS) in Philadelphia, Pennsylvania. EAPIS is intended to support the continuing implementation of Philadelphia's Residential Energy Efficiency Plan (REEP), an interagency effort with at least ten distinct programs. By providing more detailed and timely client information, EAPIS permits better energy assistance targeting, coordination and resource allocation among participating agencies and organizations. DG/84-307

RETROFITTING OF RESIDENTIAL GAS HEATING EQUIPMENT WITH FLUE RESTRICTING AND INPUT REDUCING COMPONENTS

Conducted by Detroit, Michigan, this project continued an experimental program with the local natural gas utility to evaluate alternative methods and equipment for residential gas furnace derating. Pressure regulator redesign or flue restrictor equipment was installed in over 400 residences and compared with a control group of residences with no modifications. Results indicated average energy savings of about 14% after modification. DG/81-321

REHABILITATION OF OLDER HOUSING TO SUPERINSULATION STANDARDS

Conducted by the City of Detroit, Michigan, this project conducted research and provided findings for superinsulation retrofit in regard to the technologies and materials selected; cost/benefit analysis; the interior environmental quality conditions; and the resultant reduction in supplemental heating and cooling needs. Private sector involvement of builders, suppliers, utilities and unions was included as part of the project. DG/83-319

RESIDENTIAL PROGRAMS (Cont'd)

A DEVELOPMENT STRATEGY FOR SUPERINSULATED HOUSING

This project defined and tested a strategy to induce residential developers and others in St. Louis, Missouri, to employ superinsulation building techniques as standard construction practice. The project report covers superinsulation technologies and construction methods, examples of actual applications, and cost-saving results. Results from the project are anticipated to become an integral part of strategies for residential renewal in the City of St. Louis. DG/84-318

USE OF THERMOGRAPHY FOR ENERGY CONSERVATION

This PTI information bulletin discusses the capabilities of various infrared sensing technologies and equipment and describes their use in the detection of heat loss in individual buildings and in community-wide aerial surveys. Lists vendors and information sources. IB/80-306

COMMERCIAL PROGRAMS

A METHODOLOGY FOR ENERGY IMPACT ANALYSIS OF URBAN DEVELOPMENT PROJECTS

Conducted by Chicago, Illinois, these Management and Technical Guides define a method to evaluate the impact that large urban development projects can have on an urban area's energy supply and consumption patterns. Procedures contained in this methodology will aid municipal staff in determining energy use effects by energy type and in defining means to reduce or avoid the negative energy effects of a major urban development project. PI/80-314 (2 Volumes)

COMMERCIAL AREA ENERGY ASSISTANCE PROGRAM

Conducted by New Orleans, Louisiana, this project was designed to improve business managers' awareness of the cost benefits of energy conservation, to identify energy problems specific to the New Orleans - Gulf Coast climate, and to develop a computer assisted, non-contact technology that could be used for energy audits of commercial buildings in southern cities. On-site visits to sixty business establishments were made using conventional audits and infrared thermal scanning technology to assess energy waste. A software package, merging results from the audits and the thermal scans, was developed and is documented in the project report. DG/81-323

ENERGY MANAGEMENT FOR SMALL BUSINESS

Conducted by Chicago, Illinois, this project developed and implemented a program to train owners and managers of small businesses in energy management principles, audit procedures and conservation techniques. Activities and products of the project included a training manual for small business

COMMERCIAL PROGRAMS (Cont'd)

staff, business audits that formed a highlight of seminars sponsored during the program, and efforts to assure combined private/public sponsorship of the program to encourage its continuation. The project report documents each aspect of the Chicago assistance and training program. DG/81-324

MATCHING ENERGY END USE NEEDS TO SOURCE POSSIBILITIES

Conducted by the New York City Energy Office, this report presents an analytic process to forecast energy needs by energy type in the city's commercial sector. Issues identified as a result of applying this process in New York City directed the structure of a public/private financial assistance program to reduce commercial energy costs. DG/81-328

TRANSIT AND PARATRANSIT PROGRAMS

A METHODOLOGY FOR ASSESSING THE TRANSPORTATION ENERGY IMPACTS OF URBAN DEVELOPMENT

Conducted by San Francisco, California, this project used as a base the work previously completed by Chicago ("An Energy Impact Analysis Methodology") to add a detailed transportation component. The report describes the energy impacts of large scale urban development projects on transportation services and suggests appropriate transportation system management measures to ameliorate negative community impacts and to reduce public cost. DG/81-325

MICROCOMPUTER TOOLS FOR TRANSPORTATION AND RESIDENTIAL ENERGY CONSERVATION

Conducted by King County, Washington, this project was designed to aid community energy efficiency both in its transportation system and in new land development through the development and application of two computer based analysis systems. A transportation energy impact analysis system will aid the design of efficient road networks, while a building energy analysis program will provide an effective aid to builders at the preliminary design stage of a new development. The project report describes the development and use of each system to aid transfer and application in other jurisdictions. DG/82-317 (2 Volumes)

MEMPHIS AREA RIDESHARE ON-LINE INFORMATION SYSTEM

This project, conducted by the City of Memphis, Tennessee, provided in-house computer capability, software, and employee training to process and match rideshare candidates and vehicles thereby encouraging employer/private sector sponsored ridesharing. Benefits include increased accuracy, cost savings, improved response to applications and car/van pool formation rates, and reduced gasoline consumption for commuters. DG/83-314

TRANSIT AND PARATRANSIT PROGRAMS (Cont'd)

PROVISION OF VANPOOL SERVICES USING NEW MINI-VAN TECHNOLOGY

This project was conducted by Memphis, Tennessee, to determine the feasibility of utilizing new mini-van technology to establish vanpool service in areas where low commuter densities inhibit the formation of full-size (15 member) vanpool groups. The project evaluated fixed and operating costs, fare structures, acceptability of mini-vans in various market segments, and potential energy and related benefits. DG/84-314

REGULATORY AND UTILITY ISSUES

REDUCING REGULATORY AND FINANCIAL IMPEDIMENTS TO ENERGY EFFICIENCY

Focusing on means to reduce disincentives to energy efficiency in its local building codes, the City of Houston, Texas, combined recommendations of a private/public energy advisory committee with findings of local and national surveys to develop effective code alterations. Strong coordination with the building industry was emphasized to assure that recommendations for code changes, incentives and educational components resulting from the project could be endorsed and supported by both the construction industry and the city government. DG/82-315

CUSTOMER PREFERENCES FOR CONSERVATION AND SERVICE ALTERNATIVES TO INCREASED ELECTRICITY GENERATION

Performed by the Office of the People's Counsel in Washington, DC, this project identified and evaluated customer needs and preferences for electrical service. From this preference analysis, the project recommended conservation and demand limiting alternatives which are customer acceptable and can reduce the need for increased utility generating capacity and the costs associated with such increases. DG/83-317

THE UTILITY HANDBOOK: A GUIDE FOR LOCAL GOVERNMENTS IN DEALING WITH ELECTRIC AND GAS UTILITY ISSUES

The Utility Handbook includes descriptions of the gas and electric utility industries and a discussion of how those utilities are regulated, at both the Federal and State levels. To enable local governments to take full advantage of opportunities to participate in the development of utility policies which affect local residential and commercial consumers, as well as the local government itself, the Handbook describes administrative processes and rate negotiation, as well as means of participation in Federal and State ratemaking proceedings. The Handbook also addresses local government franchise power and its role in utility/government relationships, and discusses special considerations involved with municipal utilities. Finally, because of the interest in cogeneration and small power production in urban areas, the Handbook includes a discussion of municipal participation in these areas. DG/82-325

ALTERNATE SOURCES AND INTEGRATED SYSTEMS REPORTS

BUILDINGS AND FACILITIES

A DECISION PROCESS FOR THE RETROFIT OF MUNICIPAL BUILDINGS WITH SOLAR ENERGY SYSTEMS

Conducted by the City of Los Angeles, California, this Technical Guide pre-defines a step-by-step process to aid in the identification, analysis and selection of solar energy retrofit alternatives for public buildings. The process is designed to assist local government managers in evaluating solar retrofit technologies and their cost-effectiveness. The Guide includes case examples of solar retrofit in selected Los Angeles buildings. DG/80-309

UTILIZATION OF FELLED TREES AS SUPPLEMENTAL BOILER FUEL

Designed to evaluate the potential for use of felled, city-owned trees as a supplemental fuel in Detroit, Michigan, this project used chipped wood waste in varying proportions as a fuel for a school building's boiler. The project addressed technical and cost considerations for handling and transportation, for storage and pest control, for sizing and mixing, and for performance, corrosion potential and post-combustion residue. The project report includes discussions concerning the market potential for this fuel supplement and Detroit's future plans based on the results of this project. DG/82-320

COMMERCIALIZATION OF FLUIDIZED BED COMBUSTION SYSTEMS IN URBAN AREAS

Designed by the City of Indianapolis, Indiana, as a practical means to encourage the use of locally available coal resources, the project provides a practical assessment of this emerging technology and includes comparative costs for systems of differing sizes and their competing conventional systems. With a focus on combined private/public cooperation for implementation, the project report describes methods to identify prime user candidates and suggests financial/institutional arrangements for system development. An appendix lists appropriate reference sources for additional information and assistance. DG/82-311

FLEETS AND TRANSIT

DEVELOPMENT OF A HYDROGEN FUELED MASS TRANSIT VEHICLE

Conducted by Denver, Colorado, this project is one portion of a larger Denver program to address the problems of solid waste disposal, air pollution and potential motor vehicle fuel shortages. Focusing on technology to convert a standard municipal bus to operate on non-polluting hydrogen fuel, the project report documents the design and retrofit aspects of the Denver

FLEETS AND TRANSIT

conversion as well as institutional barriers that must be overcome prior to full implementation. DG/81-327

ANALYSIS OF MUNICIPAL BUS OPERATIONS FOR THE ADVANCEMENT OF FUEL CELL TECHNOLOGY

The City of Albuquerque, New Mexico, with assistance from the Los Alamos National Laboratory, collected and analyzed data on its mass transit system (40 foot buses) to enhance the reliability of fuel cell propulsion systems for large transit vehicles. This information will be used in conjunction with existing fuel cell projects in other cities to aid in defining guidelines for fuel cell development in mass transportation applications. DG/84-306

METHANOL USE IN VEHICLE FLEET OPERATIONS

Conducted by the City of Baltimore, Maryland, this project presents results of the conversion of normal fleet vehicles to operation on a pure methanol fuel. The project includes technical descriptions and costs for conversion, fuel blending and storage, and the vehicle test program. Results from the project include a discussion of methanol's advantages and disadvantages as a vehicular fuel as well as management concerns and other institutional constraints to full acceptance and use. The project report describes Baltimore's future plans for methanol use based on these results and provides advice for other jurisdictions in their consideration of similar fuels. DG/82-319

WASTE-TO-ENERGY SYSTEMS

EVALUATION OF LANDFILL GAS AS AN ENERGY SOURCE

Conducted by Baltimore, Maryland, this Management Guide presents a simple methodology to evaluate the feasibility of methane recovery from a sanitary landfill. The evaluation process includes methods to estimate the methane production life expectancy, the potential quality and quantity of gas produced, types of treatment required and potential methane uses and markets. The report includes results of the methodology's application to a Baltimore landfill for methane recovery and sale. PI/80-313

CEDAR HILLS LANDFILL METHANE GAS RECOVERY

Conducted by King County, Washington, this project used the methodology developed by Baltimore ("Evaluation of Landfill Gas as an Energy Source") as a base for investigating the technical feasibility and marketability of methane recovery from a 900+ acre regional sanitary landfill. The report reviews and suggests general costs for differing levels of feasibility stud-

WASTE-TO-ENERGY SYSTEMS (Cont'd)

ies for landfill gas recovery assessment. DG/81-315

LANDFILL GAS RECOVERY - A PLANNING METHODOLOGY FOR FUTURE SITE LOCATION

Conducted by the City of San Antonio, Texas, this project utilized results of previous Energy Task Force work in Landfill Gas Recovery, expanding these evaluation methodologies to form the basis for a predictive planning tool. The major result from the project is a practical set of criteria for the location future landfill sites that increases their potential for the effective generation, extraction and use of naturally generated landfill (methane) gas. DG/83-310

PRODUCTION OF ETHANOL FROM THE CELLULOSIC FRACTION OF MUNICIPAL SOLID WASTE

Conducted by Baltimore, Maryland, this commercialization study evaluated the technical and economic feasibility of producing ethanol from the cellulosic fraction of municipal solid waste at a suitable site in Baltimore. The report includes a detailed analysis of resource availability and estimates for capital investment, working capital and operating costs. Commercialization potential is analyzed based on estimates of return on investment and production facility availability in Baltimore as well as in other urban areas. DG/81-316

ALTERNATIVE USES FOR DIGESTER-GENERATED METHANE GAS

Focusing on alternate energy resources available from municipal sewage treatment processes, this Denver, Colorado, project identified a range of practical uses for digester-generated methane gas produced at a municipal waste-water treatment facility. Results from the project present criteria useful in determining the feasibility of each potential use option. DG/83-308

A STATUS REPORT ON ENERGY RECOVERY FROM SOLID WASTE: TECHNOLOGIES, LESSONS AND ISSUES

This PTI information bulletion reviews the lessons learned and issues raised regarding the recovery of energy from municipal solid waste. It includes brief descriptions of technologies currently in planning, construction or shakedown phases in the United States and lists sources for additional assistance and information. IB/80-303

DISTRICT HEATING AND COOLING SYSTEMS

AN INITIAL ASSESSMENT OF DISTRICT HEATING/COOLING

Conducted by the city of Chicago, Illinois, this project assessed the feasibility of DHC, on a case study basis, for several large commercial or

DISTRICT HEATING AND COOLING SYSTEMS (Cont'd)

multiuse developments within a target area including Chicago's central business district. Emphasis was placed on technical/economic feasibility and legislative options for development and implementation of one or more DHC projects. DG/83-312

RENOVATION OPPORTUNITIES FOR STEAM DISTRICT HEATING SYSTEMS: A DECISION PROCESS

This project was conducted by the City of San Francisco, California, to define a procedure by which local governments can examine old, steam-based district heating systems to evaluate renovation opportunities for improving their performance. The report presents a six phase process to evaluate the technical and economic merits of optional renovation opportunities and describes how this process was applied to two steam-based systems in San Francisco. DG/83-313

MULTI-JURISDICTIONAL PLANNING FOR DISTRICT HEATING AND COOLING

With leadership from Hennepin County, Minnesota, this project developed a plan for a district heating system potentially served by an alternative energy source, for existing and future real estate development in a planned and designated multiuse Development District. The project focused on the process used in developing a concept and implementation plan for the district heating system. The results of the project describe the nature and focus of the concept plan, and the organizational and contractural issues involved with the implementation of district heating systems that involve at least two different governmental jurisdictions. DG/83-305

FINANCIAL PLANNING FOR DISTRICT HEATING: THE BROOKLYN NAVY YARD

Conducted by New York City, this project defined a private-public financing and ownership package for a proposed District Heating and Cooling System in an existing industrial park complex. The project identified the potential market for DHC, assessed selective ownership and financing options and defined the relationship of City, non-profit development corporations, and private financial organizations whose participation may be required to finance the proposed system. DG/83-315

FEASIBILITY OF WATER-BASED DISTRICT HEATING AND COOLING

This New York City project was designed to research and assess the economic, technical and preliminary marketing feasibility for adapting hot water technology to certain sites within the Consolidated Edison Company's central steam district heating system. Emphasis was placed on assessing the economic impact on existing ratepayers of water-based district heating and cooling systems and means to determine whether or not to proceed to more detailed Phase Two development and implementation stages. DG/84-311

DISTRICT HEATING AND COOLING SYSTEMS (Cont'd)

CENTRAL ENERGY SYSTEMS APPLICATIONS TO ECONOMIC DEVELOPMENT

This project was designed to evaluate and define potential technical and financial benefits of central energy systems (specifically district heating and cooling) as incentives to encourage private development in San Antonio, Texas. Procedures were defined to integrate proven benefits with other private and public actions to improve economic development within targeted areas in the City of San Antonio. DG/84-309

COGENERATION SYSTEMS

ON-SITE COGENERATION FOR OFFICE BUILDINGS

The overall objective of this project is to encouragge the use of cogeneration technology as an energy supply system for office buildings in San Francisco, California. The project considered the use of steam provided through cogeneration as a thermal source for an existing district heating system, as well as for other uses. The project outlines technical and economic barriers, possible alternative solutions and presents recommendations for further action specific to San Francisco. DG/84-308

IMPLEMENTATION METHODS FOR AN INTEGRATED ENERGY SYSTEM

This project builds on previous studies in Chicago, Illinois, to develop an implementation plan for a cogeneration facility with district heating potential in the City's Stockyards Industrial Area. The overall objective of the project was to support at least one private corporation and/or investor in the implementation of a cogeneration system that may be expended to serve other users. The project also served as a demonstration to encourage development of the cogeneration market in Chicago. DG/84-312

PRICING, REGULATION AND COMPETITION IN COGENERATION: A METHOD FOR RISK ANALYSIS

This Houston, Texas, project developed a methodology to deal with issues of cogeneration development, to include issues of price for cogenerated electricity, state and local regulation, and risk analysis for reliability and fuel mix. The project supported the development of rules based on the methodology for consideration and adoption by appropriate Texas regulatory bodies. DG/84-316

EMERGING TECHNOLOGIES: COGENERATION AND PHOTOVOLTAICS

This PTI information bulletin provides basic descriptions of each of these technologies, to include areas for best application, installation and

COGENERATION SYSTEMS (Cont'd)

maintenance considerations and availability. It discusses financial risks and benefits, anticipated technology improvements and demonstration sites and lists vendors and information sources. IB/80-304

PUBLIC/PRIVATE FINANCING AND IMPLEMENTATION REPORTS

MUNICIPAL OPERATIONS

ENERGY FINANCING FOR LOCAL GOVERNMENTS: THE ENERGY INVESTMENT FUND

In this project, Metro-Dade County, Florida, documented a transferable procedure for identifying and placing "in-house" dollars into a revolving energy investment fund to be used for building energy retrofits. This project focused on investments which have a payback period of greater than one year but less than five years. Results include an application and review process for the use of the funds; procedures to determine the return on and priority of the investments; a payback and monitoring process; and employee training/incentive programs which will ensure the continued flow of dollars into the investment fund. DG/83-302

ENERGY SAVINGS PAYBACK FUND

The City of Cleveland, Ohio, developed an Energy Savings Payback Fund (ESPF) to finance energy improvement projects within municipal facilities. This report describes the ESPF and the types of data and management systems necessary to fully implement this financing mechanism both in Cleveland and for transfer to other local jurisdictions. DG/83-306

SOURCES AND TECHNIQUES FOR ALTERNATIVE FINANCING OF ENERGY CONSERVATION PROJECTS FOR LOCAL GOVERNMENTS

The city of Houston, Texas, investigated alternative sources and techniques for the financing of energy conservation projects in local governments. The project report describes these options and includes a selection process which local governments can utilize in determining which financing system best fits their needs. DG/83-318

AN INNOVATIVE FINANCING AND INCENTIVE PACKAGE TO REDUCE MUNICIPAL ENERGY CONSUMPTION

This project, conducted by the city of New Orleans, Louisiana, investigated financial tools (including bonding, lease-purchase and shared savings arrangements) to implement capital-intensive conservation measures in municipal buildings. It also establishes a procedure and recommends available institutional/budgetary incentives for departments to reduce energy consumption. DG/83-307

IMPROVING ENERGY MANAGEMENT AND ACCOUNTABILITY IN MUNICIPAL OPERATIONS: A MODEL BUDGET

In order to emphasize conservation efforts, the city of Pittsburgh, Pennsylvania, documented its process in developing an "Energy Budget" to be used as a planning, management and information tool. This "Energy Budget" consolidates existing energy and energy related costs and serves as the

MUNICIPAL OPERATIONS (Cont'd)

basic guide for programming future conservation projects. DG/83-303

BUDGETARY INCENTIVES FOR MUNICIPAL ENERGY MANAGEMENT

This project was structured to define incentives for municipal energy management that can be incorporated into the budgetary process for departments within the City of Columbus, Ohio. These incentives should stimulate effective energy management by allowing individual departments to finance specific projects and directly benefit from the savings they achieve through energy management actions. In addition, a supporting energy management information system was designed to provide data necessary to support the incentive system. DG/84-310

SHARED SAVINGS FOR ENERGY CONSERVATION: A MODEL PROCESS

This Pittsburgh, Pennsylvania, project developed a rational decision process to enable municipal governments to implement energy conservation projects in a cost-effective and orderly fashin as part of an overall energy management program. The process includes the identification of legal, political and economic factors involved in shared savings agreements and the development of a model decision process for the development and negotiation of shared savings agreements. DG/84-317

LIFE CYCLE COSTING AND LOCAL GOVERNMENT PURCHASING

This PTI information bulletin describes the basic concept and technique of life-cycle costing as a procurement policy and demonstrates how LCC can assist in energy conservation efforts. It includes examples of state and local implementing legislation to allow LCC techniques. IB/80-307

COMMUNITY ENERGY MANAGEMENT

FINANCIAL OPTIONS FOR NEIGHBORHOOD ENERGY EFFICIENCY

Conducted by Kansas City, Missouri, this project coordinated and focused several existing neighborhood energy conservation programs to leverage additional support from non-municipal funding sources. The project report describes in detail the program and organizational design, and the legislative and regulatory considerations significant in developing substantial financial support from national Foundations, from a local natural gas utility and from corporate contributions. DG/82-309

FINANCIAL OPTIONS FOR ENERGY EFFICIENCY

In a differing approach to neighborhood energy efficiency, the city of New Orleans, Louisiana, combined components of education, demonstration and

COMMUNITY ENERGY MANAGEMENT (Cont'd)

technical assistance to implement residential energy cost reduction measures and to evaluate their actual effectiveness. Results from these initial efforts were used to show the practical benefits of energy conservation to private financial institutions and to justify their active support of the program. The project report describes this approach and continuing efforts in New Orleans. DG/82-308

PUBLIC HOUSING ENERGY EFFICIENCY THROUGH PRIVATE FINANCING

Focusing on needs for energy conservation in multi-family public housing, the city of San Francisco, California, developed an innovative three part financing approach that combined an existing energy utility subsidy with the encouragement of more individualized "micro-utility" and energy management company concepts. The development and implementation of this program, including a description of initial technical support from the Lawrence Berkeley National Laboratory are described in the project report. DG/82-302

SHARED SAVINGS IN THE RESIDENTIAL MARKET: FINANCING SINGLE-FAMILY ENERGY CONSERVATION

Conducted by staff in Hennepin County, Minnesota, this project applied the shared savings approach for financing energy conservation improvements to the single-family residential market. This market has been generally considered unattractive for shared savings agreements because of relatively small individual savings potentials and high administrative costs. Results from the project demonstrate that both energy service company and consumer participation in these agreements is feasible with practical economic benefit to both parties. DG/84-319

ALTERNATE SOURCES AND INTEGRATED SYSTEMS

REDUCTION OF IMPEDIMENTS TO ALTERNATIVE ENERGY USE: ENERGY POLICY AND CODE DEVELOPMENT IN DENVER

As a center of activity for a large part of this nation's burgeoning alternative energy industry, the City of Denver, Colorado, focused on means to encourage alternate energy use by improving incentives in building codes, in land development review processes, and for the retrofit of public buildings. The project report describes actions suggested for each of these areas and suggests means to address institutional needs as well as to establish coordinative structures essential for implementation. DG/82-316

ALTERNATE SOURCES AND INTEGRATED SYSTEMS (Cont'd)

HANDBOOK OF FINANCIAL OPTIONS FOR WASTE TO ENERGY SYSTEMS FOR URBAN GOVERNMENTS

The Waste to Energy Handbook describes the options likely to be available to a local government wishing to construct, own, or operate a facility to produce energy from municipal waste. The Handbook summarizes various methods of public and private ownership of waste to energy facilities, and suggests issues to be reviewed in determining which ownership option is most advantageous for a particular local government. The Handbook further describes the specific characteristics of those financing options most likely to be employed in connection with each form of ownership identified. Appendices to the Handbook address a variety of background issues which will influence a local government's decision about its level of involvement with waste to energy system. These include an appendix discussing technical, legal and policy issues which could affect consideration of the waste to energy issue, and an appendix discussing specific tax issues associated with waste to energy facilities. DG/82-324

INNOVATIVE FINANCING FOR A PRIVATELY-OWNED WASTE-TO-ENERGY FACILITY

This project identified and evaluated innovative methods for the financing of a privately owned waste-to-energy facility. The project focuses on relevant factors to be considered in providing sufficient incentives for private investment while maximizing service benefits to public agencies. The project report describes experience in San Diego County and provides a Users Guide for the financial analysis model developed during the project. Software for the financial analysis model is available. 2 Volumes -- DG/84-303 and DG/84-304

Index to Applied Research

PRIORITY AREA: MUNICIPAL OPERATIONS

REPORT AND INFORMATION SOURCES

Readers interested in obtaining additional copies of this "Program Overview" or full copies of any publication listed in this document should address inquiries with the publication title and publication number to:

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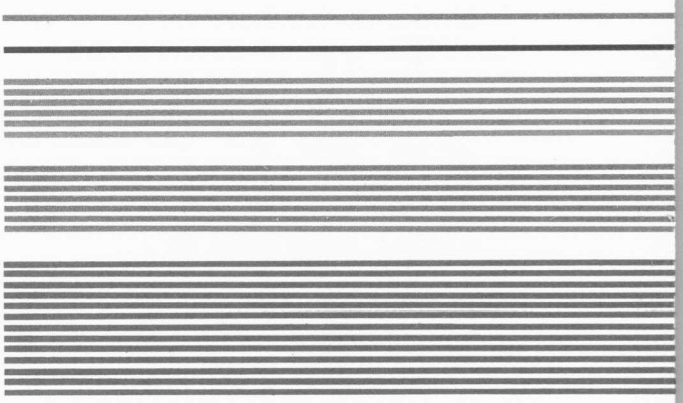

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