



ENERGY OPERATIONS MANAGEMENT PROGRAM

A CASE STUDY PREPARED BY OAK RIDGE NATIONAL LABORATORY AND THE
NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT AUTHORITY

Improving the efficiency of energy use in commercial and industrial buildings can provide significant energy and cost savings to owners and occupants. Commercial sector energy use in New York accounts for 34%, and industrial sector use accounts for 23% of total Statewide non-transportation energy use. Commercial and industrial customers combined spend approximately \$11.0 billion annually on energy. The **New York Energy SmartSM** Energy Operations Management program supports energy efficiency improvements in commercial, industrial, and public sector building operations through on-site energy management technical assistance. The program targets operational improvements in energy systems as an alternative to expensive large scale equipment replacements.

The Energy Operations Management program builds on NYSERDA's experience working with the FlexTech program and the New York State Office of Mental Health's (OMH) Energy Management Services program. OMH, working with NYSERDA, has achieved a 55% reduction in energy costs at its facilities throughout the State.

The Energy Operations Management program is one of five **New York Energy SmartSM** programs that provide financial assistance to customers interested in identifying improvements in energy efficiency. The five programs are: (1) Energy Operations Management; (2) Rate Analysis and Aggregation program, which identifies electricity consumption, time of use, and purchase options; (3) Energy Feasibility Studies program, which identifies energy-efficient capital improvements; (4) Energy Audit Pilot program, which helps small business owners identify energy-saving opportunities; and (5) the FlexTech program, which provides assistance from NYSERDA's pre-qualified consultants in identifying energy-efficiency opportunities. Together, these programs comprehensively address the technical assistance needs of the business, institutional, and public sectors of New York State.

There has been significant interest in the Energy Operations Management Program during the program's first 18 months. As a result, an additional \$800,000 of funding was added to the initial three-year budget of \$1.1 million.

PROGRAM OVERVIEW

The goals of the program are to increase the use of energy operations management services and to increase the awareness and appreciation of the role that operational improvements can play in lowering energy costs and increasing productivity. At the beginning of the program, the following objectives were outlined:

- Sponsor at least 30 demonstration projects in New York State that illustrate the benefits of energy operations management.
- Achieve \$4.4 million in annual energy savings from the implementation of study recommendations.
- Increase the number of energy operations management service providers from the nine originally known to at least 25 service providers by the end of the program.

The program provides cost-sharing of technical assistance projects. For small projects, defined as projects costing less than \$200,000, NYSERDA contributes 50% of project costs, up to \$50,000. For selected small projects located in a New York State Economic Development Zone or projects participating in the U.S. Environmental Protection Agency (EPA) ENERGY STAR® or Climate Wise programs, 75% of project costs, up to \$50,000 is provided. Large projects (more than \$200,000) receive cost sharing of 25%, up to \$100,000. The project process is illustrated in the text box to the right.

NYSERDA set out to establish a technical assistance program that differs from traditional technical assistance offered by the utilities and other states. NYSERDA's Energy Operations Management program incorporates the following features:

- Maximizing the operating efficiencies of existing equipment through comprehensive engineering analysis.

STREAMLINED PROJECT PROCESS

Step 1. Small-project applicants submit a two-page application. Large-project applicants submit a three-page application with a scope of work, budget, and schedule.

Step 2. NYSERDA convenes a Technical Evaluation Panel (TEP) to review submissions and make funding recommendations.

Step 3. Purchase Order is issued.

Step 4. The Detailed Scope of Work is finalized.

Step 5. Project is executed.

Step 6. Once project is completed, study results are submitted. After review by NYSERDA, report is finalized.

Step 7. NYSERDA pays final invoice from customer.

- Minimal paper work.
- Cost-sharing, leading to greater leveraging of public funds and greater commitment from the program participants.
- Emphasis on increasing the number of firms capable of providing energy operations management services in New York State.

CUSTOMER PERSPECTIVES

ROCKLAND COUNTY COMMUNITY COLLEGE

Rockland County Community College is located in the Hudson Valley, approximately thirty miles northwest of Manhattan. Since 1990, the college has achieved major energy cost reductions from energy efficiency projects. In 1999, in an effort to identify additional savings opportunities, the College applied for and was approved for funding from NYSERDA's Energy Operations Management program. The funding is enabling the College to work with Strategic Power Energy Services, Inc. to develop a Master Energy Plan that will identify operations strategies for further reducing energy costs. An interim report, released in January 2000, identified a number of opportunities for improving efficiency through the modification of operation and maintenance procedures. For example, the report identified an opportunity for savings from optimizing the dual-fuel capable equipment (able to fuel switch easily between oil and gas depending on current market conditions). When the study is finalized, it is expected to include a full evaluation of the college's energy use, including (1) an assessment of operational and maintenance processes, (2) an identification of energy efficiency measures that need further study prior to acquisition, and (3) identification of opportunities for training personnel on a computerized maintenance management system (CMMS). Estimates of potential cost savings range from 6% to 10% of



Rockland Community College's Main Utility Plant

total energy costs, which translates to savings of approximately \$40,000 to \$67,000 per year.

The following comments, from Robert Schuler, PE, Director of Plant Facilities and Lorinda M. Gussow, Facilities Management Coordinator, addresses the benefits that the program has provided to Rockland Community College.

- "Securing final approval to procure new capital equipment can take from 3-5 years at the local level of government. The program is ensuring that our operations are fully optimized before looking at capital improvements while allowing us to start saving money almost immediately by identifying energy-saving opportunities."
- "The strategic planning process supported by the program helps energy managers to view energy efficiency improvements from a life-cycle perspective rather than from a simple first-cost view. In particular, the program helps get institutions to pay attention to the payback and energy savings from different operational enhancements."
- "The simple program application process developed by NYSERDA and the active support of NYSERDA program managers allows small institutions like Rockland to avoid the time and cost of securing professional grant preparation assistance."



Lorinda Gussow explains the dual-fuel boiler control system at Rockland Community College.

- "The grant provided by NYSERDA is an important mechanism for securing upper management support for undertaking the expense of completing a comprehensive energy operational assessment. NYSERDA's cost-sharing and assistance made this project possible."

GENERAL MILLS

The General Mills plant in Buffalo, New York employs approximately 400 people in the production of several cereal brands, including Cheerios. The plant recently acquired an advanced process control system to integrate and coordinate systems operation. With technical assistance from Optimization Technologies, Inc. and cost-shared funding through the Energy Operations Management program, the company expects to maximize production efficiencies from the new control system.

The system is currently monitoring the use of electricity, natural gas, steam, and compressed air in major operations areas. This tracking is being used to monitor energy usage by work shifts and to identify peak energy demand. A report that will compare daily cereal production with energy usage by energy type is in development. To date, energy cost savings have been realized through peak load shedding and overall demand reduction. For example, it was determined that several pieces of equipment with large power demands

could be idled when not in use or when approaching a utility demand peak, resulting in savings of \$20,000 to \$30,000 in annual energy costs. Other examples of potential savings include more efficient use of chilled water and reductions in air leaks and system pressure. In addition to energy savings, the project is benefitting the personnel by providing a better understanding of the new control system. The project began in July of 1999 and is expected to be completed in late 2000.

ALFRED UNIVERSITY

Alfred University, in Western New York, is a small private university founded in the early 19th century. The University has about 2,400 students, and is home to the publicly-endowed New York State College of Ceramics. With financial assistance through the Energy Operations Management program and the New York State Electric and Gas Corporation (NYSEG), and technical support from Sear-Brown, Alfred University is conducting a comprehensive evaluation of energy use in 20 campus buildings. Using data from micro-data loggers (MDLs) supplied by NYSEG, the University is developing a list of proposed energy improvements. These improvements will be evaluated to determine economic feasibility and then ranked by priority.

As a value-added benefit, mechanical engineering students assisted in the implementation of the project and received six credits toward completing their senior mechanical engineering design project, a prerequisite to graduation. Students assisted Sear-Brown technical consultants in the installation of instrumentation, in the downloading and analysis of the data from the equipment, and the development of demand curves for each of the 20 buildings instrumented. They also assisted in conducting a thorough energy audit of each instrumented building. These audits tracked energy use to various devices in each building, including heat pumps, lights, copy machines, and motors.

General Mills plant in Buffalo





Alfred University's Powell Campus Center.

"Our students in the senior mechanical engineering design project had a real-world type of experience in that we treated them as employees working on a job. We identified goals and objectives and then they had to figure out a schedule to make measurements, when they had to finish, which buildings [instruments] had to be put in, when to collect the data at each of the buildings, and how to remediate problems when they were not getting the data they expected."

– DR. WILLIAM F. HAHN, CHAIRMAN,
MECHANICAL ENGINEERING DEPARTMENT

Table 1 presents a summary of the preliminary recommendations identified through the auditing and evaluation activities at Alfred University to date. Potential energy savings have been identified in four categories: motors, lighting, energy accounting awareness, and personal computer energy use.

PROGRAM PERFORMANCE: INITIAL FEEDBACK

Figure 1 depicts the growth in program participation from third Quarter of 1999 through the second Quarter of 2000. The number of program participants has increased from 10 to 63 during this time period. The participation is 110% over the three-year goal of 30 projects. As of June 30, 2000, \$1.8 million had been awarded to customers.

Figure 2 shows that most of the funding has been awarded to the institutional,

commercial, and industrial sectors.

Manufacturing firms such as General Mills are likely to find a competitive advantage in the ability to closely track energy usage.

Moreover, optimizing energy usage in long-standing institutional facilities such as Alfred University will lead to energy savings for many years.

The following observations regarding program performance are made in relation to the **New York Energy \$martSM** program goals that are of particular relevance to this program:

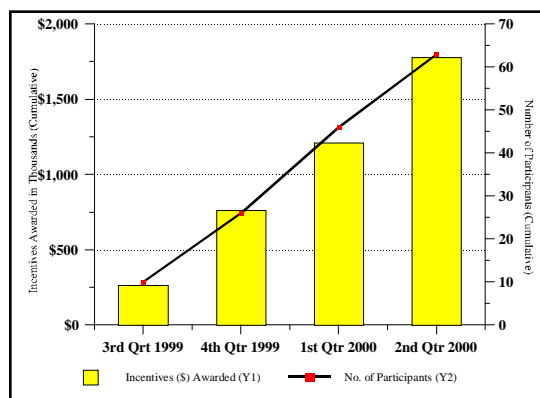


FIGURE 1: Cumulative Number of Participants and Value of Funds Awarded

Goal 1. Improve the efficiency of electricity use through cost-effective energy-efficiency measures and services.

TABLE 1: ENERGY SAVINGS RECOMMENDATION MEASURES AT ALFRED UNIVERSITY

Energy Savings Measure Period	Energy Savings (Electricity - kWh)	Annual Dollars Saved	Estimated Implementation Costs	Simple Payback (Years)
Premium Efficiency Electric Motors	48,800	\$4,970	\$20,700	4
Occupancy Sensors for Lighting	35,500	\$3,550	\$18,500	5
Energy Accounting Awareness Program	334,000	\$33,400	\$226,000	7
Personal Computer Energy Initiative	558,000	\$55,800	\$11,000	2 months
Totals	976,000	\$97,700	\$276,000	3

The Energy Operations Management program will reduce the energy costs of pro-

TABLE 2: SUMMARY INFORMATION ON THE PROGRAM PARTICIPANTS	
Expected Energy Savings	\$7.2 million/year
Expected Annual Electricity Savings	\$4.5 million/year
kWh Use Avoided	41 million kWh/year
NO _x Emissions Avoided	58 tons/year
SO _x Emissions Avoided	74 tons/year
CO ₂ Emissions Avoided	51,000 tons/year

gram participants by an average of \$114,000 per year. Table 2 provides a summary of anticipated energy cost savings and emissions reductions from current projects.

their facilities. Already, the number of service providers willing to provide energy operations management services has grown from nine at the beginning of the program to 33 contractors. Also, as noted by Dr. William Hahn (Alfred University), the program is contributing to enhancing the energy management experience of engineering students. Obviously, one project will not make a discernable difference in the availability of technical expertise to support market transformation. However, the project is suggestive of the potential role projects of this type could play in developing the scientific talent and engineering expertise necessary for New York to support a growing energy services industry.

The 63 participants are contributing a total of about \$2.7 million, or 60%, toward the cost of the projects. The average participant contribution is \$42,000 per project. Cost-sharing allows the program to leverage its resources, thereby allowing more facilities to participate in the program.

The Energy Operations Management program is encouraging operational efficiency improvements across New York State. The rapid subscription rate points to increasing awareness by facilities managers of the energy savings and other benefits that can accrue through operational enhancements. However, the current level of funding is insufficient to make significant inroads in an energy market that approaches \$11 billion dollars in spending. Particularly, large, multi-facility customers may need a program that addresses the higher funding needs of their facilities.

A survey is planned for late 2001 to determine the implementation rate of the various recommendations. The survey will also assess actual energy savings as well as qualitative benefits such as improved productivity and comfort.

Goal 2. Promote and foster the energy efficiency industry.

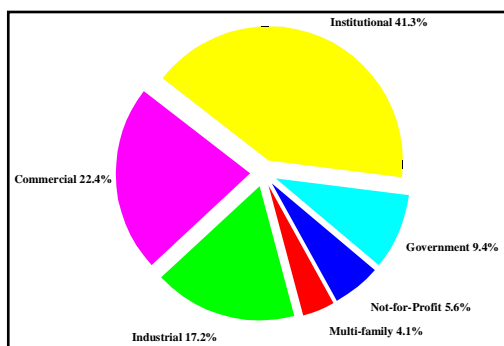


FIGURE 2: Distribution of Funds Awarded by Sector

The Energy Operations Management Program is helping to develop a critical infrastructure of contractors that can provide technical assistance to organizations interested in improving operational efficiencies in

The strong interest and response to the Energy Operations Management Program can also be attributed to NYSERDA's years of experience with the FlexTech program which has allowed it to develop and implement a program that is customer-friendly and addresses the critical needs of New York State facilities.

<p>For further information about New York Energy \$martSM programs, contact NYSERDA's Communications Department at: (518) 862-1090, ext. 3250; or visit our website: www.nyserdera.org</p>	<p>New York State Energy Research and Development Authority 17 Columbia Circle Albany, New York 12203-6399</p>
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