Niagara Mohawk Power Corp.

Commercial/Industrial Lighting

Profile #69

Executive Summary

In terms of energy savings, Niagara Mohawk's Commercial and Industrial Lighting Rebate program is the largest program that has been profiled by The Results Center. Begun in 1989 as a pilot around Albany, New York, the program was quickly ramped up to encompass all of NMPC's service territory. In 1990 the program achieved evaluated energy savings of 55 GWh, then grew to 117 GWH in 1991, before racking up an impressive 145 GWh in 1992.

One of the keys to the success of the C/I Lighting Rebate program has been the emphasis placed on both process and impact evaluations conducted for each year of the program. Through these evaluations, the program has evolved. For instance, rebate levels have been modified (mostly decreased over time), relative levels of rebates between new construction and retrofits have also been adjusted, and the list of eligible equipment has been changed to reflect both new technologies and technologies that are deemed to no longer require incentives. NMPC can tell its customers have been tracking program changes as well. In the last two weeks of 1992 NMPC received a surge of 1,000 rebate applications, signalling that its customers were well aware of the impending decreases in rebate levels for 1993!

Given the magnificent nature of the program – over three million pieces of hardware have been installed as a result of the program's three-year history – the program has been influential in transforming the market for some energy-efficient technologies. In 1992 NMPC purposefully offered rebates for eight-foot, T8 fluorescent lamps, a technology that at the time was not yet commercially available but which had been cited as an important addition to the roster of energy-efficient technologies coming into the marketplace. A few months later the eight-foot, T8s were available for consumers in NMPC's service territory, signalling the power of such a program to draw new, emerging technologies into a regional marketplace!

Finally, NMPC has reached approximately 7% of its eligible customers through the C&I Lighting Rebate program at a cost of $45.2 million. Of this total amount, fully 85%, or $38.4 million, has been spent on rebates and the remaining 15% or $6.8 million on administrative costs. Despite these enormous nominal costs and taking account of the fact that NMPC has effectively derated savings based on detailed impact evaluations, using a 5% real discount rate The Results Center calculates that the program has cost only 0.65, 1.65, and 1.56¢/kWh in 1990, 1991, and 1992, a remarkable achievement well worthy of attention and careful examination.

Commercial / Industrial Lighting Rebate

Utility:	Niagara Mohawk Power Corp.
Sector:	Commercial and industrial
Measures:	Lighting measures including: fluorescent lamps, ballasts, compact fluorescent lamps, occupancy sensors, reflectors, exit signs, and HIDs
Mechanism:	Rebates for installation of energy-efficient lighting. Pre-approval required for rebates expected to exceed $5,000
History:	Began full-scale in 1990

1992 Program Data

Energy savings:	145.1 GWh
Lifecycle energy savings:	2,031.7 GWh
Peak capacity savings (w):	19.8 MW
Cost:	$22,362,700

Cumulative Data (1990 - 1992)

Energy savings:	547.5 GWh
Lifecycle energy savings:	4,457.6 GWh
Peak capacity savings (w):	41.1 MW
Cost:	$45,190,900

Conventions

For the entire 1993 profile series all dollar values have been adjusted to 1990 U.S. dollar levels unless otherwise specified. Inflation and exchange rates were derived from the U.S. Department of Labor's Consumer Price Index and the U.S. Federal Reserve's foreign exchange rates.

The Results Center uses three conventions for presenting program savings. **Annual savings** refer to the annualized value of increments of energy and capacity installed in a given year, or what might be best described as the first full-year effect of the measures installed in a given year. **Cumulative savings** represent the savings in a given year for all measures installed to date. **Lifecycle savings** are calculated by multiplying the annual savings by the assumed average measure lifetime. **Caution:** cumulative and lifecycle savings are theoretical values that usually represent only the technical measure lifetimes and are not adjusted for attrition unless specifically stated.

Niagara Mohawk Power Corporation (NMPC) is an investor-owned utility serving the largest area of any utility in New York State. It supplies gas and electric service to approximately 1.5 million customers over some 24,000 square miles, an area extending from Lake Erie to the borders of New England, Canada, and Pennsylvania. Its service area includes Albany, New York's capitol, though its headquarters are located in Syracuse, New York.[R#1,5]

Much of the NMPC service area is subject to severe winters, as the people of the notoriously-snowy cities of Syracuse and Buffalo will attest. In fact, in March of 1991, an ice storm swept across New York State, cutting off electric service to more than 100,000 NMPC customers and to 200,000 others served by neighboring utilities. Niagara Mohawk was nevertheless able to restore power within a week after the storm.[R#6] The annual mean temperature in Albany is 47.3°F, with an average of 150 days when temperatures drop below 32°F, and an average annual snowfall of 64.3 inches. Albany has an average of 6,927 heating degree days and 494 cooling degree days each year.

As might be expected, NMPC is a winter peaking utility. In 1992, the winter peak of 6,205 MW occurred in the evening in January, and the system's summer peak of 5,762 MW was in the early afternoon in August.[R#1,5,7] In 1992, NMPC had a total electric capability of 8,272 MW, representing a 33% reserve margin. NMPC generates 64.7% (5,354 MW) of its total capacity and the remaining 35.3% is purchased. Most of the capacity is derived from thermal sources, including 15.5% coal, 18.1% oil, 8.5% dual fuel, 12.8% nuclear, 1.3% natural gas, and 0.8% purchased nuclear from the New York Power Authority. Non-utility generators supplied 1,549 MW in 1992, or 18.7% of NMPC's total capability. This comes from a variety of thermal and non-thermal sources. For hydropower sources, NMPC owns 706 MW (8.5%) and purchases 1,302 MW (15.8%) from the New York Power Authority.[R#5]

NMPC has four subsidiaries. The Canadian-based Opinac Energy Corporation operates two companies: Opinac Exploration Limited and Canadian Niagara Power Company Limited. These two companies are involved in exploration in Alberta and power generation at the Niagara Falls hydro plant in Ontario. Another of NMPC's subsidiaries is Hydra-Co Enterprises Inc., located in Syracuse. This company develops, operates, and owns cogeneration and small power plants. NMPC also owns NM Suburban Gas, Inc., a gas utility, and NM Uranium, Inc., a mining company.[R#1,7]

NMPC 1992 ELECTRIC STATISTICS

Number of Customers	1,537,346	
Electric Sales	36,611	GWh
Electric Sales Revenue	$2,924.5	million
Peak Demand	6,205	MW
Generating Capacity	8,272	MW
Reserve Margin	33.3	%
Average Electric Rates		
Residential	9.80	¢/kWh
Commercial	9.27	¢/kWh
Industrial	5.15	¢/kWh

In 1992 NMPC had 1,537,346 electric customers made up of 1,389,470 residential customers, 142,345 commercial, 2,269 industrial, and 3,262 others. Total electricity sales in 1992 decreased slightly to 36,611 GWh from the previous year total of 36,738 GWh. Electricity sales were fairly evenly distributed among the residential, commercial, and industrial sectors, at 28%, 32%, and 31% respectively.[R#5]

The number of gas customers served by Niagara Mohawk in 1992 was 488,705, made up of 448,601 residential, 39,230 commercial, and 234 industrial customers. In 1992, Niagara Mohawk Gas completed a merger with Syracuse Suburban Gas, adding 4,600 new customers. Total gas sales increased in 1992 with sales of 79.2 million dekatherms, above both the 1991 and 1990 levels. (Gas sales had dropped in 1991.) Transportation of customer-owned gas continues to increase, rising from 50.6 million dekatherms in 1991 to 65.6 million dekatherms in 1992. Most of 1992 gas deliveries were to residential customers (37%), and 45% of the gas deliveries were transportation of customer-owned gas.[R#5] ■

Utility DSM Overview

In 1990, the Niagara Mohawk Power Corporation launched 11 demand-side management programs targeted at the residential, commercial, and industrial sectors of its service territory. In 1991, the programs were expanded under the name "Niagara Mohawk Reducing Plan" to include farm and nonprofit and public sector operations.[R#2] In the first two years of operation, DSM programs served over 400,000 customers (approximately 25% of Niagara Mohawk's electric customer base) and generated savings of 295 GWh. In 1992, three new programs were established, one program was discontinued, and one program was not marketed. For 1992, peak load savings as a result of the DSM programs were 57 MW in the summer and 41 MW in the winter. In 1992, NMPC spent $54.4 million on DSM, representing 1.9% of its gross revenues.[R#2,3,4,18]

DSM Overview	*Annual DSM Expenditure (x1000)*	*Annual Energy Savings (GWh)*	*Annual Summer Peak Capacity Savings (MW)*	*Annual Winter Peak Capacity Savings (MW)*
1990	$17,026	84.38	30.84	33.18
1991	$42,779	210.99	94.98	111.45
1992	$54,418	312.85	57.47	41.18
Total	$114,222	608.22	183.28	185.81

NIAGARA MOHAWK DSM PROGRAMS

A) RESIDENTIAL
- Energy Saver's Kit
- ReHeat
- Value Plus
- Night Shift
- High-Efficiency Lighting
- Refrigerator Roundup
- Demand Savings for Multi-Family Buildings

B) FARM
- Energy Efficient Farmstead Program

C) NONPROFIT/PUBLIC SECTOR
- Energy Assistance Pilot Program

D) COMMERCIAL/INDUSTRIAL
- **Commercial/Industrial Lighting Program**
- High Efficiency Motors and ASD Program
- Innovative Rate Programs
- Power Partner Programs
- Custom Incentives
- New Construction
- Direct Installation

E) INFORMATION
- Residential Bill "Disaggregation" Analysis
- C/I Energy Mgmt. Service: Load Expert
- C/I Energy Analysis
- Integrated DSM Communications

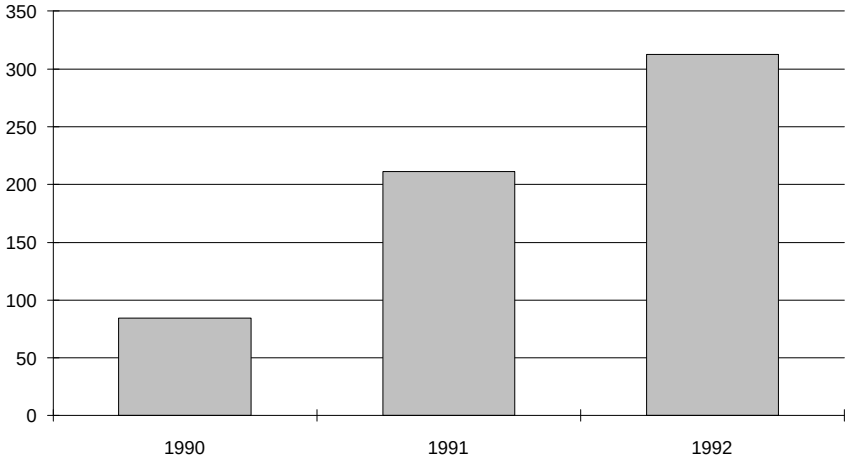
Implemented by Niagara Mohawk's Consumer Services and Regional Sales departments, the Reducing Plan offers cash incentives and rebates for the purchase or installation of energy-efficient lighting, space conditioning equipment, water heating equipment (for residential and farm customers only), motors, and adjustable speed drives. The Plan also has informational programs that offer technical assistance, computer modeling, and free energy audits.[R#2,3]

For example, the Residential Low Cost Measures Program, with over 27 GWh in savings in 1992, provides residential customers with a free Energy Saver's Kit with four low-cost, energy-saving devices. In the commercial/industrial sector, the lighting program (the subject of this profile) has achieved more than 318 GWh in total annual energy savings from 1990 through 1992. The High Efficiency Motors and Adjustable Speed Drives Program, (See Profile #41), has achieved significant savings and participation rates, exceeding its 1992 savings goal by more than 770 percent.[R#2,4,18]

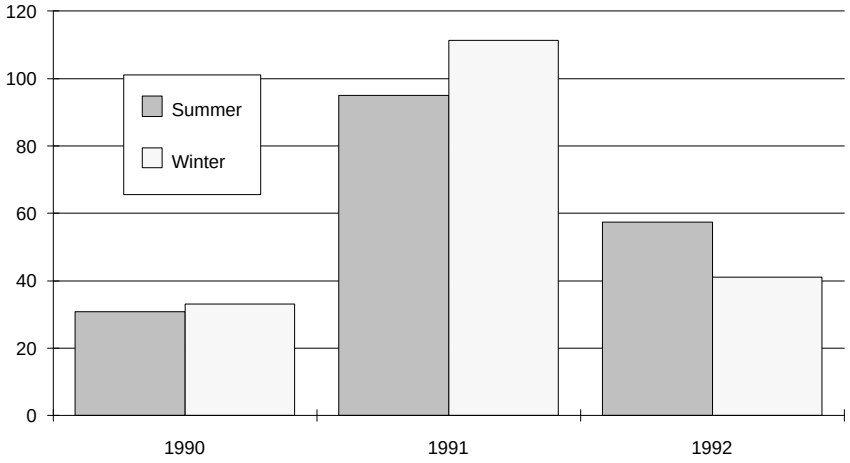
In 1993, Niagara Mohawk is implementing 20 demand-side management programs and has several more in the testing and pilot stage. The programs are monitored by the Resource Economics and Program Evaluation Group and incentives are calculated by the Demand Side Planning Group which is also responsible for incorporating evaluation results into system planning functions.[R#2,12] ■

ANNUAL DSM EXPENDITURE ($1,000,000)

ANNUAL ENERGY SAVINGS (GWH)



ANNUAL CAPACITY SAVINGS (MW)



Program Overview

NMPC's C&I Lighting Rebate program was first initiated in November 1989 around the City of Albany, New York's capitol. Due to a state mandate the program was quickly expanded to encompass all of NMPC's service territory by March 1990. The program offers rebates to commercial and industrial customers who install energy-efficient lighting equipment in their facilities.

The program's straightforward design and implementation have made it popular among NMPC's customers. Customers apply for pre-approval if the rebate is expected to exceed $5,000, or if the rebate will be less than $5,000, then the customer simply proceeds with purchase and installation of the eligible measures. After measures are installed, the customer submits a rebate application, which is verified and processed by NMPC.

Rebate checks are typically issued within four to six weeks of receipt of a complete rebate application, however, backlogs sometimes occur. For example, over 1,000 rebate applications were received in the last two weeks of December, 1992. This situation resulted because changes for the 1993 program became effective on September 1, 1992. The 1993 rebate levels were significantly lower than the 1992 levels, and NMPC allowed any rebate application preapproved before September 1, 1992 and installed by December 31, 1992 to be eligible for the 1992 rebate levels. While NMPC was able to process some of these rebates within the promised time frame, many were delayed, due to the sheer quantity of rebates NMPC was trying to process.[R#11]

From the time of program initiation, NMPC embarked on a three-year evaluation effort. Recommendations are made each year regarding process and evaluation methodologies, and NMPC can decide which recommendations to pursue in an effort to optimize the program.

Due in large part to this evaluation strategy, NMPC has implemented considerable changes in the program each year. Six changes were made in the 1991 program. First, specific criteria were added for reflectors to ensure that proper installations would be made and expected savings would be realized. Second, incentives for T8 fixtures and ballasts were changed from a single rebate level to an incentive based on the number of ballasts. Third, rebates for lighting controls (current limiters) were dropped due to the development of other energy-efficient technologies.

Fourth, a separate program with lower rebate levels was developed for new construction projects in an effort to encourage proper lighting design and reduce free ridership. The new construction program does not include rebates for HIDs, or reflectors, and only hard-wired compact fluorescents are eligible for rebates. Program designers thought that hard-wired compact fluorescents should be used instead of single-modular units, that HIDs were becoming standard, and that reflectors would not be necessary if good lighting design was done in the first place. Fifth, due to a short-term shortage of electronic ballasts within the service area, NMPC doubled the rebate for hybrid ballasts for a 90-day period to encourage their use. Finally, in the middle of 1991, NMPC dropped a requirement that NMPC would pay the lesser of the established rebate level or 75% of the measure cost.

In the 1992 program, several more changes were made. T12 34 watt lamps were dropped from the rebate list as it was found that these were becoming standard purchases. Also, rebates for T8 lamps were increased and a requirement was added that they be purchased with ballasts. Interestingly, in an effort to stimulate production of eight-foot T8 lamps, NMPC included a rebate level for these lamps even though this equipment was not being manufactured. (Eight-foot T8 lamps did become commercially available at the beginning of 1993.)[R#10] For the 1992 program, rebate levels for compact fluorescents and reflectors were reduced; rebates for electronic ballasts were changed to vary depending on the level of total harmonic distortion. Three new rebate levels were instituted for HID lighting depending on their wattage levels, and LED exit signs were added to the rebate list.

The changes for 1993 included a restriction that initial light levels from a retrofitted luminaire must be a minimum of 15 percent above the mid-level that the Illumination Engineering Society recommends for the task illuminated. A new pre-approval requirement was added in 1993 for rebate applications for equipment that replaces high-efficiency equipment or equipment purchased, installed, or rebated under a previous NMPC lighting program. Rebate levels dropped for most equipment, and ballasts with total harmonic distortion greater than 20% were no longer eligible for rebates.[R#10] ■

MARKETING

The C&I Lighting program is marketed primarily through direct mail and bill inserts to eligible customers. In addition, NMPC's representatives actively market the program to eligible customers. NMPC also works with contractors and dealers to market the program. Print advertising in newspapers and trade journals is used to a limited extent.

Each of the program evaluations conducted for the 1990, 1991, and 1992 program years included an investigation into participants' and non-participants' awareness of the program. The 1990 survey included 235 participants and 315 non-participants, the 1991 survey was of 550 participants and 1,134 non-participants, and the 1992 survey included 447 participants and 1,048 non-participants. Of the participants surveyed in 1990, 1991, and 1992 respectively, the following sources of awareness were cited: 43%, 49%, and 40% indicated that they had heard of the program through separate NMPC mailings; 31%, 25%, and 38% heard of the program from dealers or contractors; 18%, 17%, and 16% learned of the program directly from NMPC representatives. Of the non-participants surveyed each year who were aware of the program, 78% in 1990, 67% in 1991, and 65% in 1992 indicated that NMPC mailings were their source of information about the program. The 1991 and 1992 non-participants were more likely to have learned of the program through an NMPC representative (13% in 1991 and 14% in 1992) than through a contractor (7% in 1991 and 10% in 1992). In contrast, 9% of 1990 non-participants heard about the program through a dealer or contractor, and 5% heard through an NMPC representative. Large customers (with demands greater than 1,000 kW), whether participants or non-participants, most frequently cited NMPC representatives as their information source.[R#8,9,10]

DELIVERY

Once a customer has learned of the program and decided to participate, the customer, with the help of an NMPC representative or a trade ally, must estimate the amount of the rebate. In order to discourage customers from applying for several small rebates, NMPC limits customers to two rebates per year. A pre-approval form must be completed for rebates of more than $5,000, new construction projects, projects using specular reflectors, or projects replacing existing high-efficiency equipment or equipment which was previously rebated by NMPC.

NMPC's service area is divided into three divisions and further divided into 11 regions. Each region has several Customer Contact Representatives and one Division Lighting Specialist. These personnel are responsible for reviewing and approving pre-approval forms. A Customer Contact Representative is assigned for each individual project and is primarily responsible for maintaining communication with the customer and facilitating the rebate process.

After pre-approval is received (if required), the customer may proceed with purchase and installation of the qualifying equipment. Upon completion of the installation, the customer submits a rebate application form to NMPC's System Sales and Technical Services/Marketing Information Services department for review. At this point, it is determined whether a post-installation inspection is required. Post-installation inspections are necessary if the rebate amount is more than $2,000, if there is suspect information on the rebate application, or if the project is one of the 10% that the Customer Information Management System (CIMS) has randomly selected for a post-installation audit. The Customer Contact Representative is responsible for conducting the post-installation audit, verifying the application, and completing the Rebate Verification Form.

All projects are reviewed by the System Marketing Information Services department before a rebate check may be issued. Rebate checks are usually sent to the Area Manager, who distributes checks to the Area Contacts for delivery to the customer. The time between submittal of the rebate application form and when the customer receives their rebate check varies from one to three months.[R#17]

NMPC provides training to keep staff informed about the lighting program, to instruct in the proper completion of rebate applications, and to ensure that staff are adequately prepared to deal with customer inquiries. One course for the staff, entitled "The Basics of Lighting," lasts two and one-half days and covers specifics about the lighting program as well as a general lighting technology overview. Another course, "Advanced Lighting Topics," is offered through Rensselaer Polytechnic Institute's Lighting Research Center (see The Results Center Profile #57).[R#17] ☞

1993 Rebates for Existing Structures

Fluorescent lamps

T8 3-foot, 4-foot, or 8-foot lamp with ballast	$1.00

Fluorescent lamp ballasts

T12 Electronic < 20% THD	$10.00
T12 Hybrid < 20% THD	$10.00
T8 Dedicated < 20% THD	$20.00

Compact fluorescent lamps

Single piece compact unit <= 27 watts	$4.00
Screw-in modular unit <= 27 watts	$8.00
Hard-wire compact fluorescent fixture <= 27 watts	$10.00

Exit signs

Fluorescent hard-wire conversion kit	$10.00
LED exit signs	$50.00

Reflectors

per fixture	$10.00

Occupancy sensors

Wall or ceiling mounted sensors	$25.00

HIDs

Hard wired HPS or MH < 100 watts	$30.00
Hard wired HPS or MH 100 - 249 watts	$45.00
Hard wired HPS or MH >= 250 watts	$90.00

1993 Rebates for New Construction

Fluorescent lamps

T8 energy-saving lamp with ballast	$0.50

Fluorescent lamp ballasts

Solid-state electronic T8 ballast < 20% THD	$10.00

Compact fluorescent lamps

Hard-wire compact fluorescent fixture	$5.00
Fluorescent exit signs	$5.00
LED exit signs	$40.00

Occupancy sensors

Wall or ceiling mounted sensors	$15.00

MEASURES INSTALLED

A variety of energy-efficient lighting measures are installed through the C&I Lighting Rebate program. Measures included in the program and the corresponding 1993 rebate levels are shown in the table at left.

Only 12% of rebate applications are for amounts exceeding $5,000. However, these rebates exceeding $5,000 account for 74% of all rebate dollars awarded. A majority of applications (60%) are for rebates of less than $1,000.[R#12]

STAFFING REQUIREMENTS

The C&I Lighting Rebate program is primarily administered by its full-time program coordinator, Brandon McKnight. He is responsible for program planning, design, regulatory filings, and marketing. NMPC's service territory is divided into three divisions through which customer services are administered. Each division has an Energy Utilization department which serves as the key link between the NMPC's DSM managers and the customer relations personnel. Within the Energy Utilization department in each division is a lighting specialist who is responsible for implementation, monitoring, and analysis for the C&I Lighting Rebate program.

The program is marketed to customers by the Consumer Relations personnel. There are 70 to 80 Consumer Relations staff in each division who are responsible for handling all commercial and residential customer services, including high bill complaints, service problems, and DSM queries. Thus, the Consumer Relations personnel have the contact and knowledge of individual customers that enables them to identify appropriate potential customers for the C&I Lighting Rebate program.[R#12]

Rebate processing, technical assistance, and customer inquiries are handled by Sales and Technical Services specialist Jeff Chiodo who supports the field representatives. Customer inquiries are also handled by the Marketing Programs and Services coordinator. Clerks are responsible for rebate processing, including application reviews, approvals of rebates less than $5,000, and entry of information into the CIMS tracking system. ■

MONITORING

All of NMPC's DSM programs are tracked via the Customer Information Management System (CIMS), a computerized database system. After rebate application forms are verified, the information regarding the customer, customer account number, facility description, number and type of measures installed, and amount of rebate are entered into the system. The CIMS database contains over 80 fields used by the C&I Lighting Rebate program. The system has three components: Customer Activity Tracking, Proposal Tracking, and Rebate Processing.

All rebates for amounts more than $5,000 must be pre-approved. NMPC representatives verify that installations are eligible for rebates and conduct post-installation inspections for every installation subject to pre-approval. Additionally, for smaller rebate applications where the installation seems questionable or the rebate form has been improperly filled out, a post-installation inspection is conducted to ensure that qualifying equipment was installed and the application was appropriate. In early 1993, NMPC's evaluation group conducted on-site inspections of 1992 program participants, visiting 87 sites. NMPC targeted schools, hospitals, and offices.[R#12] Additionally, 10% of all rebates under $2,000 are randomly selected for verification.

EVALUATION

PROCESS EVALUATION

The monitoring and evaluation plan for the C&I Lighting Rebate program includes three annual process and impact evaluations which were completed in July of 1991, 1992, and 1993. NMPC contracted Xenergy, Inc. to conduct and publish the evaluations. The impact evaluations included discussion of gross and net impacts, including estimation of free-ridership, and a detailed cost analysis. Process evaluations included discussion of program data issues, operational performance from both the customer and the utility perspective, and a market analysis. The evaluations served to document the program's evolution and to make recommendations for improvement in the program marketing, administration, and delivery mechanisms.

In the first-year evaluation completed in June 1991, it was found that 79% of the 1990 program participants were either very satisfied or satisfied with the program. In 1991, 84% were very satisfied or satisfied, and in 1992, the figure increased to 87%. Each year, the most frequently cited factors in participants' satisfaction were saving money, prompt receipt of the rebate check, and satisfaction with the new lighting equipment.[R#8,10] The number of dissatisfied participants dropped from 9% in 1990 to 5% in 1991 and 4% in 1992 (note that some customers surveyed were neutral or did not answer the question). The most common reason for dissatisfaction each year was delay in receiving the rebate check.

The market analysis conducted as part of the first and second year evaluations was particularly valuable to program planners. The analysis investigated product saturation levels for non-participants and participants. The lowest saturation level was for lighting controls and occupancy sensors, at 1% and 3% saturation, respectively. Compact fluorescent units had a saturation rate of 5% as did energy-efficient magnetic ballasts. Electronic and hybrid ballasts had 10% saturation, fluorescent exit signs had 21% saturation, energy-efficient lamps had 34% saturation, and energy-efficient HID lamps had the highest saturation level at 78%. Significant differences in saturation levels were found between non-participants and participants for HID lamps (77% saturation for non-participants and 92% for participants), compact fluorescent lamps (5% and 18%), energy-efficient lamps (34% and 62%), electronic and hybrid ballasts (10% and 43%), and occupancy sensors (2% and 7%).[R#8]

In 1991, the saturation levels for compact fluorescent lamps, fluorescent exit signs, and occupancy sensors increased dramatically from their 1990 levels. The saturations went from 5% to 27% for compact fluorescents, 21% to 42% for exit signs, and 3% to 10% for occupancy sensors.[R#9]

The market analyses also evaluated the number and types of participants in 1990 and 1991. Hospitals had the highest participation in 1990 and 1991, with 14.2% of all eligible hospitals participating by the end of 1991. Elementary and secondary schools also had a high penetration, with 11.3% of the 2,140 customers in this sector participating by 1991. The lowest participation was by restaurants and bars, at 0.8% of this sector, and retail businesses, at 0.5%. The market analysis also found that larger ☞

customers participated six times more frequently than small customers in 1990.

IMPACT EVALUATION

Impact evaluations in 1990, 1991, and 1992 were done using several assumptions to estimate the savings attributable to the program. The algorithms used in the analysis included the following variables: number of units, measure savings per unit (in watts), full load hours, coincidence factor, demand factor, interaction factor, and control factor.

Number of units and measure savings were determined based on data available from the CIMS database. In 1990, savings for each measure type were based on a standard assumption regarding the type of equipment installed and replaced. Due to difficulties in correlating installed measures with replaced equipment, savings in 1990 were not based on the actual equipment replaced.[R#8] However, new coding in the 1991 program facilitated analysis of program impacts based on products installed and the equipment which was replaced.[R#9]

Cooling bonuses and heating penalties were incorporated into all gross savings calculations. The evaluation assumed that the summer system peak occurs at 2:00 pm and the winter system peak occurs at 6:00 pm.

Hourly coincidence factors and full load hours for different building types were derived from a study that Xenergy had done for the New England Electric System. For 1992 participants in the hospital and school sectors who participated between January and August 1992, full load hours and coincidence factors were derived from an on-site verification study discussed below.

In 1990, a demand factor (the ratio of maximum demand to capacity for an end-use) was assumed to be 70%; in 1991 and 1992, a demand factor of 90% was assumed.

Net impacts were determined by evaluating free ridership and free drivership for each measure, and adjusting the savings appropriately. Low and high estimates of free ridership were made. The high estimate included all participants who indicated that they would have implemented some or all measures without the program. However, the evaluation found that participants tend to overreport their intentions for energy efficiency. For example, 38% of the respondents indicated they had installed T8 lamps, but only 3.5% of all rebates were for T8s. Thus, a low estimate was generated which eliminated from the free ridership count those participants who had not implemented any conservation measures prior to their participation in the C&I Lighting Rebate program.[R#8]

In addition to producing gross and net system impacts, the evaluation also generated load shape impacts for 12 different representative days (peak day, average weekday, and average weekend for winter, spring, summer, and fall).

ON-SITE VERIFICATION STUDY

The 1992 evaluation included on-site verification of savings achieved by a number of hospitals, offices, and schools. These sectors were chosen because historically they have represented about 30% of program participants. On-site visits were conducted at 14 hospitals, 85 offices, and 55 schools, with 25 of the hospitals and schools being metered.

A survey instrument was developed to collect standardized data on building characteristics, operating hours, facility use patterns, and interior and exterior lighting installations. “Energy Eye” loggers were installed on lighting equipment according to established protocols. On average, one logger was installed for each 0.5 kW saved at the site.

Data from the on-site verification was used to establish full load hours and winter coincidence factors for the hospital and school sectors. The results indicated that self-reported full load hours were significantly greater than the full load hours as measured by the loggers. The full load hours used in the previous impact evaluations had been derived from secondary load shapes. The measured full load hours were 78% of the secondary load shape full load hours for the hospital sector, and 74% for the schools.

Similarly, the on-site surveys revealed that winter coincidence factors were overestimated by the secondary load shapes used in previous impact evaluations. For hospitals, the measured winter coincidence factor was 0.42, compared to 0.55 previously assumed; for schools, the factor was 0.25, compared to 0.66 previously used.[R#10] ■

Data Alert: All program savings reported below are net impacts, adjusted for free ridership as reported in NMPC's annual evaluations. Free ridership for 1990 and 1991 was approximately 13%. The 1992 figures reflect the "midpoint" free ridership estimate, in which net impacts were 77% of the gross impacts, for a free ridership estimate of 23%.[R#8,9,10]

Between 1990 and 1992, the C&I Lighting Rebate program has achieved total annual energy savings of 318 GWh, cumulative summer coincident peak demand savings of 75.8 MW, and cumulative winter coincident peak demand savings of 41.1 MW. Lifecycle savings totalled 4,457 GWh between 1990 and 1992.[R#8,9,11]

Annual energy savings more than doubled in the second year of the program. The increase in savings from 1990 to 1991 is attributed to the increase in the number of measures installed by participants.[R#9] The savings increase between 1991 and 1992 is more likely attributable to the growth in the number of participants.

Annual summer coincident peak capacity savings were 12.7 MW in 1990, 26.9 MW in 1991, and 36.2 MW in 1992. The winter coincident peak capacity savings figures also nearly tripled between 1990 and 1992, from 6.8 MW in 1990 to 14.5 MW in 1991, to 19.8 MW in 1992.

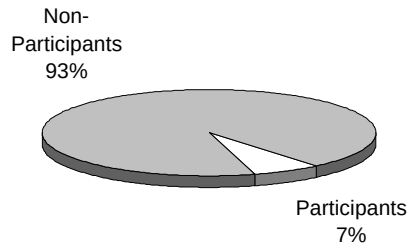
Installation of electronic ballasts, reflectors, and energy-efficient lamps (T8s and T12s) were responsible for the majority of each years' program savings. In 1990, electronic and hybrid ballasts contributed 28% of program savings, reflectors contributed 17%, and energy-efficient lamps contributed 21%. In 1991, the figures were 42%, 17%, and 13% of total savings, respectively; in 1992, the figures were 36%, 27%, and 13%.[R#8,9,10]

PARTICIPATION RATES

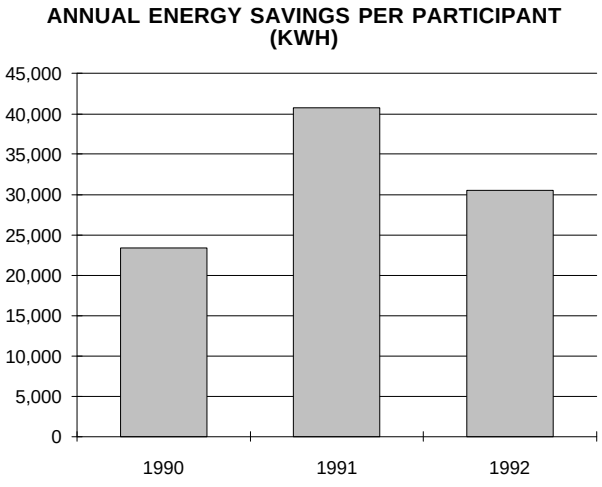
As part of the annual evaluation effort, a detailed market analysis was completed for each of the program years 1990 and 1991. Discussion of some of the results of this analysis may be found in the Monitoring and Evaluation section.

Participation	*Participants*	*Annual Energy Savings per Participant (kWh)*
1990	2,392	23,356
1991	2,881	40,753
1992	4,755	30,520
Total	10,028	

Participants are defined as individual customer accounts that apply for a rebate and install the lighting equipment in a given year. Thus, if a customer applies for

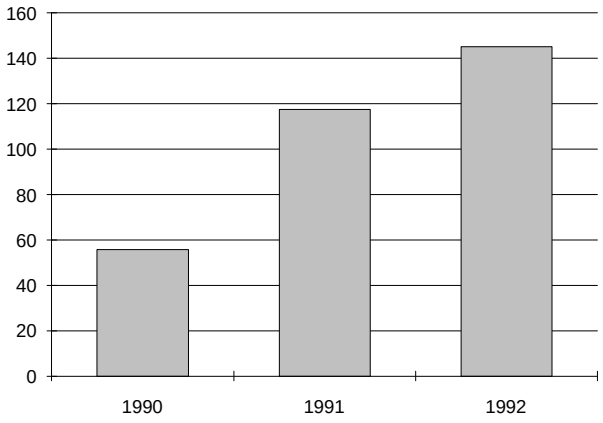


rebates in two years, that customer would be counted once in each year. Furthermore, a customer who installs lighting equipment at the end of the year, but does not ☞

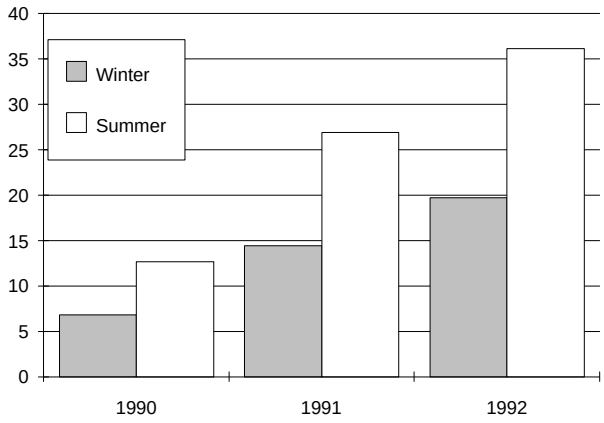


Savings Overview	*Annual Energy Savings (MWh)*	*Cumulative Energy Savings (MWh)*	*Lifecycle Energy Savings (MWh)*	*Annual Summer Peak Capacity Savings (MW)*	*Cumulative Summer Peak Capacity Savings (MW)*	*Annual Winter Peak Capacity Savings (MW)*	*Cumulative Winter Peak Capacity Savings (MW)*
1990	55,868	55,868	782,156	12.711	12.711	6.836	6.836
1991	117,410	173,279	1,643,745	26.913	39.624	14.464	21.300
1992	145,121	318,400	2,031,699	36.193	75.817	19.757	41.057
Total	318,400	547,547	4,457,600	75.817		41.057	

ANNUAL ENERGY SAVINGS (GWH)

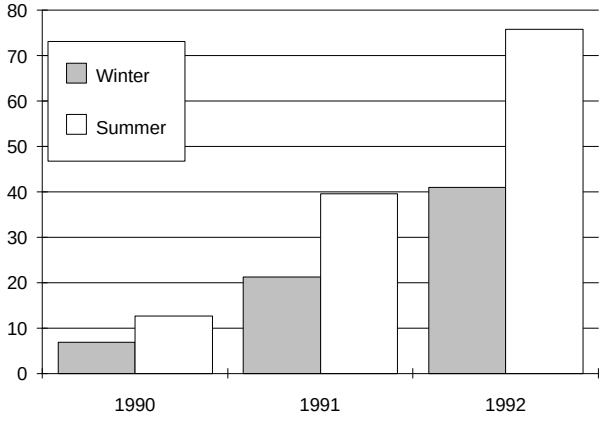


ANNUAL PEAK CAPACITY SAVINGS (MW)



CUMULATIVE ENERGY SAVINGS (GWH)

CUMULATIVE PEAK CAPACITY SAVINGS (MW)



receive the rebate check until the following year, would still be counted as a customer in the installation year.

In the three years of operation, a total of 10,028 rebates were paid. All 147,000 commercial and industrial customers of NMPC are eligible to participate in the C&I Lighting Rebate program. Thus, the total penetration is approximately 7%, assuming a minimal number of repeat participants.

Energy savings per participant increased significantly between 1990 and 1991, from 23.4 MWh to 40.8 MWh, reflecting an increase in the number of measures installed by participants. The increase may also be partially attributed to installation of measures with higher savings per measure. Energy savings per participant decreased between 1991 and 1992 from 40.8 MWh to 30.5 MWh respectively.

Participation may also be defined as the number of individual measures installed each year. In 1990, more than 314,000 measures were rebated, including 201,209 energy saving fluorescent lamps (T8 and T12), 69,949 electronic fluorescent ballasts, and 11,179 T8 fluorescent fixtures with electronic ballasts.[R#8] In 1991, 1.28 million measures were installed, including 496,625 T12 4-foot 34 watt lamps, 292,304 4-foot 2-lamp ballasts, 104,484 T8/electronic ballasts, and 98,237 4-foot 2-lamp hybrid ballasts.[R#9] In the 1992 program goal year, (January 1992 to December 1992) 1.7 million measures were installed, including 577,533 4-foot T8 lamps, 249,431 4-foot 2 lamp T8/electronic ballasts, and 210,293 T12 4-foot 34 watt lamps.[R#10]

FREE RIDERSHIP

Free ridership was evaluated through a "Discrete Choice" analysis. This method compares customers who are aware of the program (both participants and non-participants), with those non-participants who are not aware of the program. The model used incorporated the fact that customers' decisions are not limited simply to whether or not to install specific equipment, but to how much equipment to install. The analysis produced population-weighted determinations of free ridership for each of nine classes of measures included in the C&I Lighting Rebate program. In 1991, the free ridership values ranged from a high of 21% for compact fluorescents and T12 lamps, to a low of 8% for ballasts.[R#9] Gross program impacts for each measure type were then reduced by the corresponding free ridership factor. The weighted average of free ridership was 13% in 1990 and 1991, so net impacts as shown in the Savings Overview Table, are 87% of gross impacts.

For 1992, free ridership was estimated at three levels: lower, mid-point, and upper. The mid-point estimate ranged from 28% for compact fluorescents, to 15% for high efficiency T8 lamps, to 0% for high-efficiency T12 lamps. The weighted average was 77% and net impacts shown in the Savings Overview Table for 1992 represent 77% of the gross impacts for that year.[R#10]

MEASURE LIFETIME

NMPC used an average lifetime of 14 years in its analyses of the C&I Lighting Rebate program.[R#9] Thus, The Results Center used 14 years in calculating lifecycle savings in the Savings Overview Table and cost of saved energy as shown in the Cost of the Program section.

PROJECTED SAVINGS

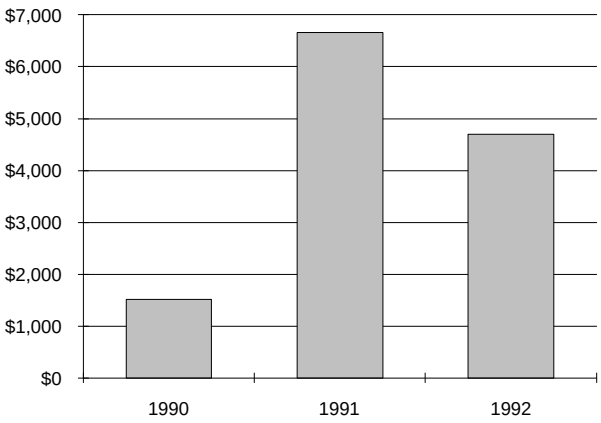
In 1990 and 1991 respectively, the program reached the following amounts toward its goals: 100% in 1990 and 123% in 1991 of its participation goal; 56% and 92% of its energy savings goal; 79% and 96% of its summer peak demand reduction goal; and 74% and 53% of its winter peak demand reduction goal. Differences between savings goals and achievements were attributed to differences in the distribution of lighting measures installed from that used in the program plan, and to improvements in the accuracy of data used for impact evaluation.[R#3,4] ■

Cost of the Program

Costs Overview	*Office Supplies, Data Processing, Outside Services, and Equipment (x1000)*	*Labor (x1000)*	*Marketing (x1000)*	*Evaluation (x1000)*	*Rebates Paid (x1000)*	*Total Program Cost (x1000)*	*Cost per Participant*
1990	$369.4	$1,129.5	N/A	N/A	$2,120.6	$3,619.5	$1,513.17
1991	$243.9	$1,738.2	$301.3	$315.3	$16,610.0	$19,208.7	$6,667.38
1992	$241.6	$1,960.2	$157.6	$323.1	$19,680.3	$22,362.7	$4,702.99
Total	$854.9	$4,827.9	$458.9	$638.4	$38,410.8	$45,190.9	

TOTAL PROGRAM COST (x1,000)

COST PER PARTICIPANT



Cost of Saved Energy (¢/kWh)	*Discount Rates*						
	3%	4%	5%	6%	7%	8%	9%
1990	0.57	0.61	0.65	0.70	0.74	0.79	0.83
1991	1.45	1.55	1.65	1.76	1.87	1.98	2.10
1992	1.36	1.46	1.56	1.66	1.76	1.87	1.98

Between 1990 and 1992 NMPC spent a total of $45.2 million on the C&I Lighting Rebate program. Administrative costs increased from $1.5 million in 1990 to $2.6 million in 1991, to $2.7 million in 1992. Costs for rebates increased from $2.1 million in 1990 to $16.6 million in 1991, to a whopping $19.7 million in 1992.

COST EFFECTIVENESS

NMPC has performed cost-effectiveness tests on the C&I Lighting Rebate program. Results of the benefit/cost tests for 1990, 1991, and 1992 respectively were as follows: 4.05, 9.28, 7.01 on the Participant's Test; 6.22, 3.16, 3.01 on the Utility Test; 3.62, 3.20, 3.33 on the Total Resource Cost Test; 3.95, 4.24, 4.19 on the Societal Test; and 1.06, 0.39 0.51 on the Ratepayer Impact Test.[R#8,9,12]

The Results Center calculated the cost of saved energy for this program based on total annual costs and annual savings as shown in the Cost of Saved Energy Table. Based on a 14-year lifetime, the cost of saved energy ranged from 0.57 to 0.83 ¢/kWh in 1990, 1.45 to 2.10 ¢/kWh in 1991, and 1.36 to 1.98 ¢/kWh in 1992, depending on the discount rate used. The increase in cost of saved energy in 1991 may be due either to the distribution and type of measures installed, or to the fact that some rebates paid in 1991 were for measures installed (and savings accrued) in 1990.

COST PER PARTICIPANT

The Results Center calculated cost per participant ranging from $1,513 in 1990 to $6,667 in 1991, to $4,703 in 1992. As with the cost of saved energy, the increase in costs from 1990 to 1991 may be attributable to the number and type of measures installed, or to the disconnect between accounting for participants and costs each year.

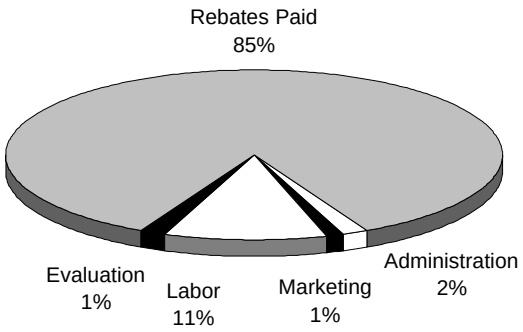
The average rebate paid (determined by dividing the yearly rebate cost by the number of participants each year) rose dramatically from 1990 to 1991, from $886 per participant to $5,765 per participant. The average rebate dropped in 1992 to $4,139 per participant.

In terms of customers costs, NMPC estimated that in 1990 customers spent a total of $6.4 million on measures and installation, before rebates. In 1991, the total was $33.7 million, and in 1992 the total was $46.0 million before rebates.[R#8,9,10]

COST COMPONENTS

NMPC broke down administrative costs somewhat differently in each year of the program. In 1990, total administrative costs were $1,498,900 including 75% for labor; 9% for office supplies and equipment; 9% for contractor services (evaluation); and 7% for consulting services. In 1991, administrative costs totalled $2,598,700. These costs were comprised of labor and data processing at 67%; advertising at 12%; evaluation at 12%; office supplies and equipment at 8%; and outside services at 1%. In 1992 administrative costs totalled $2,682,400 with 74% for labor and data processing; 6% for advertising; 12% for evaluation; 6% for office supplies and equipment; and 2% consultants.

As shown in the pie chart a total of $45.2 million has been spent over three years, with 85% or $38.4 million being spent on rebates and the remaining 15% or $6.8 million on administrative costs. The percent of total costs spent on rebates has risen each year, with proportionate drops in the administrative cost expenditures as the program has matured. In 1990, nearly 59% of costs were on rebates, with the expenditure increasing to 85% in 1991 and 88% in 1992. ■



Environmental Benefit Statement

In addition to the traditional costs and benefits there are several hidden environmental costs of electricity use that are incurred when one considers the whole system of electrical generation from the mine-mouth to the wall outlet. These costs, which to date have been considered externalities, are real and have profound long term effects and are borne by society as a whole. Some environmental costs are beginning to be factored into utility resource planning. Because energy efficiency programs present the opportunity for utilities to avoid environmental damages, environmental considerations can be considered a benefit in addition to the direct dollar savings to customers from reduced electricity use.

The environmental benefits of energy efficiency programs can include avoided pollution of the air, the land, and the water. Because of immediate concerns about urban air quality, acid deposition, and global warming, the first step in calculating the environmental benefit of a particular DSM program focuses on avoided air pollution. Within this domain we have limited our presentation to the emission of carbon dioxide, sulfur dioxide, nitrous oxides, and particulates. (Dollar values for environmental benefits are not presented given the variety of values currently being used in various states.)

HOW TO USE THE TABLE

1. The purpose of the accomanying page is to allow any user of this profile to apply Niagara Mohawk's level of avoided emissions saved through its Commercial/Industrial Rebate program to a particular situation. Simply move down the left-hand column to your marginal power plant type, and then read across the page to determine the values for avoided emissions that you will accrue should you implement this DSM program. Note that several generic power plants (labelled A, B, C,...) are presented which reflect differences in heat rate and fuel sulfur content.

2. All of the values for avoided emissions presented in both tables include a 10% credit for DSM savings to reflect the avoided transmission and distribution losses associated with supply-side resources.

3. Various forms of power generation create specific pollutants. Coal-fired generation, for example, creates bottom ash (a solid waste issue) and methane, while garbage-burning plants release toxic airborne emissions including dioxin and furans and solid wastes which contain an array of heavy metals. We recommend that when calculating the environmental benefit for a particular program that credit is taken for the air pollutants listed below, plus air pollutants unique to a form of marginal generation, plus key land and water pollutants for a particular form of marginal power generation.

4. All the values presented represent approximations and were drawn largely from "The Environmental Costs of Electricity" (Ottinger et al, Oceana Publications, 1990). The coefficients used in the formulas that determine the values in the tables presented are drawn from a variety of government and independent sources. ■

*** Acronyms used in the table**

TSP = Total Suspended Particulates
NSPS = New Source Performance Standards
BACT = Best Available Control Technology

AVOIDED EMISSIONS: Based on 547,547,000 kWh saved 1990 - 1992

Marginal Power Plant	*Heat Rate BTU/kWh*	*% Sulfur in Fuel*	*CO2 (lbs)*	*SO2 (lbs)*	*NOx (lbs)*	*TSP* (lbs)*
Coal	**Uncontrolled Emissions**					
A	9,400	2.50%	1,180,511,000	28,007,000	5,662,000	566,000
B	10,000	1.20%	1,258,811,000	10,841,000	3,656,000	2,710,000
	Controlled Emissions					
A	9,400	2.50%	1,180,511,000	2,801,000	5,662,000	45,000
B	10,000	1.20%	1,258,811,000	1,084,000	3,656,000	181,000
C	10,000		1,258,811,000	7,228,000	3,614,000	181,000
	Atmospheric Fluidized Bed Combustion					
A	10,000	1.10%	1,258,811,000	3,313,000	1,807,000	903,000
B	9,400	2.50%	1,180,511,000	2,801,000	2,265,000	170,000
	Integrated Gasification Combined Cycle					
A	10,000	0.45%	1,258,811,000	2,229,000	361,000	903,000
B	9,010		1,132,327,000	807,000	272,000	54,000
Gas	**Steam**					
A	10,400		686,624,000	0	1,566,000	0
B	9,224		596,279,000	0	3,734,000	176,000
	Combined Cycle					
1. Existing	9,000		596,279,000	0	2,289,000	0
2. NSPS*	9,000		596,279,000	0	1,084,000	0
3. BACT*	9,000		596,279,000	0	151,000	0
Oil	**Steam--#6 Oil**					
A	9,840	2.00%	993,798,000	15,058,000	1,777,000	1,686,000
B	10,400	2.20%	1,054,028,000	14,937,000	2,235,000	1,084,000
C	10,400	1.00%	1,054,028,000	2,132,000	1,795,000	566,000
D	10,400	0.50%	1,054,028,000	6,264,000	2,235,000	345,000
	Combustion Turbine					
#2 Diesel	13,600	0.30%	1,319,041,000	2,626,000	4,078,000	223,000
Refuse Derived Fuel						
Conventional	15,000	0.20%	1,565,984,000	4,035,000	5,312,000	1,181,000

LESSONS LEARNED

The C&I Lighting Rebate program's success can be attributed to its simple implementation strategy and aggressive evaluation plan. The foresight of the original program planners and the willingness of program managers to revise the program in accordance with the recommendations of the annual evaluations have resulted in a program that is attractive to customers, closely meets the needs of its target market, minimizes free ridership, is cost effective, and achieves significant savings. Each year since its inception in 1990 an extensive evaluation of the C&I Program has been conducted. Each evaluation included recommendations for program improvement and NMPC has implemented many of these recommendations.

Many of the changes were refinements to the program that have improved the efficiency with which it is implemented and the accuracy of the impact evaluations. After the first year, rebate product categories were expanded in order to better reflect measure costs. The evaluation had determined that by including several different lamps under the category of "energy-efficient fluorescent lamps," mean unit costs had significant variation. By instituting this small change, rebate levels better reflected actual measure costs.[R#8]

At the end of 1990, 1991, and 1992, NMPC received a surge of rebate applications. It was first hypothesized that the increase in rebate applications was due at least in part to the timing of program mailings. In an effort to address the perceived problem, NMPC sent out its 1991 program mailings at different times to various customer sectors. Nonetheless, there was still an increase in rebate applications received at the end of the year. The 1991 program evaluation suggested that the problem would recur as long as rebate levels continued to drop from year to year.[R#9] One potential solution is to bring staff in from the field offices to help with rebate processing for a two- to three-week period at the beginning of each year. However, the evaluation noted that it was important to bring in people familiar with the program in order to avoid the need for extensive training.[R#9]

Another issue raised by the program evaluations was the conflict experienced by Consumer Relations personnel who had to verify customers' lighting installations. Denying approval for a rebate had the potential to make it difficult to maintain a positive relationship with the customers. Thus, the evaluation recommended that a third party conduct the verifications.[R#4,9]

Improvements in the Customer Information Management System (CIMS) database have enhanced program evaluation capabilities. However, the annual process evaluations have recommended several specific revisions in order to further enhance the system. These include changes to allow better correlation of installed equipment to replaced equipment, addition of a field to track installation labor costs, and addition of a check-off box to allow identification of lighting equipment as interior or exterior, or whether the space in which it is installed is conditioned, in order to determine whether a heating penalty or cooling bonus would apply.[R#9,10]

Finally, the evaluation for the third year of the program included an on-site verification study producing data that enhanced the accuracy of engineering analysis used in the program impact evaluation. NMPC has enhanced the program's achievements by improving the accuracy of the engineering estimates and the reliability of its savings data.

TRANSFERABILITY

NMPC's C&I Lighting program is highly transferable. Such a program has the potential to achieve high savings in many regions as it has in NMPC's service territory.

NMPC has been very successful in designing and implementing programs aimed specifically at single technologies. Promoting specific technologies through separate programs has allowed NMPC to spark interest in energy-efficiency, increase participation, and move the market toward energy-efficient products. As a result, NMPC has been able to lower its rebate levels each year while still maintaining participation and savings levels. NMPC has made these accomplishments with both its C&I Lighting program and its High-Efficiency Motors and Adjustable Speed Drives program (see The Results Center Profile #41).

The design and implementation strategy used by NMPC in its C&I Lighting program would be applicable in many other areas of North America. Much of the success of NMPC's program has been due to the extensive market research and ongoing evaluations that have allowed NMPC to revise the program to best address the needs within its service territory. With an accurate analysis of the market and appropriate revision of rebate structures, combined with application of many of the lessons learned by NMPC, it would be possible to replicate the success of the C&I Lighting program. ■

Traditional utility ratemaking, where each and every kilowatt-hour sold provides profit, is a major barrier to utilities' implementation of energy efficiency programs. Several state regulatory commissions and their investor-owned utilities have been pioneers in reforming ratemaking to: a) remove the disincentives in utility investment in DSM programs, and b) to provide direct and pronounced incentives so that every marginal dollar spent on DSM provides a more attractive return than the same dollar spent on supply-side resources.

The purpose of this section is to briefly present exciting and innovative incentive ratemaking mechanisms where they're applied. This we trust, will not only provide some understanding to the reader of the context within which the DSM program profiled herein is implemented, but the series of these sections we hope will provide useful snapshots of incentive mechanisms being used and tested across the United States. (Note that the dollar values in this section have not been levelized.)

NEW YORK STATE OVERVIEW

The New York Public Service Commission has taken major steps to encourage energy efficiency programs at the state's seven investor-owned utilities, including Niagara Mohawk, and to remove the financial disincentives from utility investment in DSM.

In 1988 the Commission began a revolutionary process in New York and dramatically changed the tests for cost effectiveness served as screens for utility DSM investments and opened up the possibility for utilities to actually profit from these investments. The Commission ruled that utilities could no longer rely on the Unit Cost Test (similar to the Non-Participant Cost Test that had been developed in California) to determine the cost effectiveness of demand-side management programs, but instead were directed to use the Total Resource Cost Test, a test that is fundamentally rooted in a societal economic perspective. This has ushered in a new generation of DSM programs. The second major aspect of the ruling in 1988 was that each of the state's utilities were invited to submit suggestions on how to provide shareholders with an incentive for their DSM investments.

Since 1988, the Commission has approved, and in some cases has already approved modifications, of one incentive mechanism for each utility in the state. Thus New York has been a test bed for several mechanisms concurrently. The Commission was implicitly acknowledging the complexity of incentive ratemaking and leaving open the possibility that different mechanisms may best suit the needs of different utilities. The Commission sought to provide utility shareholders with a piece of the benefit, "such that DSM programs that benefit customers are also rewarding to stockholders."[R#13]

OVERVIEW AT NIAGARA MOHAWK

Niagara Mohawk has been a national leader in developing incentive mechanisms. In fact a majority of incentive mechanisms adopted since 1989 have emulated the shared-savings approach pioneered by Niagara Mohawk and Orange & Rockland Utilities in New York State.[R#14] Shared savings bonuses appear to be finding favor with both utilities and regulators because the concept is simple and readily understood by all parties and the general public. In the shared savings mechanism, the program's costs are subtracted from the gross benefits, as determined using the Total Resource Cost Test for cost effectiveness, then a percentage of the resulting net societal benefit is paid to shareholders, typically 10-20%. For Niagara Mohawk, the benefit paid to the utility was 10% in 1990-1992, and now will be 5% capped at $5 million.[R#14,16]

Shared savings mechanisms motivate both cost effectiveness and greater spending on DSM. The utility can maximize its bonus by pursuing all opportunities for which benefits exceed costs. Finally, these mechanisms are being developed such that ratepayers get over 75% of the benefits of the DSM programs, limiting windfall profits to shareholders.[R#14] ☞

Niagara Mohawk introduced its shared-savings incentive mechanism in 1989 and it was approved by the New York Public Service Commission in September 1989. The Niagara Mohawk incentive was similar to the one proposed by Orange & Rockland Utilities. Each proposal called for recovery of lost revenues associated with efficiency programs as well as the programs' costs. They also called for bonuses to serve as direct incentives for DSM.

TREATMENT OF DSM EXPENDITURES

In New York, DSM program costs are recovered from ratepayers through base rates and the Fuel Adjustment Clause (FAC). All amounts are recovered subject to reconciliation with actual expenditures. The timing of cost recovery varies from one to five years depending on the utility.

Specifically for Niagara Mohawk, all DSM costs are recovered in base rates or the FAC for the respective service classes whose customers are eligible to participate in the DSM programs. The amount not recovered in base rates is levelized over a twelve-month period and added to each month's FAC. Recovered costs are annually reconciled with actual expenditures and the FAC is adjusted to account for any differences identified.

NIAGARA MOHAWK'S UNIQUE DSM SUBSCRIPTION SERVICE

In large part due to the industrial customers' perceptions that NMPC's financial incentives for customers had become too large, a rather fascinating experiment is taking place at NMPC. Michael Kelleher, Manager of DSM Planning at NMPC, explains that he and his staff have developed an intriguing option for customers concerned about being obliged to pay for other customers' energy conservation measures. Now they have the opportunity to "opt-out" of conventional rebate programs, but to do so must take their own quite aggressive initiatives:[R#19]

"Niagara Mohawk successfully negotiated a three-year trial DSM Subscription Service Program as part of the Company's 1993 rate case settlement. The Subscription Service Program unbundles the Company's demand-side management services for its 330 largest commercial and industrial customers. The eligible customers were given the opportunity to chose between two types of demand-side management services; one with utility financial subsidy, the other without subsidy. Approximately 60% of NMPC's eligible customers chose to remain eligible for DSM rebates (subsidies), and will contribute to the costs of providing those rebates. The 40% of eligible customers whose chose the non-subsidized option, will be offered non-subsidized DSM services where each participant pays for 100% of their individual project cost. Niagara Mohawk will continue to work with customers in both options to aggressively pursue cost effective DSM opportunities by offering technical assistance, information programs, and help in arranging financing in either option."

"The Subscription Service Program was developed based on requests from Niagara Mohawk's large commercial and industrial customers for the Company to adopt an energy service approach for the DSM programs offered to its large industrial customers. NMPC designed the Subscription Service Program to meet the needs of its customers, while aggressively pursuing DSM opportunities. The Company is committed to obtaining incremental energy savings, above those forecast in its 1993 Long Range DSM Plan, based on offering the Subscription Service Program. NMPC has placed earnings at risk for 1994 and 1995, where the Company can only earn an incentive if incremental energy savings are obtained from the non-subsidized customers."

"Customers in the non-subsidized option pay for the full cost of energy efficiency improvements at their facilities. Customers choosing the non-subsidized portion are also required to complete a detailed energy audit of their

facilities. [These audits are expected to cost customers $50,000-70,000 each.] In addition, customers in the non-subsidized option pay their share of DSM costs for administration, support projects, and information programs."

"The Subscription Service Program which NMPC offered its Customers provides an alternative to its traditional DSM rebate programs. Because the options offered customers included the status quo, no customer could be made worse off with the Subscription Services Program. The substantial proportion of customers choosing each option indicates that offering options is an appropriate approach to DSM for NMPC and its customers."

TREATMENT OF LOST REVENUES

Niagara Mohawk recovers lost revenues in rates, subject to later reconciliation. The rate year sales forecast is adjusted downward to reflect the estimated impacts of DSM programs. DSM program evaluations results will be used to determine actual lost revenue by class of service.

PROVIDING INCENTIVES: DECOUPLING SALES AND REVENUES

Niagara Mohawk's mechanism permits the utility to earn an incentive equal to 5% of the net resource savings attributable to DSM programs. For NMPC, the net resource saving is defined as the present value of lifetime avoided costs, plus $0.0157/kWh adjustment for environmental externalities, less utility programs costs inclusive of incentives paid to the customers. This definition is equivalent to net benefits under the Societal Cost Test as defined by the California Standard Practice Manual.

In 1991 and 1992 each of NMPC's DSM programs were analyzed individually to determine the societal economic benefit of the program and thus the incentive which was awarded. For instance, in 1991 the Commercial Lighting program resulted in a net societal benefit of approximately $63.136 million, thus the utility earned its 10% share of $6.314 million. In 1991 the total incentive to NMPC for all its 1991 DSM programs was $8.042 million; for 1992 programs the total incentive grew to $11.580 million. In 1992 the Commercial Lighting program resulted accrued a net societal benefit of $69.365 million and a utility incentive of $6.94 million. In 1993 and in subsequent years, all of NMPC's DSM programs will be bundled together for the purposes of determining incentives. In addition, "non-resource" programs, such as demonstration programs, which were excluded from the incentive mechanism, are now eligible as well for cost recovery and incentive payments.[R#15,16] ■

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