



PREMIUM EFFICIENCY MOTORS PROGRAM

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

Energy use by commercial and industrial electric motors and machine drives constitutes about 27% of the total electric energy use in New York State, amounting to more than 35,300 gigawatt hours (gWh) in 1998. These motors operate everything from printing presses to conveyor belts to air-handling systems. Improving the efficiency of electric motors saves energy, reduces facility operating and production costs, and improves productivity.

The New York State Energy Research and Development Authority (NYSERDA) launched the **New York Energy SmartSM** Premium Efficiency Motors program in December 1998. Its goal is to increase the availability, promotion, and sale of Consortium for Energy Efficiency (CEE) qualified premium efficiency motors throughout New York's System Benefits Charge (SBC) service area. CEE-qualified premium efficiency motors are generally one to two percent more efficient than motors meeting the federal efficiency standard set by the Energy Policy Act. The program seeks to promote structural changes in the market that favor the use of CEE-qualified premium efficiency motors in commercial building applications, institutions, industries, and municipi-

ties. Bringing about this change is a community of participating motor distributors who actively promote the benefits of premium efficiency motors to customers.

If all commercial and industrial end-users in the State upgraded motors to CEE-qualified premium efficiency motors, the State could reduce its total electricity use by 162 gWh annually. As reported in Table 1, significant reductions in air emissions would also be realized.

Table 2 displays the efficiency and cost savings expected from a 20-horsepower CEE-qualified premium efficiency motor over a standard motor available on the market today. The simple payback period of 0.94 years means that customers can expect to recover the incremental cost of the premium-efficient motor in less than one year. Moreover, savings continue over the lifetime of the motor.

Approximately 50,000 integral horsepower motors are sold annually in the **New York Energy SmartSM** program service area. Only about 12% of motors sold in the State are considered CEE-qualified premium efficiency motors (Easton Consultants, Inc. and Xenergy, Inc., *Northeast Premium Motor Initiative*

Market Baseline and Transformation Assessment, Final Report, August 17, 1999). Market studies indicate that addressing customers' concerns beyond energy savings (e.g., motor life and avoided downtime), and increasing the number of motor distributors who routinely promote CEE-qualifying motors should increase the penetration of these motors into the market (Ibid).

PROGRAM OVERVIEW

The **New York Energy \$martSM** Premium Efficiency Motors program offers incentives for motor vendors to sell CEE-qualified premium motors in New York State. The primary program goals are to: (1) promote their use in commercial buildings, institutions, industries, and municipalities, and (2) increase their market share by 10%. Financial incentives, in the

amount of \$40 per premium efficiency motor, are offered to vendors to promote the sale of about 8,000 units over the three-year program period.

PROGRAM FEATURES

Distinguishing features of the program are:

Mid-Stream Market Focus. NYSERDA reviewed several programs in developing the Premium Efficiency Motors Program, including: Southern California Edison's (SCE) Pilot Energy Efficient Motors and Compact Fluorescent Bulb programs, the Premium Efficiency Motors program sponsored by the Northwest Energy Efficiency Alliance, Inc., and the Compact Fluorescent Fixture Manufacturer Incentive program operated by the Sacramento Municipal Utility District. These reviews suggested that

TABLE 1: REDUCTIONS IN AIR EMISSIONS FROM CEE-QUALIFIED PREMIUM EFFICIENCY MOTORS

	INDUSTRIAL (78 gWh/year)		COMMERCIAL (84 gWh/year)		TOTAL Annual Emission Reductions
	Tons/gWh	Annual Emission Reductions	Tons/gWh	Annual Emission Reduction	
CO ₂	441	34,398 tons	441	37,044 tons	71,442 tons
NO _X	0.65	51 tons	0.65	55 tons	106 tons
SO ₂	1.51	118 tons	1.51	127 tons	245 tons

TABLE 2: ECONOMICS OF PURCHASING A 20 HORSEPOWER, 1800 RPM PREMIUM EFFICIENCY MOTOR RELATIVE TO THE COST OF A STANDARD ELECTRICAL MOTOR*

Scenario	Efficiency Improvement	Up-Front Price Premium for Higher Efficiency Motor	Projected Annual Energy Cost Savings	Simple Payback
Purchasing a CEE-qualified premium efficiency motor versus a standard motor.	1.2 %	+\$78 (8%) In this example, the standard motor costs about \$931 and the premium motor is about \$1,009.	\$84 Energy costs for the premium efficiency motor are \$6,416 per year, while the standard motor energy costs are \$6,500 per year.	0.94 years At \$0.0612 per kWh.

* Adapted from *CEE Efficient Motors: Selection and Application Considerations* and *MotorMaster +3* (U.S. Department of Energy, Office of Industrial Technologies).

offering rebates directly to customers provided only a temporary and marginal change in purchasing behavior. Once these rebate programs ended, consumers returned to purchasing products with the lowest initial cost.

Rather than providing rebates to motor buyers, this program provides financial incentives to mid-stream market actors, whose support is deemed critical to building a sustainable market infrastructure for premium efficiency motors. The expectation is that once vendors understand the additional profit potential from premium efficiency motor sales, they will use program materials to inform customers of the fuller range of benefits of these motors, including longer life and cost savings resulting from less downtime.

Active Program Marketing. To recruit participating vendors, NYSERDA hired Honeywell DMC Services (Honeywell). Honeywell is relying on its long-standing relationship with motor vendors to promote program participation.

Phased Implementation Allows for Corrective Actions. NYSERDA recognized that the program might require some modifications to accelerate the acceptance of these motors into the market place. During the first year of implementation, it was noted that the application process was deterring vendors from participating. NYSERDA responded by having Honeywell help interested vendors through the application process, and streamlining second-year program participation requirements. Enhanced incentives added for Year 2 are discussed below in the Early Program Results section.

PARTICIPATING VENDOR PROFILES

Vendor profiles include one privately-owned, regional electric motor supplier (Auburn Armature), and two major national distributors of electric motors (GE Supply and Grainger).

AUBURN ARMATURE

Auburn Armature has 70 employees and has been in business for 54 years with \$15 million in sales during 1999. The company provides electric motors, motor controls, variable frequency drives, power distribution equipment, transformers, and plant automation equipment to industry and contractors. The company's New York market area ranges from Canada to the Pennsylvania border and from Syracuse west to Buffalo. All operations are located at its single site in Auburn, NY. The company provides on-site technical assistance to customers and maintains a modern electric motor repair facility. Auburn Armature has been one of the more active participants in the Premium Efficiency Motors program.

Auburn Armature learned of the Premium Efficiency Motors program through NYSERDA's web site. Initially, they felt the program application requirements were cumbersome and required extensive baseline information on prior sales. However, with Honeywell's assistance, Auburn Armature completed the application process with a reduced effort, and

"Honeywell cleared the path for us to participate in the program."

**– GREG PARA,
AUBURN ARMATURE**



more recent modifications have further streamlined the process.

Identifying CEE-qualified premium efficiency motors was an obstacle to Auburn Armature's participation in the program. The problem was solved by reprinting the CEE-qualified premium efficiency motor guidelines for sales personnel. Auburn Armature passes along to its sales personnel \$10 of the incentive for each premium efficiency motor sold. The remaining balance of \$30 covers marketing costs and contributes to the company's earnings.

Greg Para, general manager, questions whether the motors program can, on its own, make significant changes in the market due to fact that motor sales are "strictly price driven." He believes the program would have a greater chance of success if it included advertising directed at the upper managers of manufacturing companies who purchase electric motors on a volume basis. According to Mr. Para, most facility maintenance personnel focus primarily on the "first cost" rather than life-cycle savings, while many upper level managers have a broader perspective.

GE SUPPLY

General Electric, one of the founders of the electrical industry in the United States, has been in the electric motor business for over 100 years. GE Supply, a subsidiary of General Electric, started distributing electrical supplies in the 1920s and has sustained a significant presence in New York State since the early 1970s. GE Supply distributes AO Smith, ABB, and GE electric motors throughout much of New York State.

GE's Roger Garcia displays a premium efficiency motor used for training sales personnel.



Roger Garcia, a senior industrial salesperson in GE Supply's Empire District, views the **New York Energy SmartSM Premium Efficiency Motors** program as an opportunity to increase the number of premium efficiency motors GE Supply sells in an increasingly

competitive marketplace. He notes that as the industrial electric motors customer base has become smaller, the competition among electric motor distributors to maintain or increase market share has grown more intense. Consequently, the **New York Energy SmartSM motors** program is an important component of GE Supply's strategy to maintain a competitive position within New York.

GE Supply has elected to pass on to their sales staff the entire \$40 incentive provided by NYSERDA for each CEE-qualified premium efficiency motor sold. Mr. Garcia believes the incentive will encourage sales staff to spend the additional time necessary to inform prospective customers of the life-cycle energy cost advantages of the premium efficiency motors. In turn, GE Supply hopes to benefit by both increasing its market share, and by generating more income per motor sold.

GRAINGER INDUSTRIAL SUPPLY

Grainger Industrial Supply has been in the electric motors business for 74 years. The public-traded company (Chicago, Illinois), had sales of \$4.5 billion last year and is one of the largest suppliers of industrial motors in the country. The company sells both GE brand and its own Dayton line of electric motors manufactured by Emerson, Inc. Grainger has been an active participant in the motors program.

Grainger's management views the **New York Energy SmartSM Premium Efficiency Motors** program as a strategic opportunity to increase the company's share of efficient motor sales in a very competitive marketplace. Grainger is now in the process of creating a fully-integrated, premium efficiency motors program, including an inventory system that "labels" those motors which qualify for financial incentives. Grainger is also taking advantage of Notor soopportunities to train sales staff on the benefits of CEE-qualified premium efficiency motors.

In response to NYSERDA's Motors program, Grainger has evaluated and adjusted their stocking patterns of premium efficiency motors. In an effort to build long-term industrial customer confidence, Grainger has committed to carry a sufficient inventory of premium efficiency motors in stock. Grainger identified 112 models most commonly sold under 100 horsepower, and made a commitment to stock CEE-qualifying motors in eight Northeast distribution centers. This will assure CEE-qualified motor delivery to any New York location within 24 hours. For 100 to 200 horsepower motors, Grainger also identified the most common models, and committed to stock CEE-qualifying motors at two main Northeast distribution branches, ensuring 36-hour delivery. The company estimates that these changes have brought \$1.2 million worth of CEE-qualifying inventory into the Northeast.

Grainger is a State Contract supplier for the NYS Office of General Services (OGS). NYSERDA is interested in working further with Grainger and any other State-qualified suppliers to promote the greater use of premium efficiency motors by State agencies.

EARLY PROGRAM RESULTS

A total of 242 CEE-qualified premium efficiency motors were sold during Year 1 of the program (from December 1998

through March 2000). The 242 motors sold represent about 5% of the Year 1 goal of 5,000 motors. In retrospect, the 5,000-motor goal (representing about 10% of current electric motors market in New York's SBC territory), might have been overly ambitious given: (1) the resistance of the current motor purchasers, including vendors, to consider life-cycle costs in purchase decisions; (2) the complexity of establishing working relationships with motor vendors; and (3) the four-month delay between the start of the Year 1 incentive offering and the hiring of vendor assistance contractor, Honeywell.

As of June 30, 2000, 327 CEE-qualified motors were sold (Year 1 plus early Year 2 sales). It is expected that using these motors will result in annual electric energy savings of nearly 205,000 kWh. Figure 1 shows the growth in motor sales through June 2000. Despite this increased activity, it will be difficult to achieve the program's sales goal of 8,000 motors.

At the suggestion of program participants, NYSERDA has instituted changes to lower the cost of participation and continues to explore customer marketing initiatives. Planned customer marketing activities include: Motor Challenge Workshops, organized in conjunction with participating vendors and their customers; the development of up to six case studies to illustrate program benefits and lessons learned; tabletop displays,

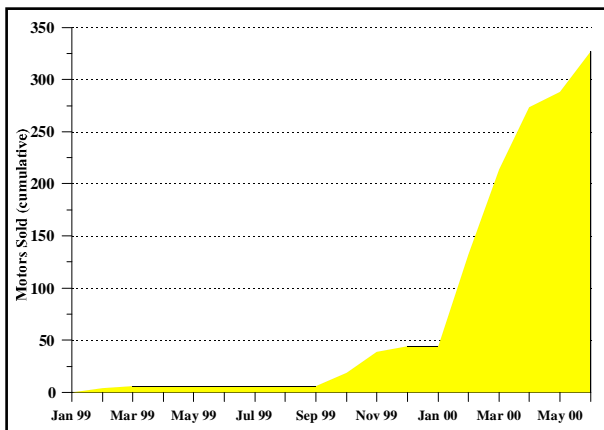


Grainger's Industrial Supply Shop in Albany, NY.

telephone message-waiting tape loops, and similar materials for vendors to use for promotion to customers; and a series of mailings to end-users identifying the benefits of premium efficiency motors and alerting them to other program resources (schedules of up-coming workshops, program materials, etc.).

During Year 1 of the program NYSERDA offered participating vendors \$40 per CEE-qualified premium efficiency motor sold. Vendors could also earn a 10% bonus (\$4) per motor if their initial sales goals were met by January 1, 2000. NYSERDA has modified the incentive offering to stimulate greater participation by combining the balance of Year 1 incentives (\$206,000) with Year 2 incentives (\$430,000), for a total of \$636,000 available to vendors. NYSERDA has also removed the 10% bonus, and instead is offering a \$600 voucher for every 15 qualified motors sold. Vendors can use the voucher to cover a customer's full or partial costs of purchasing or installing a qualifying motor. This incentive adjustments are expected to encourage more qualified motor sales, and provide an additional incentive to sell to customers that are especially reluctant to purchase a more expensive, but efficient motor. The Year 2 incentives, which became available in February 2000, can support the sale of about 8,000 premium efficiency motors. These additional incentives will be available to both new and continuing program participants, and changes in Year 2 vendor participation and activity

FIGURE 1: Premium Efficiency Motor Sales by Participating Vendors.



will be tracked to assess their effectiveness. As of June 30, 2000, there are 20 vendors participating in Year 2 with a sales performance goal of 4,100 motors. In the first four

months of the Year 2 incentives, 85 motors have been sold.

PROGRAM PERFORMANCE: EARLY RESULTS AND FEEDBACK

NYSERDA's Premium Efficiency Motors program, as a market transformation initiative, is relatively new and, therefore, observations regarding program performance must be viewed as tentative and subject to change. The following comments respond to the **New York Energy SmartSM** program goals that are most applicable to the premium motors initiative:

Goal 1: Transform permanently the market for energy-efficient products and services including informing the public about the full range of energy efficiency opportunities.

Market transformation is the ultimate objective of the **New York Energy SmartSM** motors program. However, significant challenges need to be addressed in order to develop a more sophisticated consumer base that is fully aware of life-cycle benefit and cost concepts. Some vendors are not optimistic that the program can overcome the pervasive first cost bias. Other vendors, however, view CEE-qualified premium efficiency motors as a growing market sector and wish to ensure their position as primary players in that market. The desire to increase market share appears to be a fundamental reason why these vendors are active participants in the Premium Efficiency Motors program. This, in itself, is a forward-looking position that supports the market transformation nature of the program. Vendors see the potential for gaining competitive advantage and increasing market share with the success of the program.

Offering incentives to vendors (mid-stream market participants) to spur the purchase of premium efficiency motors and promote market transformation is a

new concept. Therefore, extensive one-on-one outreach is necessary. It has taken Honeywell some time to “drill down” into vendor organizations, identify key decision-makers, and develop relationships based on shared goals. As this relationship matures, the program is expected to experience further growth in participants, training requests, and ultimately, motors sold.

The market penetration attained by way of those vendors participating in Year 1 is another factor suggesting the potential for market transformation. The reported annual motor sales for the 17 vendors participating in Year 1 was nearly one-half of the total motor sales in the SBC program area (24,176 of the 50,000-motor market).

The program hit a notable early indicator of market transformation by signing on such an influential network of participating vendors. Now that vendor support and interest are apparent, NYSERDA will have to work closely with these vendors to ensure that CEE motors are readily available to customers. In a recent survey of participating motor vendors, 75% of respondents either "strongly agreed" or "agreed" that stocking and availability of CEE-qualified motors impacts ultimate sales of CEE motors. When asked what percentage of their current motor stock was CEE-qualified, vendor responses ranged from 5% to 85%, with an average of 45.6%. One-quarter of respondents said that they had increased their stocking of CEE-qualified motors since joining the Premium Efficiency Motors program.

The potential for transforming the market for premium efficiency motors is also suggested by the large number of firms electing to remain in the program. Over 80% of those vendors enrolled in Year 1 have already agreed to remain in the program through Year 2. Of those vendors that actually received incentive payments during the first year, nearly 90% have applied to participate during the second year.

It is important to note that participating vendors are making suggestions to enhance the program, including a recommendation to institute a major advertising or outreach program to inform consumers of the benefits of premium efficiency motors. Another recommendation made is to provide additional financial incentives directly to customers. These suggestions are being considered as NYSERDA institutes a customer marketing campaign. NYSERDA program managers are also considering ways to enhance coordination with the **New York Energy \$martSM** New Construction program which offers financial incentives directly to customers for the use of premium efficiency motors in new construction and substantial renovation projects.

Goal 2: Improve the efficiency of electricity use through cost-effective, energy-efficient equipment, products, measures, and services.

As noted above, the 242 motors sold in Year 1 fell significantly short of the first year goal of 5,000 motors. However, as illustrated in Figure 1, there has been dramatic growth in the number of CEE-qualified premium efficiency motors sold through June 2000. This rate of growth is expected to continue through Year 2 of the program as: (1) New York motor vendors become aware of the availability of additional incentives; and (2) sales personnel inform customers of the advantages of premium efficiency motors.

The disparity between expected and actual motor sales is not unique to the **New York Energy \$martSM** program. The recent Northeast Premium Motors Initiative, which provided rebates to customers rather than financial incentives to retailers, fell short of expectations by one-half. While initial projections were for 3,000 rebates, only 1,600 rebates were provided during the first year-and-a-half (Easton Consultants and Xenergy, Inc., 1999). Likewise, the Premium Efficiency Motor

Initiative sponsored by the Northwest Energy Efficiency Alliance (NEEA) fell short of initial motor sales expectations. In its performance evaluation, Pacific Energy Associates, Inc., reports that “in its first seven months of program field activity (April 1997 through October 1997), the NEEA program had little influence on motor sales, stocking, or promotion” (Pacific Energy Associates, *Premium Efficiency Motors: Market Progress Evaluation Report*, January, 1998, Report #E98-002).

While the track record for existing motor programs (including the **New York Energy \$martSM** motors program) has not met expectations, managers of the **New York Energy \$martSM** Premium Efficiency Motors program have shown a willingness to streamline vendor applications, modify incentives, and develop new customer marketing strategies.

Goal 3: Foster the energy-efficiency industry and provide information encouraging customers to regard energy efficiency as a value-added service, measured in terms of energy savings, increased affordability, improved environmental quality and other non-energy benefits.

Lack of readily accessible information on CEE-qualifying motors remains a major impediment to vendors. NYSERDA is sponsoring training programs on premium efficiency motors and providing software (e.g., MotorMaster +3.0) including a significant database on standard and premium efficiency motors. The software has been well received by motor sales personnel who have participated in demonstrations at vendor workshops and training sessions.

In the manufacturing sector, supply reliability and low first-cost remain far more important to maintenance and procurement managers than any long-term energy cost savings or environmental benefits. Consequently, it is important that information on premium efficiency motors reach those managers high enough in an organization to consider the importance of total energy cost savings (and non-energy related benefits) rather than simply the first-cost of a particular motor. An important suggestion by a participating vendor is to meet with senior-level industrial and commercial managers who are in a position to consider a broad range of factors in making motor purchasing decisions, including life-cycle cost savings.

In conclusion, the following unresolved issues could have a significant impact on the program’s ultimate effectiveness: (1) whether the program budget and scope are sufficient to make any lasting structural change in the motors market; (2) whether customer incentives offered under the **New York Energy \$martSM** New Construction program can be effectively leveraged to complement vendor incentives and help the transformation effort; and (3) whether planned customer marketing will reach enough key decision-makers within the commercial and industrial sectors who are positioned to understand the value of premium efficiency motors and have the authority to purchase large volumes of motors.

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.nyserda.org

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