

# **Efficient Motors: Industry Allies Business Development in Energy Efficiency Services**

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## **ABSTRACT**

State and regional initiatives in the Northeast (New England, NY and NJ) have promoted high efficiency motors since Epcot motor rules took effect in 1997. These programs have evolved to embrace and promote ‘motor management planning’ through the ‘Motor Decisions Matter’ campaign (developed in cooperation among national interests EASA, NEMA, CEE, ACEEE, DOE, etc.). There has been encouragement to further expand the focus of these programs beyond just the ‘motor’, to include energy savings and productivity improvement in ‘motor systems’, and to do this by engaging the motor services industry (Elliott 2002). This paper presents context and examples in which these changes are beginning to happen in the Northeast. It presents examples of programs and projects that bring motor users, motor vendors, motor service shops and energy service engineers together to identify and execute energy saving and productivity enhancing projects. Existing programs or new ones have an opportunity to transform the motors and motor services markets for energy efficiency and customer productivity. The paper shows that the ‘energy efficiency community’ and the motor services industry can achieve parallel goals (energy efficiency for one and business development for the other) through a coordinated effort that makes their shared customers stronger and more competitive.

## **Introduction**

Over the past five years there have been two major efforts in the Northeast (New England, New York and New Jersey) to promote selection of high efficiency electric motors at the time of a motor-purchase. The two programs, 1) MotorUp and 2) **New York Energy SmartSM** Premium-Efficiency Motors Program focused initially on the motor purchase, then evolved to encompass the repair-replace decision.

The **New York Energy SmartSM** Premium-Efficiency Motors Program and the Northeast “MotorUp” initiatives have followed parallel paths, and both have developed strong working relationships with the region’s motor vendors and motor service centers. Both initiatives have taken leadership roles in developing the national “Motor Decisions Matter” (MDM) campaign which promotes plant-wide motor management practices for energy efficiency and productivity, and both have embraced MDM as an integral component of their marketing efforts.

The regional initiatives have reached a level of respect and recognition among their allies - motor vendors and service shops - and customers such that a next step in program evolution may be possible. The ‘next step in program evolution’ is a question with several possible answers. The best answer should take into account the ‘market transformation’ strategy, professed by the initiative’s sponsors.

The “Vendor Approach” considered here is a promotional effort to encourage and develop motor management and motor system capabilities in existing vendor shops. This focus is likely to provide a lasting transformation, with chances for long-term success.

In the past year, there have been several examples of activities and projects demonstrating vendor service shops’ desires and attempts to expand their capabilities, to offer more ‘value-added services’ to their customers. Shops have explored options, and expanded into ‘plant-wide motor management services’, providing valuable ‘motor management plans’ and conducting distinct motor system projects for energy efficiency and improved productivity.

This paper discusses the case for a shift in program focus from simply the motor to an institution of motor management. This is supported by a confluence of effects: maturity of the northeast initiatives, strong market relationships, the MDM campaign and changes in the motor services industry. It presents examples of successful projects, and it offers suggested strategies for program development.

## **Motor Efficiency ‘Market Transformation’ Initiatives in the Northeast**

A brief look at the history and status of two motor efficiency initiatives in the Northeast will help to frame discussion of their ‘next steps’ in evolution. The **New York Energy SmartSM** Premium-Efficiency Motors Program and the MotorUp program (covering New England, New Jersey and Long Island) evolved together, starting in 1998 and 1999, respectively.

### **MotorUp**

MotorUp is the Northeast regional ‘premium motors’ initiative. Its region covers most of New England, New Jersey and Long Island. Its sponsors are electric utility companies and energy efficiency organizations-administrators of ‘system benefits charges’ through electric billing rates.

MotorUp, as well as the NYSERDA program, focuses on the population of motors defined by EPACT: integral horsepower, three-phase motors, one to 200 horsepower, design A & B, Totally Enclosed Fan Cooled (TEFC) and Open Drip-proof (ODP). Both programs recently embraced the NEMA Premium™ specification as the definition of ‘high efficiency’.

MotorUp’s goal is to transform the market of motor sales and repair to qualifying high efficiency motors and quality repair, depending on life-cycle economic decision criteria. It uses a range of marketing tactics to engage the market players. MotorUp provides circuit riders - technicians to make personal contact with motor vendors, to provide materials, information, education and overall support, in selling-up qualifying motors. They offer vendor and customer presentations and workshops. MotorUp provides customer rebates for purchase of qualifying motors, and it engages vendors in the rebate process, as a selling tool, and as a cost incentive.

Since 2000, both MotorUp and NYSERDA’s Program have incorporated Motor Decisions Matter (MDM) into their program message and tactics. MDM is a campaign developed by a combination of national players in the energy efficiency and motors communities. Its message is, ‘manage your motor fleet for energy efficiency and reliability through education, awareness, establishing a corporate plan, and being prepared ahead of time to respond to a motor failure’. MDM tries to cement the relationship between a customer and a motor shop, through information, awareness and sound decision criteria.

Use of the MDM message and materials has helped shops and service centers to recognize opportunities to serve their customers in new ways. Development of MDM and 'market changes' raises a 'chicken and egg' question. MDM is available at a time when the motor services industry is changing, and looking for new opportunities. (Or is the market changing because of newly identified opportunities?)

### **New York Energy SmartSM Premium-Efficiency Motors Program**

The **New York Energy SmartSM** programs are developed, managed and delivered by the New York State Energy Research and Development Authority (NYSERDA). NYSERDA's Premium-Efficiency Motors Program, one of their commercial and industrial (C&I) Market Transformation Initiatives, is designed to induce lasting structural changes in the motors market resulting in an increased use of qualified premium-efficiency motors.

The program uses a multi-faceted approach, targeting vendors to encourage them to increase their stocking, promotion and sale of qualified premium-efficiency motors. It provides circuit riders who make personal calls on vendors and distributors, providing them with information, training (both technical and sales), tools (Motor Master, MDM Motor Planning Toolkit), vendor and customer-targeted workshops, and marketing materials (case studies, press events). These serve to educate the vendors and provide them with skills, knowledge and tools to help them sell-up to premium-efficient motors.

NYSERDA views the role of the vendor as critical to building a sustainable market infrastructure for high efficiency motors. Through the vendors, the program provides end-users with tools and resources to assist them in motor selection, life-cycle cost analysis, and repair versus replace decision-making. To get vendors attention, buy-in and support, the program offers financial incentives to participating vendors for sales of qualifying motors. NYSERDA also provides customer rebates for the purchase of qualifying motors through its Smart Equipment Choices Program.

In four years of program operation both MotorUp and NYSERDA have seen a maturing of the program market. Relationships among vendors, circuit riders and program administrators have solidified. The programs show high recognition and trust among motor manufacturers, distributors and vendors.

### **Changes in the Motor Services Industry**

A number of recent market signals indicate that this is a turning point in the motors market, offering a business opportunity for service shops.

A 2000 survey of motor service shops in northern and central New Jersey (Bastion) found that the motor services industry is 'shrinking and changing focus'. Larger shops were developing specialty customer niches and were spreading their geographic territories in order to grow. Smaller shops were struggling to keep their traditional customers in the increasingly competitive field of motor services. Smaller shops tended to have small customer bases, and they did not tend to have money available to staff up and equip themselves to provide increasing technical services. The demographics of all shops personnel were exceedingly aged and not being replenished. A lot of small family businesses were closing their doors at the end of several generations of service.

At the Electrical Apparatus Services Association (EASA) annual convention in June, 2002, there was overwhelming interest among motor services shops, in new business development opportunities. In a presentation titled, "Retain and Develop Customers with Motor Planning Services" (Benkhart), participants were encouraged to use energy efficiency and the MDM message to offer motor management planning services to their existing customers and to help engage new customers. They heard that this could work in conjunction with their traditional 'sales of motors', and alone as a new service. It was a significant indicator of the interest, that while many of the conference panel sessions attracted 15 to 20 participants, this presentation was overflowing with over 85, and the hand-out materials, from MDM and session notes were replenished and exhausted several times during the session.

At the Consortium for Energy Efficiency (CEE) program workshop, September 2002 in St. Louis, EASA personnel (Raynes, Nielson) presented to the general audience, about the state of the motor services industry. The audience, mostly energy efficiency program planners and developers, heard that this was a turning point in the industry. EASA (and other) shops generally provide both sales of new motors and repair services. Even though shops tend to make more profit from repair than sales, they need to provide both, to maintain customers. The slowing economy had reduced overall business volume. Repairs were down due to increased competition and reduced industrial production. Also, consolidation and changes in sales practices among many of the major motor manufacturers was cutting into the sales end of their business.

The EASA presenters stressed that in order to survive, shops needed to distinguish themselves from their competitors. They had to keep up with market changes, and embrace changes in sales and service patterns as an opportunity. The presenters had been instrumental in developing the MDM campaign, and they believed that motor management planning was a service that their shops needed to develop. They challenged the energy efficiency community to embrace the MDM message, and help spread the word to market players through their programs.

In its July 2002 paper, American Council for an Energy Efficient Economy (Elliott) makes a case for engaging the motor services industry, in association with the engineering community to serve the motor systems customers' needs. The paper rejects the 'failed' attempts to introduce new market players, Energy Service Companies, (ESCOs) into the market and instead recommend developing capability in existing customer-supplier relationships. They recommend partnerships between engineering firms and motor vendors to provide plant-wide motor systems and management services. There are a number of advantages to building upon existing relationships: trust, concentration of expertise, knowledge of plant and process, perception of productivity as well as energy efficiency projects, and access. ESCOs have been unsuccessful for a number of reasons - mostly due to the relationship between the customer and service company, and uncertain benefits of projects.

The paper suggests vendors should engage in motor systems and management services, but that the customer-vendor relationship is not enough. The vendor will still be seen as 'wanting to sell equipment'. The addition of the engineering firm in the transaction will help validate the vendor's service, and make the sale. And since this arrangement is from within the existing industry, it has an opportunity to endure beyond the life of an intervention program.

## **Motor Systems and Motor Management Services Projects**

To demonstrate opportunities and services available to vendors we look at recent examples of plant-wide motor management planning projects, as well as an example of a successful vendor services project. In a limited search for examples of representative projects, we found that size and experience of the shop is less significant as an indicator of possible success than is its people's interest and creativity.

### **Town of Bethel, CT: Water Pumping Overhaul, Schulz Electric Co.**

The Town of Bethel, Connecticut recognized that its water pumping system was costing more than it should, compared to neighboring towns. The pumps operated continuously to fill a holding pond from the town's reservoir. Overflow from the holding pond continually drained off. The Town Engineer presented the problem to Schulz Electric Co., to propose a solution.

Schulz is a full-service electrical supply center. This EASA member shop sells and repairs electric motors. They also perform in-place and laboratory testing to construct speed-torque curves and offer 'systems integration work', assembling motor and control packages. On occasion and via request, they will also manufacture motor systems.

Schulz's solution was to cycle the pumps according to need. They proposed to design and install controls to cycle the pumps to maintain volume of the holding pond at proper level. They also proposed to add a telemetry system so that the Town Engineer would be capable of controlling and monitoring the system from off-site, over the internet. The Town of Bethel fully funded the project from its general fund, and found that electric cost savings alone paid the cost back in less than one year. The Town recognized an added environmental benefit, saving more than 400,000 gallons of water per day.

Schulz completed the project for a total cost of \$250,000. The Town of Bethel pumping system 'problem' presented Schulz with a new opportunity. Although they are accustomed to responding to a customer's specific equipment needs, in this case the customer came to Schulz looking for a 'solution'.

### **Steel Rolling Mill: Plant Motor Management Plan, Walco Electric, Providence, RI**

After a recent management change at a specialty steel rolling mill in eastern Massachusetts, Walco Electric learned that the new plant managers had charged the mill staff with reducing costs. Walco saw this as an opportunity to develop a new business capability, to provide solutions in addition to its core electrical business.

Walco Electric is a full service motor and electrical service center. It has 100 employees in two locations in southern New England. It is a systems 'integrator', selling motors of three major motor manufacturers, they sell all electrical supplies, sell and repair motors, provide predictive maintenance services and assemble and service hoists and cranes.

The steel mill had been a motor sales and service customer of Walco's. When Walco's sales manager learned of the mill's charge to reduce costs, he was reminded of a recent offer from Reliance Electric. Reliance had made available, for purchase, a motor inventory project software tool. The project software program might help them solve the customer's problem, and also present a new business opportunity for Walco.

Walco went directly to the mill's upper management. They made a presentation to the plant manager, the plant engineer and the corporate Vice President of Operations. They proposed to conduct an inventory of all significant motors in the plant. The resulting 'inventory' would be a useful tool for the plant, for ongoing operations, and also afforded Walco the opportunity to identify additional projects for energy savings and improved productivity.

Also, since Walco saw this as an opportunity to learn and possibly to develop a business capability, they offered the service at a reduced rate. This solved another problem for the customer, since they were constrained for capital, they found a way to proceed by funding the project as a fixed-cost expense. It would proceed for 2 months at Walco's reduced hourly rate.

In the two month project, which cost the customer approximately \$12,000, Walco examined 600 motors. In their inventory of the plant, Walco

- Surveyed and inventoried 600 motors,
- Identified opportunities to convert from DC motor-generator systems to AC motors with variable frequency drives,
- Identified gear-drive and pumping system upgrade opportunities
- Identified savings projects in curing ovens, involving fan-damper systems convertible to premium motors and variable frequency drives.
- Conducted vibration analysis of motor systems which lead to installation of automatic lubrication systems, for preventative maintenance and increased reliability, and
- Identified other energy savings opportunities.

At the completion of the initial 'motor management planning' phase of the project, Walco had delivered three completed products to the customer:

1. Motor management inventory and plan, a useful tool for current and future plant operation,
2. Completed project - vibration analysis and lube system for selected motors, and
3. Pending project - oven exhaust fan system converted from constant speed to premium efficiency motors with variable frequency speed control.

The oven fan project in fact would not go forward. Mill personnel looked further into the opportunity, and decided to examine a process change for yet more cost and productivity savings. It is believed that this additional improvement possibility resulted from the added awareness raised by the Walco inventory.

Walco found that they 'broke even' with the mill's completed projects. However, they are convinced that they gained valuable experience from the project. First, they expect that they will develop more projects at the mill as a result of the motor management plan and project proposals. Second, as a result of this learning experience, they feel they will 'do better the next time'. Walco sees this as an opportunity to distinguish themselves from among their competitors, as a provider of solutions.

## **Compressed Air System Efficiency Program: NYSERDA, New York Energy Smart<sup>SM</sup> Program Territory**

Through its “Compressed Air System Efficiency Program”, NYSERDA has opened opportunities for vendors to team up with energy engineers in customer projects for compressed air system efficiency. The program is meant to demonstrate the value of a practical and effective approach to improved motor-driven systems operation.

Since early 2000, NYSERDA has supported a project, implemented by Xenergy, Inc., to accelerate the development of compressed air system efficiency services by increasing vendor capabilities while reducing vendor costs in offering credible and effective system efficiency services. The project rationale is based on the following key observations:

- Compressed air system efficiencies offer significant energy and financial savings opportunities.
- In-house industrial personnel often lack technical background and staff time to assess system opportunities.
- Distributors and vendors have a long-term business interest in providing system efficiency services.

The primary focus of the work was to equip and encourage compressed air vendors to be able to provide a useful and technically sound service to their customers, while balancing the limited resources (time and money) that the vendors could devote to developing their service delivery capacity. The work included the services and technical support of several contracted ‘energy engineers’. The energy engineers provided hands-on training and assistance to the participating vendors throughout the duration of the project. The project scope consisted of five main tasks 1) vendor recruitment, 2) field process and tool development, 3) customer workshops and site recruitment, 4) plant assessment and project development and 5) evaluation.

**Vendor recruitment.** Eleven vendors elected to participate in the program, generally larger firms who serve large customers with significant compressed air systems. Each of the vendors was required to attend the Compressed Air Challenge training, recruit 10 customers to also attend the training and conduct a plant assessment at 1-2 customer’s facilities. Vendor staff were also required to provide input in the development and attend training on the use of program-developed System Assessment Toolkit materials. Finally, the vendor was required to present the results of the assessment to the customer, with the assistance of a program consultant (Xenergy staff or ‘energy engineer’).

**Field process and tool development.** A Compressed Air System Assessment Toolkit, which consists of 9 separate pieces, was developed as a resource that vendors would be able to use with little or no additional technical support after going through the program. The types of materials include a Users Guide, Report Template, customer data collection forms and checklists, plant assessment examples and marketing materials, including case studies.

**Customer workshops and site recruitment.** To provide a market “pull”, the program co-sponsored two *Compressed Air Challenge* workshops. The workshops provided an independent

source of information on the technology and the value of compressed air system efficiencies. The workshops were also used to generate customer interest in the program plant assessments.

**Plant assessment and project development.** Each compressed air system assessment afforded vendors the opportunity to conduct full plant assessments, with the assistance of an ‘energy engineer’, in 1-2 customer facilities. The assessments gave each vendor the opportunity to test and evaluate program plant assessment methods and materials, generate customer savings estimates and present project proposals to the customer. Plant Assessments were completed at thirteen facilities, eight of which implemented the full group of recommended measures without further technical or financial assistance from NYSERDA. The estimated energy savings for these projects total 6,629 MWH per year or \$455,800 at current electric rates, on average a less than 1 year payback period.

## **Project Lessons**

The project examples above show that there can be wide varieties in project and customer type, and in vendor approach, but there are common threads that support changes in the motor services industry.

- A customer may or may not be aware of a specific problem or opportunity. The customer may not even recognize problem operations: working around difficulties over time may make them appear ‘matter of fact’. Even if plant personnel do indeed recognize a problem, they often have significant barriers to implementing their own improvements. They’re not likely to happen, in-house. A vendor, as an objective observer may be better suited to recognize an opportunity.
- Vendors have long-term business interests in providing or brokering system efficiency services. They are in a competitive industry, and these services can help distinguish themselves from among their competitors. Also, these types of projects are likely to have higher profit margins than the vendor’s core business.
- There is strength in developing projects in the context of existing relationships. Once a vendor builds trust at a certain level of service, he is likely to hold the customer’s attention for the next level.
- A team process adds value. A trusted vendor-customer relationship may not be enough; an independent third party adds credibility and customer comfort.
- A customer may not know what they might find until they take a good hard look. A vendor may start out with a motor management planning inventory, but end up with a handful of motor system improvements or even process improvements.
- Non-electric benefits may be the best driver to sell a project to a customer. Cost savings are great, but improvements to a customer’s production activity really get his attention.

How do we make use of the lessons learned from the vendors’ experience? We suggest using elements of the various ‘vendor approaches’ highlighted above to encourage them and their peers to adopt packages of services. Motor vendors need to expand their business capabilities, and customers are receptive to motor services. It’s a match. What may be needed, to start the ball rolling, is some sharing of information, and some early market assistance. This may be an opportunity for a regional market transformation program approach.



## **Strategy Alternatives for Programs to Promote the “Vendor Approach”**

Vision of the motor services world in 2018. In the utopian world of motor services, fifteen years from now, motor users, large and small have plants that operate efficiently and reliably. Motors don't fail in use, rather they are serviced, in-use, during planned shut-downs. How does this happen, you ask? (Well, where have you been for the last fifteen years?)

The motor services industry has instituted the “Vendor Approach” as a value-added service for their customers. In the Vendor Approach, motor vendors are equipped with engineering expertise (internal or as a team), and have the marketing and sales capabilities to capitalize on customer needs and relationships. In addition to their motor sales and service business, they are now counted on to identify and build motor system projects for energy efficiency and productivity, for their valued customers.

The plants are more productive than before, and the motor shops are enjoying the rewards of having satisfied and productive customers. How did we get to this utopian ‘transformed’ market? It was through programs using a variety of market strategies. Here are some examples of possible Vendor Approach strategies:

### **Vendor as Service Provider**

In this model, the existing vendor, who may initially provide motor sales and motor repair, in some combination, becomes a value-added service provider. As shown, above, this can happen regardless of the size of the vendor. To develop this capability, the vendor may need to receive assistance from a program providing technical and sales support, such as from MDM.

A weakness of this approach is that the vendor may not have the technical skills needed to recognize all of the opportunities. He may have the trust and respect of the customer, but the customer may be aware of the vendor's limitations. A solution could be for the vendor to offer the customer a ‘team approach’, to bring in technical expertise. This could be a temporary solution, until the vendor develops expertise, or it could be an on-going approach.

### **Engineer as Service Provider**

An engineering firm with a working customer-relationship is well suited to build upon existing relationships and take on the role of motor service provider. The firm knows the customer's plant and processes, so the combination of expertise and familiarity is a plus.

A weakness to this approach might be that the engineer however is not equipped to implement projects. The customer would therefore still need to bring in someone, such as the ‘vendor’ for implementation. This is solved with a ‘team approach’, or with an understanding that the engineer or customer is responsible for engaging the implementation contractor.

## **Engineer-Vendor Team**

Combining the capabilities of the engineer and vendor to develop a plan, identify opportunities, and implement projects is a winner at several levels. The team approach makes use of a variety of skills, capabilities and relationships. The addition of the engineer as an objective third party offers validation for the vendor's work, and avoids the perception that "he's just trying to sell more motors". And, still, the combination comes from within the existing service industry, so the possibility of enduring is enhanced.

This approach is especially strong when the customer has existing relationships with both the engineer and the vendor. Difficulties can arise when one or the other are unfamiliar to the customer. This offers the opportunity for an objective party, perhaps a public interest program, can help.

## **Program Marketing Team Member**

As an initial model in development of the "vendor approach", public interest program intervention may help 'jump-start' the industry. A program representative teams up with a vendor or vendor-engineer combination, and assists with marketing and sales. This may come in the form of materials, training or personal presence. This brings a trusted provider (utility or other) to help defuse any fears or concern over a project's risk, and it validates the shop's service.

A caution in this approach is: what is the technical or skill level needed in the program representative? Project experience above tells us to leave the technical details to the 'experts'. The program personnel could be focused on providing marketing and sales assistance, by making introductions and providing credibility to the rest of the players.

## **Program Technical Expert Circuit Rider**

In this case the public interest program hires an engineer (circuit rider) to help customers develop a motor management plan, and to possible improvements to motor systems. Then the customer (perhaps with the help of the circuit rider) finds a service shop to 'build' the project.

This approach may serve to help start up the vendor services industry, but it has problems as a long-term strategy. It attempts to create a new industry of 'program circuit rider engineers'. This can be expensive, and can be too narrowly focused (he's a consultant, not an expert in our plant's process) because when the program goes away, so does the engineer.

## **Conclusions**

Customers gain value from motor vendor services. At the same time the motor services industry is in transition, and some shops are struggling to compete in a difficult motor sales and services market. Shops and service companies who make the effort to develop their capabilities and provide distinct, valuable and reliable services to their customers will endure.

Progressive motor shops have shown that it is possible to respond to the changing market. The examples above show that in a variety of markets and with varying resources, shops can rise to the challenge to develop and provide value added services.

Customers can be found who will appreciate and gain value from in-depth motor services. In the examples above, the customers are varied in size and sophistication. Yet they all benefited from projects that were developed through an existing service provider relationship.

The Northeast is ready for a transition to a market of motor service providers. Mature motor efficiency programs have served to develop awareness and visibility among the region's motor shops. Vendors have learned that they can prosper by selling up energy efficiency, and they can understand the transition to services in addition to 'sales'.

To test the market, program managers may wish to start small, then expand to full program implementation. A 'pilot' program may start in a small geographic division, such as a single utility service territory. Or, it could simply target a handful of potential leaders. Once it is shown that a program can work, others may be willing to join-in.

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