A Culture of Excellence:
Corporate Energy Management at 3M
A Corporate Energy Management Case Study
Sponsored by the U.S. Department of Energy, Industrial Technologies Program

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OVERVIEW

3M seeks to reduce energy consumed (Btus) per pound of product by 20 percent over the 2000 – 2005 time frame. This goal will require 3M's tier-1 plants (52 facilities worldwide) to achieve 3M's own "World Class" energy management label. 3M has already surpassed that target and promotes its energy performance in its product marketing, noting that superior energy cost control reduces the embedded energy cost that customers would normally absorb. Support for energy management at 3M begins at the corporate level. 3M's executive management believes that resource stewardship makes good business sense. As a result, the principles of energy management are an integral part of corporate culture.

What was the desired outcome of the corporate energy management (CEM) effort?

Momentum for energy management grew during the energy crises of the 1970s, when shortages and price increases upset expectations for "business as usual." During the 1980s, 3M's energy programs continued as a cost-saving opportunity. This focus has been maintained ever since.

What issues (or symptoms) led to the implementation of CEM?

3M's energy management efforts began in 1973. Progress has been monitored and recorded since then. During the 1990s, 3M noted that its plants got little help implementing new energy technologies. Accordingly, the energy management team expanded its role to include technology evaluation. Intended primarily to benefit 3M's own operations, the same knowledge generated by technology implementation was also used to support certain 3M product sales. 3M continues to find revenue opportunities related to its energy solutions knowledge.

What technical, managerial, and behavioral elements were developed?

Each plant with over $1 million in annual energy expenditures has its own energy management team. Each team has a mandate to reduce the intensity of its energy use (Btus per pound of product). Implementation begins with behavior and procedures relevant to current equipment. The behavior-first strategy saves money today while also building discipline that will raise the plant's ability to absorb new technology and demonstrate the effectiveness of its performance.

Plants are encouraged to conduct a walk-thru energy audit once per year. These audits result in suggestions for monitoring energy use and identifying priorities for control. Audit results are offered as suggestions, not directions.

Plants also have a self-assessment opportunity. A self-assessment checklist, maintained and offered by the 3M corporate energy management team, provides a 0-100 score describing how well plants follow their energy management programs. This exercise encourages fundamentals: having an energy team in place that includes representation from maintenance, production, and engineering; conducting audits annually; and identifying and prioritizing projects. The self-assessment calls for accurate measurement of energy use and cost allocations. 3M corporate maintains an Implementation Guide for reference purposes. The current goal for each plant in the self-assessment exercise is to achieve a "World Class" score of 85 percent or better.

How are empowerment and accountability addressed?

3M's current energy management strategy began in 1998 as the result of a brainstorming session with plant managers. Recommendations from this discussion were to "create accountability," conduct plant self-assessments, and develop a

FACTS & FIGURES:

3M: A global, diversified, technology enterprise characterized by inter-company cooperation in research, manufacturing, and marketing of products. 3M has a global presence in healthcare, industrial, display and graphics, consumer and office, safety, security and protection services, electronics, telecommunications and electrical, and transportation.

Revenues: $18.2 billion (2003)

Scope of operations: Operations in more than 60 countries. Twenty-eight of 3M's international companies have manufacturing operations ranging from small converting operations to full-scale manufacturing of multiple product lines.

Energy management team: Energy management at corporate level involves two people full time. A third person has international responsibility. Their annual budget is less than one percent of total energy spend. Activities address plant operations, environmental management, engineering selections, and product development support related to energy use in production. Responsibilities include demand-side management, conservation, and alternative fuels. Procurement falls elsewhere. 3M resources external to the energy management activity, as well as contract services, are widely used.

Key energy professional: Steve Schultz, the lead energy program manager: *"Low-hanging fruit grows back if you don't keep at it, but technology also gives you taller ladders."*

"World Class" concept. Quarterly operations results were developed for executive vice presidents, plant energy champions, and plant managers. Performance metrics compare energy cost and use per pound of product and current versus past-year performance and planned targets. Excesses are flagged. Corporate observers get behind the numbers, especially when single plants show performance metrics that are out of line with those of similar facilities. Graphics are crucial to summary presentations. A typical chart may depict energy consumption over time with a series of bars (histogram) with costs superimposed as a line. Momentum is maintained through regional energy conferences conducted once or twice per year that pull in energy champions from plants in the same region to discuss projects, problem solving, and new opportunities. Corporate staff attend these events to provide strategic updates.

What were the barriers to implementation, and how were they overcome?
In the past, a certain amount of plant-level resistance to energy management was ascribed to "pride in ownership," which refers to operators believing they "knew best" about their machinery and automatically discounted solutions that were "not invented here." Success stories shared through regional plant staff gatherings helped to overcome that thinking. Today, the barriers tend to be a lack of time and funding. However, that is more often true for plants that have not sufficiently prepared through use of energy audits and the self-assessment exercises described above. Still, plant managers' agendas come down to maintaining productivity and satisfying customers, and energy management tasks sometimes may be secondary. Energy stewardship is one of many variables used to evaluate plant performance.

How are results monitored and communicated?
3M developed a database for energy projects. Plants are directed to keep energy performance metrics up-to-date to allow corporate review. This cumulative record permits benchmarking that benefits all plants. 3M's database currently includes over 1,000 projects from around the world. Plant managers are able to search this database for technologies, prices, practices, rates of return, capital cost, and more. Cumulative data reveals tendencies that suggest priorities for future work, contacts for assistance, and ways to secure funding. Internet accessibility makes it easy for 3M plant managers everywhere to access energy benchmarks. Smart managers use this data to drive their energy-related contract negotiations, hedging, and similar risk management. Similar data measure environmental compliance. Results are translated into financial equivalents for management observers. Normalization of energy-to-product ratios aids plant-to-plant and year-to-year comparisons.

What are the tangible results to date (consumption, emissions, financial, etc.)?
Since 2000, 3M has reduced its energy intensity by 27 percent, which surpasses its 20 percent goal set for 2005. This accomplishment actually helps 3M with its marketing, in that the company can assure customers that the cost of inputs purchased from 3M are not needlessly inflated by embedded energy costs. Making energy reduction goals public is integral to this marketing strategy.

Who is the audience for the results?
Aside from downstream manufacturers who purchase inputs from 3M, observers include Wall Street analysts. 3M consistently ranks high among firms recognized by the Dow Jones Sustainability Index rating, which includes an energy usage indicator. A series of ads, placed in the *New York Times* and *Wall Street Journal* and paid for by the Packard Foundation, recognized 3M as one of five companies selected by the Alliance to Save Energy for outstanding energy-efficiency performance. In addition, industry peers monitor 3M's progress through trade associations and the U.S. Environmental Protection Agency's Energy Star network.

How do awards and recognition play a part?
3M recently launched an energy performance awards program which offers a range of prizes from getting a certificate to dining out at the company's expense.

In what way have BestPractices and related U.S. Department of Energy resources contributed to energy management?
3M is a U.S. Department of Energy Allied Partner, which is a relationship that permits DOE and 3M to collaborate in mutually beneficial energy research, development, and deployment. Also, 3M personnel have contributed their time to various DOE advisory functions, such as the BestPractices Steam Steering Committee.

What are the threats to the durability of the CEM effort, and how are these addressed?
3M's corporate energy management effort should be able to endure a change in personnel or leadership. The wildcard is any crisis in the wider economy, which may force a shift in priorities. During the 2000-2003 economic down-turn, energy management flourished as a cost-saving opportunity.

What remains to be done?
Overall, 3M plants need to better understand and pursue evolutionary technologies like combined heat and power (cogeneration) and waste-to-energy systems. There are always more opportunities to expand what they are currently doing.