

Performance Spotlight

Proven Tools and Practices to
Increase Industrial System Energy Efficiency



Industrial Technologies Program



Kodak:

MotorMaster+ Is the Foundation for Energy Efficiency at a Chemical and Imaging Technologies Plant

Project Summary

In 1995, staff at Kodak's plant in Rochester, New York, launched Kodak's Total Motor Program (TMP) to consolidate the plant's inventory of motors and associated spare parts. Later, the focus of the TMP was expanded to improving energy efficiency by retrofitting the plant's existing motors with smaller, more efficient motors. To determine which motors to retrofit, the Rochester plant's staff began using the U.S. Department of Energy's (DOE) MotorMaster+ software systematically to assess motor efficiency and evaluate the energy savings potential of new motors. Since 2002, Kodak has retrofitted approximately 600 motors with National Electrical Manufacturers Association (NEMA) Premium™ efficiency models, based on assessments made using MotorMaster+. Total annual energy and cost savings from these retrofits are 5,802,000 kWh and \$664,000, respectively. Since total project costs were approximately \$1.5 million, the simple payback is slightly more than 2 years.

Benefits

- Saves \$664,000 annually
- Reduces annual energy consumption by more than 5.8 million kWh
- Reduces maintenance costs
- Achieves a 2.3-year simple payback

Applications

Industrial motor-driven systems can consume a significant portion of the electricity used in manufacturing plants. Properly selecting and configuring the motors as production processes evolve can yield important energy savings and maintain production reliability.

Plant/Project Background

Rochester is home to Kodak's corporate headquarters as well as to its largest U.S. manufacturing facility, research and development activities, and a corporate services office. Originally developed more than 100 years ago, the site covers eight square miles, contains 20 million square feet of building space, hundreds of miles of roads, and 22 miles of railroad track. Two power plants with an aggregate capacity of 200 MW supply most of the electricity that the facility requires. Between 40,000 and 50,000 motors serve the plant's production processes at any given time.

Several years ago, Kodak managers realized that many supporting motor systems were oversized for newer production technologies and that this resulted in excessive energy and maintenance costs. Therefore, they initiated a "recommissioning program" to reduce energy use by retrofitting, whenever feasible, existing motors with smaller motors rated for premium efficiency to better serve the new production equipment. A rotating-equipment team was formed that included Kodak's motor vendors, managers, and maintenance personnel. The team met weekly to determine which motors to retrofit and to coordinate implementation issues.



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Results

The recommissioning program is yielding impressive energy and ancillary savings. To date, about 600 motors from 1 to 150 horsepower in size have been retrofitted with NEMA Premium efficiency motors for applications such as refrigeration; heating, ventilation, and air-conditioning; exhaust fans; chillers; and manufacturing equipment. These retrofits are yielding annual energy savings and energy cost savings of approximately 5.8 million kWh and \$404,000, respectively. Including annual maintenance savings of \$260,000, total annual savings amount to \$664,000. Because implementation costs thus far total \$1.5 million, the simple payback is a little more than 2 years. In addition, Kodak's Rochester plant is sharing the lessons of the TMP with the company's plant in Windsor, Colorado, where a similar effort is being considered.

Lessons Learned

Aging and improperly configured industrial motor systems can waste energy and increase maintenance and operating costs. Because newer production processes and technologies can require less energy, supporting motors and motor systems need to be reviewed to determine whether they are appropriately sized for the applications they support. At Kodak's Rochester plant, replacing large, aging motors with NEMA Premium efficiency models yielded important energy and maintenance savings. The systematic use of MotorMaster+ is a key component of Kodak's TMP because it helps to both analyze opportunities for energy savings and streamline the procurement process. Programs such as Kodak's TMP can help many industrial facilities manage their motor systems and identify energy efficiency opportunities.

MotorMaster+ is a software tool developed by DOE to help users identify and evaluate the energy savings potential of their motor systems. An energy-efficient motor selection and management tool, **MotorMaster+** includes a catalog of more than 20,000 AC motors. The software's capabilities include motor inventory management tools, maintenance log tracking, efficiency analysis, savings evaluations, energy accounting, and environmental reporting. You can obtain it free of charge online (www.eere.energy.gov/industry/bestpractices/software.html) or order it from the EERE Information Center (1-877-337-3463).



Robert Steele

Project Partners

Eastman Kodak Company
Rochester, NY

Kaman Industrial Equipment
Rochester, NY

Partner Profile

Robert Steele is a motor technologist at Kodak with more than 30 years' experience in electronic and electromechanical maintenance. He has coordinated the Total Motor Program for the past five years at Kodak's Rochester plant. In this position, he uses DOE's **MotorMaster+** software tool systematically to evaluate motor efficiency, and this helps to determine when to replace or repair existing process motors.

DOE System Assessment Software

Industry professionals who are involved in system or plant operations, engineering, or management often use DOE software to evaluate their plants' motor and industrial systems. DOE offers one-day training workshops in compressed air, electric motor, fan, process heating, pump, and steam systems that teach the DOE assessment software tools (**AIRMaster+**, **MotorMaster+**, **FSAT**, **PHAST**, **PSAT**, and a suite of steam system tools). These workshops assist attendees in identifying cost-cutting and efficiency opportunities in their plants.

BestPractices is part of the Industrial Technologies Program, and it supports the Industries of the Future strategy. This strategy helps the country's most energy-intensive industries improve their competitiveness. **BestPractices** brings together emerging technologies and energy-management best practices to help companies begin improving energy efficiency, environmental performance, and productivity right now.

BestPractices emphasizes plant systems, where significant efficiency improvements and savings can be achieved. Industry gains easy access to near-term and long-term solutions for improving the performance of motor, steam, compressed air, and process heating systems. In addition, the Industrial Assessment Centers provide comprehensive industrial energy evaluations to small- and medium-size manufacturers.

A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.

FOR ADDITIONAL INFORMATION, PLEASE CONTACT:

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