

## Save Energy Now in Your Motor-Driven Systems

### Facts & Figures

- About one-third of the nation's total energy use is consumed in U.S. industrial facilities.
- Even plants with energy management programs can often save 10% to 15% more using best practices to increase their energy efficiency.
- Industrial plants can often reduce their current electricity use and costs by about 5% to 15% or more by improving the efficiency of their motor-driven systems.

### Benefits

- Energy efficiency improvements can reduce utility bills and improve your plant's bottom line.
- Many improvements require little or no extra investment, are easy to implement, and have payback times of less than a year.
- Strategies that increase energy efficiency often reduce operating and maintenance costs, minimize waste, and enhance production.
- Energy efficiency helps to reduce negative impacts on the environment and can enhance corporate community relations programs.

### Resources

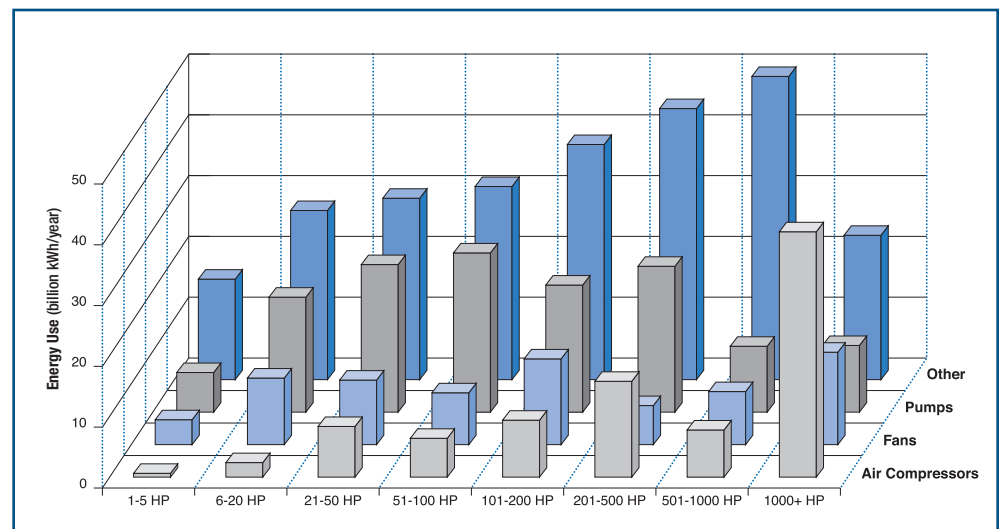
For more information on industrial motor system efficiency, to obtain DOE's analysis and assessment tools for motor-driven systems, and to learn more about DOE Qualified Specialists and training opportunities, visit the BestPractices Web site, [www.eere.energy.gov/industry/bestpractices/](http://www.eere.energy.gov/industry/bestpractices/).

Motor-driven equipment—such as pumps, air compressors, and fans—consumes about 16% of all the energy used in U.S. industrial applications. Industry as a whole consumes more than 700 billion kWh and spends more than \$30 billion annually for electricity dedicated to motor-driven systems. Plants can begin reducing this energy usage and cost by using an integrated systems approach to improving performance, selecting motor-driven equipment with the highest possible energy efficiency, and implementing effective system management practices.

As energy costs continue to rise, industrial plants need effective ways to reduce the amount of energy consumed by their motor-driven systems. To help meet this need, the U.S. Department of Energy's (DOE) Industrial Technologies Program (ITP) works with the nation's most energy-intensive plants to uncover opportunities for reducing energy use and costs while maintaining—or increasing—productivity. ITP resources can also help industrial plants reduce maintenance costs, improve the reliability and efficiency of their motor-driven systems, and minimize unscheduled downtime.

### Potential for Savings

A U.S. electric motors market assessment prepared for DOE in 1998 estimated that manufacturers could reduce their motor energy consumption by an average of



**Motor system energy consumption** (Adapted from information in the *United States Industrial Electric Motor Systems Market Opportunities Assessment*, available online at [www.eere.energy.gov/industry/bestpractices/](http://www.eere.energy.gov/industry/bestpractices/).)



11% to 18% by using energy-efficient technologies and practices. Thus, there is great potential for savings. ITP software tools such as the Pumping System Assessment Tool (PSAT), AirMaster+, and the Fan System Assessment Tool (FSAT) can uncover good opportunities for energy savings and enhanced energy management.

ITP's MotorMaster+ and MotorMaster+ International software can help you maintain and manage your motor-driven systems for greater energy efficiency. An independent report prepared by Xenergy, Inc., stated that MotorMaster+ has already helped industry save more than \$2.4 million and 50,700 MWh annually (*Evaluation of the U.S. Department of Energy Motor Challenge Program, 2000*).

## Start Saving Today

Some typical opportunities for increasing the efficiency of your motor-driven systems are shown in the table. Using ITP's resources—such as tip sheets, sourcebooks, case studies, and software assessment tools—you can begin assessing and improving these systems today.

Typical Ways to Increase Motor System Efficiency *	
<b>Pumps</b>	<ul style="list-style-type: none"> <li>Maintain pumping systems effectively</li> <li>Match pumps to system requirements</li> <li>Select energy-efficient centrifugal pumps</li> <li>Trim or replace impellers on oversized pumps</li> <li>Reduce energy losses across control valves</li> <li>Optimize parallel pumping systems</li> </ul>
<b>Compressed Air</b>	<ul style="list-style-type: none"> <li>Determine the cost of compressed air for your plant</li> <li>Eliminate inappropriate uses of compressed air</li> <li>Minimize system leaks and establish a leak management program</li> <li>Analyze your systems to determine flow, pressure, and air quality needs</li> <li>Adjust compressor controls to meet system requirements</li> <li>Establish preventive maintenance strategies</li> <li>Take steps to stabilize or reduce system pressure, including appropriate storage</li> </ul>
<b>Fans</b>	<ul style="list-style-type: none"> <li>Check belt condition, tightness, and alignment</li> <li>Lubricate bearings and replace worn ones, as needed</li> <li>Clean system components regularly</li> <li>Check ductwork for leaks</li> </ul>
<b>Motors</b>	<ul style="list-style-type: none"> <li>Match motors to required system loads</li> <li>Match motors and drives properly</li> <li>Select energy-efficient or premium-efficiency replacement motors</li> <li>Replace V-belts with cogged or synchronous belt drives</li> <li>Use adjustable-speed drives</li> </ul>

\*For more, look for ITP's tip sheets for pumps, compressed air, fans, and motors in the Resources section of the BestPractices home page: [www.eere.energy.gov/industry/bestpractices](http://www.eere.energy.gov/industry/bestpractices).

*ITP provides U.S. industries with software assessment tools, training, technical information, and assistance. These resources and energy management practices help plants improve the energy efficiency of their process heating, steam, pumps, compressed air, and other systems; reduce operating costs; and improve their bottom line.*

BestPractices is part of the Industrial Technologies Program, and supports DOE's strategy to help 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 process heating, steam, pumps, compressed air and other motor-driven 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 More Information, Contact:

EERE Information Center  
1-877-EERE-INF  
(1-877-337-3463)  
[www.eere.energy.gov](http://www.eere.energy.gov)

Or visit these Web sites:

Industrial Technologies Program (ITP)  
[www.eere.energy.gov/industry](http://www.eere.energy.gov/industry)

ITP BestPractices  
[www.eere.energy.gov/industry/bestpractices](http://www.eere.energy.gov/industry/bestpractices)

Save Energy Now  
[www.eere.energy.gov/industry/saveenergynow](http://www.eere.energy.gov/industry/saveenergynow)

U.S. Department of Energy  
Energy Efficiency and Renewable Energy  
Washington, DC 20585-0121

DOE/GO-102006-2276  
January 2006