

Best Practices

Best Practices — Industries of the Future



Energy-smart technology for today



Office of Industrial Technologies



Office of Energy Efficiency and Renewable Energy
U.S. Department of Energy



partnership

BestPractices is changing the way industry thinks about its energy use

Solutions for today

BestPractices works with OIT's Industries of the Future to advance long-term research and development priorities and subsequent technologies identified in industry roadmaps. In addition, BestPractices offers a wide array of resources and assistance for companies looking for near-term solutions.

- *Plant assessments help manufacturers identify opportunities for immediate cost savings.*
- *DOE experts in industrial energy management provide targeted, in-plant technical assistance.*
- *Training sessions educate plant personnel on the use of software to assist with systems improvements.*
- *Allied Partners work with industry to promote industrial energy efficiency practices and technologies.*

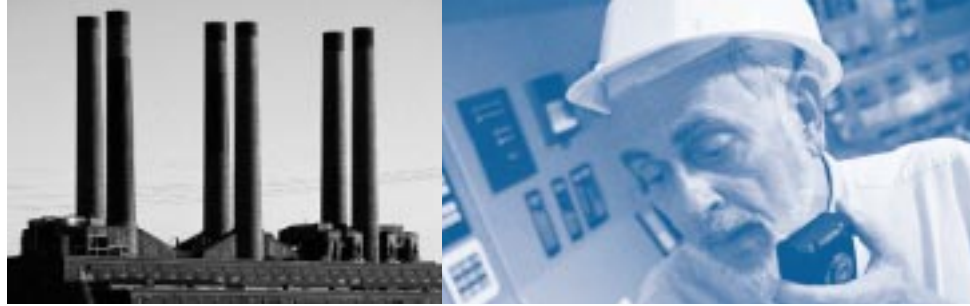


In 1999, the U.S. Department of Energy's Office of Industrial Technologies (OIT) combined its successful "challenge" programs for motors, steam, and compressed air; implemented cost-shared, plant-wide assessments; and accelerated the application of emerging technologies to build a center of energy management expertise—called "BestPractices"—to support the OIT Industries of the Future. By implementing emerging technologies, applying a plant-wide systems approach, and utilizing a network of partners to provide technical assistance and resources, BestPractices is helping industries manage energy more effectively.

Critical to the success of BestPractices are its Allied Partners, who enhance the Industries of the Future strategy by working with these industries to implement proven technologies along with the best energy management practices. Allied Partners—manufacturers, industrial service and equipment providers, industry trade associations, utilities, and other organizations—agree to work with BestPractices to increase energy efficiency and productivity for industrial manufacturers. And they make a difference. As an effective channel to industrial end-users, Allied Partners engage in a wide variety of activities to transform industrial energy use.

For example, Allied Partners may choose to invest in or promote efficient technologies, distribute materials on increasing energy efficiency, or conduct workshops using BestPractices training materials to educate their customers or staff. Efforts by Allied Partners have already led to estimated industrial energy savings of \$8.7 million annually from the increased efficiency of motor systems alone.

For more information on OIT's BestPractices for the Industries of the Future, visit www.oit.doe.gov/bestpractices



To further enhance its effectiveness with the Industries of the Future, BestPractices has commissioned a 13-member Industry Steering Committee to provide guidance on efficient means of delivering BestPractices products and services to industry. Each of the industries is represented on the committee, along with association representatives from the areas of motors and drives, steam, compressed air, pumping, and process heating systems. In bringing together experts from both industry and systems perspectives, the Steering Committee provides the program with a dynamic exchange of information and ideas that lead to integration and cross-application of energy technologies throughout industry.

In addition, their extensive knowledge and experience in their respective industries positions the members of the BestPractices Steering Committee to provide feedback to program participants on the types of information and activities that industry finds most useful and appropriate to their energy management operations. The Steering Committee will also help BestPractices identify opportunities to increase industrial use of emerging technologies, raise awareness of public policy issues affecting industrial energy use, and monitor the overall effectiveness of the program.

Partnerships in progress

With the support of BestPractices, Allied Partners help their customers and staff realize significant energy and cost savings as well as other benefits.

- California's Sacramento Municipal Utility District (SMUD), an Allied Partner, offers its customers a variety of assistance and tools to help them improve the efficiency of their motor, pump, and other systems. At the Georgia-Pacific Resin Plant, SMUD staff performed motor diagnostic testing on 20 critical motors during an annual shutdown. They discovered a motor defect—low resistance to ground reading—plus defective and poor-quality wiring. As a result of this discovery, a \$60,000 product loss was avoided.*
- Allied Partner McBroom Electric, working with US Electrical Motors, conducted a motor analysis for Cummins Engine Company, Inc., using MotorMaster+*

software, and performed a comprehensive audit of the motors used in Cummins' manufacturing process. As a result, nearly 800 energy-efficient motors were installed, and an estimated annual savings of \$200,000 in motor energy costs was realized.

- The Compressor Distributors Association (CDA) is a BestPractices Allied Partner with approximately 600 member companies who serve thousands of end users of industrial compressed air. In 2000, the CDA sponsored a national training series for equipment distributors and manufacturers' representatives on the principles of a systems approach. Approximately 600 distributors participated in this customized two-and-a-half-day Compressed Air Challenge® training, and many have already agreed to work with DOE to co-host a Compressed Air Challenge® training workshop for their customers.*

Plant-level assessments act as catalyst for change

Energy use can account for 10 percent or more of an industry's total operating costs. BestPractices offers a range of services—plant-wide assessments, Industrial Assessment Center audits, and in-plant technical assistance—to identify savings opportunities to offset these costs.

- BestPractices' **plant-wide assessments** allow a manufacturer to take a comprehensive look at energy use throughout plant operations. The assessments evaluate opportunities for substantial improvements in industrial energy efficiency, waste reduction, productivity, and global competitiveness. Plant-wide assessments are cost-shared (up to \$100,000 in DOE funds) and use process engineering and best practice analysis techniques. More than 25 companies have been awarded plant-wide assessments through solicitation requests. For a relatively low initial investment, these plants can expect to realize a minimum of \$1 million in savings annually from energy costs, waste reduction, and increased productivity—usually with a payback of less than 18 months.
- Small- to medium-sized manufacturers may be eligible to receive assessments by university-based **Industrial Assessment Centers**. Teams of engineering faculty and students from the centers, located at 26 universities around the country, conduct energy, waste reduction, and productivity improvement audits and then provide recommendations to manufacturers. Recommendations from industrial assessments have averaged about \$55,000 in potential annual savings for each manufacturer.
- DOE experts in industrial energy management are available to provide targeted, **in-plant technical assistance** to identify specific systems areas for improvement. Companies interested in hosting a showcase event can request a walk-through assessment (one to three days) to identify opportunities for increased savings and productivity in industrial systems such as motors, steam, compressed air, pumping, and process heating.

Plant-wide assessments in action

BestPractices cost-shared funding for plant-wide assessments helps industry identify many opportunities for savings and productivity improvements. For example, water pinch analysis of Boise Cascade's pulp and paper mill in International Falls, Minnesota, identified opportunities to recycle hot effluent streams to reduce the need for process steam, fresh water, and energy to cool the effluent. The four projects and two process modifications selected for implementation will remove 45.6 million Btu per hour from the effluent, save \$707,000 annually (with a payback of three years), and reduce steam use by 28,100 pounds per hour.

A plant-wide assessment at Alcoa's aluminum extrusion plant in Lafayette, Indiana, identified eight areas for further analysis. Energy-saving opportunities include improved heat recovery, furnace operations, and metering, as well as development of process energy use targets. Collectively these projects could save the plant more than \$1.9 million annually; the \$2.3 million capital investment has a payback period of only 18 months.



Implementation support and validation move technology closer to commercialization

Integrating emerging technologies into industrial processes may be seen as a risk unless performance data are collected and verified through an unbiased, independent third party. BestPractices offers cost-sharing support to provide this verification and thereby facilitate technology adoption.

Technologies that have undergone full-scale demonstration are replicated in other plants under varying use conditions. Before a technology is implemented (either in the demonstration or replication stage), an independent third party (such as a DOE national laboratory) establishes a validation and verification plan for the technology to determine what meaningful data to include, what instrumentation should be used to take measurements, and how frequently to collect data. Once the technology is properly installed, the data are collected and analyzed and savings are verified.

Showcases demonstrate energy efficiency and process improvements

Showcase Demonstrations are public events designed to highlight the benefits of energy efficiency and resource productivity by allowing others to observe five or more leading-edge technologies applied in real-use conditions. Showcases are the culmination of several months of effort by an industrial partner with assistance from OIT, including an initial plant-wide assessment, subsequent installation of energy-efficient process technologies and improved systems, and an independent third-party validation of technology performance and costs. During a showcase, facility tours are held at one or more plant sites, and workshops, seminars, and presentations may be conducted.

A wide range of OIT resources is available to host sites, including cost-sharing of the expenses involved in organizing the event. OIT uses showcases to publicize and promote energy-saving technologies and practices. In turn, by showcasing leading-edge technologies that conserve energy, protect the environment, and boost productivity, host plants enhance their image as leaders in their industry and the local community.

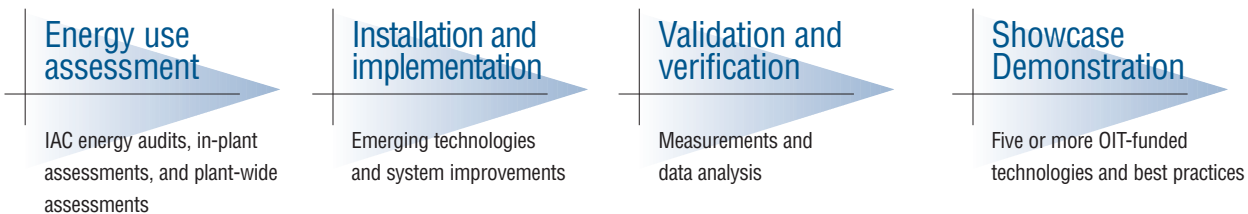


Showcase Demonstrations

Recent showcases have illustrated significant energy savings and productivity increases. Lester Die Casting realized a 20% extension in usable time between maintenance cycles, reduced scrap by as much as 20%, and increased production from 50 parts per hour to 60 parts per hour by using a visualization tool to identify die design improvements.

At the Pittsburgh Regional Technology Showcase, Weirton Steel featured technologies that are expected to result in annual savings of \$76,000 in repair and maintenance costs and \$60,000 in energy costs, after making several improvements to their compressed air system.

The Road to a Showcase Demonstration



Energy management foundation for U.S. industry



BestPractices products and services help to extend industry's energy management practices and leverage limited research and development budgets. BestPractices serves all of the Industries of the Future, and many OIT-supported emerging technologies and systems are applicable across industries. The integration of BestPractices into the Industries of the Future strategy has resulted in the formation of the Industry Steering Committee, the participation of nearly all of these industries in recent plant-wide assessments, and the growing popularity of Showcase Demonstrations among the industries.

BestPractices recognizes the efforts of OIT partners to implement and promote industrial energy efficiency by publicizing their successes through activities such as:

- Annual awards for energy and cost savings
- Showcase Demonstrations
- Published case studies
- Articles in the *Energy Matters* newsletter
- Annual program reports
- Press releases and articles sent to industry publications

How to get involved

There are a number of opportunities to participate in BestPractices activities:

- *Respond to solicitations for plant-wide assessments and technology validation and verification*
- *Attend one of our many training classes*
- *Visit our Web site for current news and information*
- *Become an Allied Partner*
- *Sign up to host a Showcase Demonstration*
- *Subscribe to the Energy Matters newsletter*

**For more information, please contact the
OIT Clearinghouse at (800) 862-2086.**

www.oit.doe.gov/bestpractices





Resources and tools assist energy-saving efforts

In addition to its many industry activities, BestPractices offers a wide range of resources and tools. BestPractices technical assistance targets immediate cost-saving opportunities and productivity improvements for Industries of the Future customers. Technical assistance includes a continuum of services—from energy assessments and evaluations to determine a plant’s energy use, to information on industrial equipment and systems to facilitate plant improvements, to tools and resources for measuring the effectiveness of new technologies. Technical experts on industrial systems and processes are available to assist with the matching and integration of components within and among plant systems.

The OIT Clearinghouse is the central access point for the Office’s products and services. Knowledgeable staff members are on hand to field questions, provide advice, and disseminate products. Information products available through the Clearinghouse include fact sheets, case studies, sourcebooks, tip sheets, software, and energy assessment reports.

Software decision tools are available to help plants save money through proper selection and efficient operation of equipment. These tools include:

- MotorMaster+—repairing or replacing electric motors with recommendations on purchasing selection
- ASDMaster—evaluating the use of adjustable speed drives
- PSAT—finding potential savings in pump systems
- 3E Plus—optimizing savings in steam pipes and equipment
- AirMaster+—maximizing the efficiency and performance of compressed air systems

BestPractices offers training classes around the country that focus on such topics as:

- Getting top performance from your steam system
- Understanding pump systems
- Managing motor systems
- Applying the fundamentals as well as advanced management to compressed air systems

BestPractices’ award-winning *Energy Matters* newsletter carries articles from industry experts, tips for performance optimization, case studies, and news on current program activities.

The BestPractices Web site (www.oit.doe.gov/bestpractices) provides information on plant assessments, Showcase Demonstrations, current solicitations, training, Allied Partner activities, and a range of publications, software, and databases.



For more information on BestPractices,
contact the OIT Clearinghouse at (800) 862-2086
or visit www.oit.doe.gov/bestpractices

Please send any comments, questions, or suggestions to webmaster.oit@ee.doe.gov



Office of Industrial Technologies
Office of Energy Efficiency and Renewable Energy
U.S. Department of Energy