

## Energy-Saving Opportunities for Manufacturing Enterprises

The United States Department of Energy (U.S. DOE) strives to meet national energy intensity and climate goals by providing energy management tools and resources, plant audits, and new technologies to the nation's manufacturers.



### Energy Audits Reduce U.S. Industry Energy Costs

Since 2006, more than 900 large U.S. companies have participated in Save Energy Now audits. The average energy cost savings identified by an audit of a single energy-intensive system within an enterprise is \$1.4 million USD. The average source energy savings identified by an audit is 190 billion Btu (6,900 tce), or 6.5% of the total source energy consumed by the enterprise. The average natural gas savings identified is 128 billion Btu (5,300 tce) per energy audit, or 6% of the plant's total natural gas consumption. Average CO<sub>2</sub> emissions

reduction identified is 12,000 metric tons per plant per year.

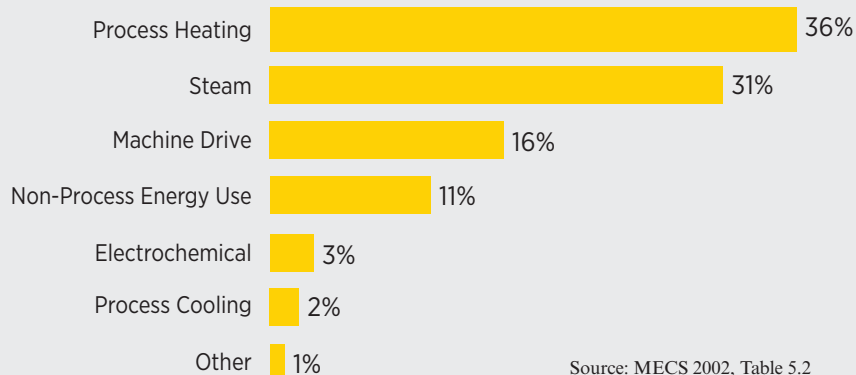
In addition, more than 1,700 small- and medium-sized U.S. companies have participated in Industrial Assessment Center audits since 2006, identifying average energy cost savings of \$165,000 USD per audit. The average source energy savings identified by an audit is 23 billion Btu (900 tce), or 8% of the total source energy consumed by the enterprise. The average natural gas savings identified is 8.7 billion Btu (400 tce) per energy audit, and average CO<sub>2</sub> emissions reduction identified is 1,400 metric tons per plant per year.

### Energy Audit Process

U.S. DOE energy audits apply software tools to identify energy savings opportunities in energy-intensive heating, steam, compressed air, motors, pumps, and fan systems. Two types of audits are offered:

- Large enterprises: U.S. DOE Energy Experts conduct 3-day audits at U.S. facilities that have a minimum annual energy use of 0.5 trillion Btu (18,000 tce) and significant potential for implementing energy efficiency improvements.
- Small- and medium-sized enterprises: 1-day audits are conducted by a team

### Manufacturing Energy End Use



Source: MECS 2002, Table 5.2

Targeting the top two energy-consuming systems, *Save Energy Now* audits have identified average process heating source energy savings of 11.03% and steam source energy savings of 7.03% per enterprise.

### Save Energy Now Success Factors

- Facilitate an energy management approach to identify and implement energy- and carbon-saving technologies and best practices
- Achieve quick energy and cost savings with a small investment
- Focus on improving system-based energy efficiency with minimal effect on production
- Use proven software tools and resources based on U.S. DOE research in industrial energy use and management

of engineering faculty and students through the U.S. DOE Industrial Assessment Centers, located at 26 U.S. universities.

**Software Tools**

Free software decision tools developed by the U.S. DOE can help enterprises find ways to reduce energy use and costs. Several of the system-specific tools feature metric units and international currencies.

**Training**

A key component of the U.S. DOE Save Energy Now model is educating manufacturing facility employees and energy consultants about industrial system efficiency, including how to use the software tools to analyze and enhance industrial system performance.

**Energy Management Standards**

In preparation for the international energy management standard, ISO 50001, the U.S. DOE is providing training and support to help U.S. enterprises implement energy management strategies and the American National Standards Institute (ANSI) Management System for Energy (MSE) standard, ANSI/MSE 2000–2008.

**Energy-Efficient Technologies**

Since 1979, the U.S. DOE has supported more than 600 separate industrial technology research, development, and demonstration projects that have resulted in significant improvements for U.S. manufacturers.

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**U.S. Energy Savings Results**

The table below shows the overall potential annual savings identified in *Save Energy Now* energy audits.\*

Average Savings Amount Identified Per Audit	Large Enterprises (annual source energy consumption > 0.5 trillion Btu** or 18,000 tce)	Small or Medium Enterprises (annual source energy consumption < 0.5 trillion Btu or 18,000 tce)
<b>Cost Savings</b>	\$1.4 million USD	\$165,000 USD
<b>Energy (source)</b>	190 billion Btu (6.5%) (6,840 tce)	23 billion Btu (8%) (830 tce)
<b>Natural Gas</b>	128 billion Btu (4,600 tce)	8.7 billion Btu (313 tce)
<b>Carbon Dioxide (CO<sub>2</sub>)</b>	12,000 metric tons	1,400 metric tons

\*Annual savings numbers based on small, medium, and large plant assessments as of September 2010.  
\*\*BTU (British Thermal Unit). 1 billion Btu = 36 tce.



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Download software tools and publications, view training sessions, and learn more about the U.S. DOE *Save Energy Now* resources at [www.industry.energy.gov](http://www.industry.energy.gov). For more information, please contact: James Quinn, U.S. Department of Energy, [james.quinn@ee.doe.gov](mailto:james.quinn@ee.doe.gov).

The U.S. Department of Energy Office of Energy Efficiency and Renewable Energy supports research and development in energy efficiency and renewable energy technologies to improve the U.S. economy, provide for a cleaner environment, and increase U.S. energy independence. The Industrial Technologies Program works with U.S. industry to improve industrial energy efficiency and environmental performance.