

The Pumping System Assessment Tool (PSAT)

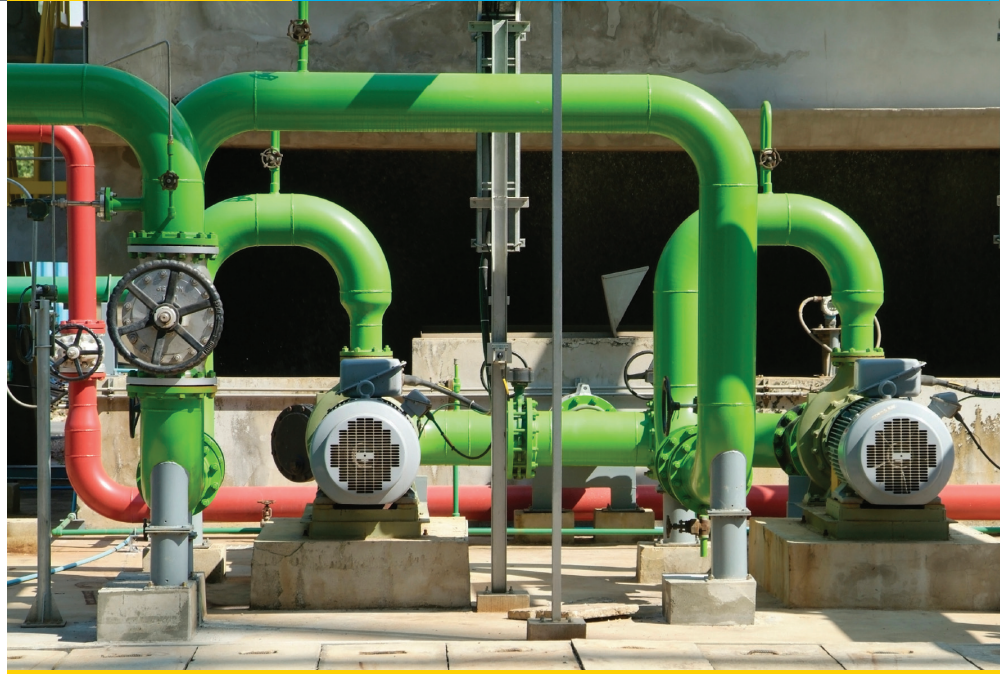
The U.S. Department of Energy's (DOE's) Industrial Technologies Program (ITP) offers a collection of software tools to help you identify and analyze energy system savings opportunities within your plant or facility. As part of ITP's Tool Suite, the Pumping System Assessment Tool (PSAT) enables you to evaluate the energy efficiency opportunities of your pumping system using an unbiased approach. This, in turn, could lead to further private sector detailed engineering analyses and design specifications with the goal of implementing identified energy-saving opportunities.

Benefits of PSAT

- Establish system efficiency
- Quantify potential energy savings
- Examine the economic and energy impacts of different operating scenarios
- Provide data for trending system performance
- Clarify impacts of operational changes on demand charges
- Identify degraded or poorly performing pumps.

Resources

To download PSAT, other free software tools, or to learn more about DOE Qualified Specialists and training opportunities, visit www.eere.energy.gov/industry/bestpractices.



Improve Pumping System Performance with PSAT

PSAT software uses data that is typically available or easily obtained in the field (e.g., pump head, flow rate, and motor power) to estimate potential energy and dollar savings in industrial pump systems.

Pump Prescreening

Use the PSAT prescreening filter to identify areas that are likely to offer the greatest savings. Look for symptoms associated with inefficient energy consumption, such as

- Throttle-valve control for the system
- Cavitation noise or damage in the system
- Continuous pump operation to support a batch process
- Constant number of parallel pumps supporting a process with changing demands
- Bypass or recirculation line normally open
- High system maintenance
- Systems that have undergone change in function.

Quantifying Potential Savings

Not only does PSAT identify energy-savings opportunities in pumping systems, but it also quantifies those opportunities in both dollars and electrical energy savings. Although PSAT does not tell you how to improve systems, it does allow users to identify the pumping systems most in need of further investigation.

PSAT assesses current pump system operating efficiency by comparing field measurements of the power delivered to the motor with the fluid work (flow and head) required by the application. It estimates a system's achievable efficiency based on pump efficiencies (from Hydraulic Institute standards) and the performance characteristics of pumps and motors (based on the MotorMaster+ database). Subsequent comparison of the actual and achievable efficiencies distinguishes systems with lower levels of opportunity from those that warrant additional engineering analysis.

PSAT Gets Results

Significant savings may come from one large application or process, but may also develop from multiple small applications that, when combined, keep total consumption low enough to avoid increased utility charges based on threshold demand.

At a gold mine, PSAT identified three pumping systems in need of further analysis. More than \$170,000 per year (2,398,200 kilowatt hours [kWh]) in potential savings was identified.

Analysis at a paper mill identified one system that presented a significant energy-savings opportunity. Potential savings of more than \$64,000 per year (2,252 megawatt hours) were traced to inefficient operating practices rather than pump degradation.

Smaller facilities are not exempt from energy savings. An aluminum rolling mill applied PSAT to four related systems and identified more than \$38,000 per year (1,015,000 kWh) in potential savings.

A PSAT analysis of three systems in an Alcoa plant identified \$110,000 per year in potential savings.

A USX steel mill employed PSAT to examine its hood spray application that used bypass flow control. The mill discovered an opportunity to save \$41,700 per year and use 13% less energy. The bypass flow control set up was replaced with a properly sized pump and energy efficient motor that would operate only when required.

As of September 2008, ITP conducted 59 targeted pumping system assessments. The table below summarizes the results of these assessments.

Pumping System Savings Identified by Industry*

Industry (No. of Assessments)	Average Energy Savings (kWh/year)	Average \$ Savings (Annual)
Automotive (4)	24,105	\$97,514
Cement (1)	3,005	\$21,300
Chemical (5)	65,516	\$416,422
Electronics (1)	13,287	\$194,659
Food Processing (4)	3,445	\$25,967
Forest Products (13)	23,075	\$113,805
General Manufacturing (13)	25,702	\$131,946
Glass (7)	9,792	\$104,000
Mining (1)	387,609	\$1,282,500
Petroleum (1)	49,865	\$181,150
Steel (9)	74,990	\$251,000

* As of September 2008

PSAT will be a part of the upcoming Energy Management Toolkit, which will act as the primary delivery mechanism for additional tool access from the Energy Management Portal.

Support and Training

ITP offers a 1-day workshop that highlights the benefits of pumping system optimization and examines pumping system performance characteristics and practical issues concerning measurement data. The session covers PSAT software functionality, data collection, how to use the software when measured data is not available, and interpreting the results. DOE has developed a PSAT Specialist Qualification as an additional level of training for industry professionals who are interested in becoming proficient in using the software tool. In addition, ITP offers an introductory 2-hour Webcast on how to use PSAT to identify energy-savings opportunities. Visit ITP's online Training Calendar for a list of upcoming sessions: www.eere.energy.gov/industry/bestpractices/events_calendar.asp.

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, DOE's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.

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For more information, please contact:

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