E3: ECONOMY · ENERGY · ENVIRONMENT

SUPPORTING MANUFACTURING LEADERSHIP THROUGH SUSTAINABILITY

Energy Resource Center

U.S. Department of Energy
Advanced Manufacturing Office

presented by
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Project Performance Corporation

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Advanced Manufacturing Office

Key Objectives and Priorities

The mission of the Advanced Manufacturing Office (AMO) is to co-invest with private and public partners to improve U.S. competitiveness, save energy, create high-quality domestic manufacturing jobs and ensure global leadership in advanced manufacturing and clean energy technologies.

Main Goals:

- Reduce the life-cycle energy consumption of manufactured goods by 50 percent over 10 years for AMO supported technologies
- Encourage a culture of continuous improvement in corporate energy management
- Support achievement of 40 GW of new combined heat and power by 2020

Technology Deployment Resources

AMO helps manufacturers across the supply chain reduce energy costs and get the most out of existing manufacturing facilities by providing unbiased information, technical assistance, and AMO resources.

- In-plant technical assistance
  - Hands-on assessments of small and medium-sized manufacturing firms through the Industrial Assessment Centers
  - In-plant trainings through the Better Plants Program
  - Combined heat and power feasibility analysis through the regional Clean Energy Application Centers
- Informational materials
  - Case studies, Sourcebooks, Design and retrofit guidelines, Fact and tip sheets
- Training materials
  - Webinar introductory courses
  - Certified Practitioners
- Tools
  - Process heating, steam, motors, pumps, fans and compressed air, Energy and carbon baselining

Energy Resource Center (eCenter)

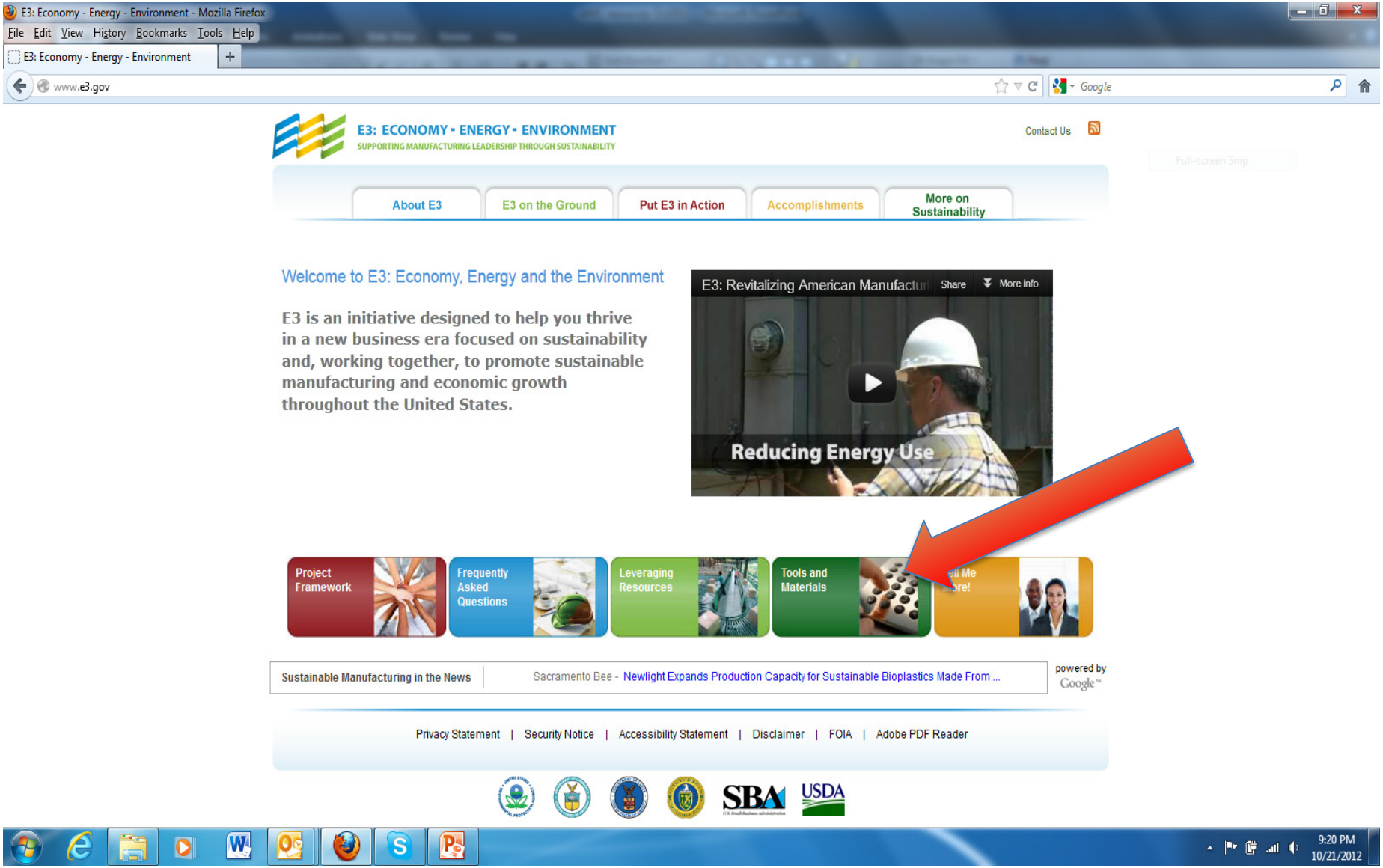
Resources include:

- Simple tools, calculators and scorecards that enable quick assessment of potential energy savings
- System-focused software decision support tools that can evaluate process heating, steam, pump, fan, and compressed air systems.
- DOE eGuide for developing an ISO 50001 energy management system
- DOE eGuide Lite
- Project Opportunities Tracker
- Training links

eCenter

http://www1.eere.energy.gov/manufacturing/tech_deployment/ecenter.html

E3.gov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About E3
E3 on the Ground
Put E3 in Action
Accomplishments
More on Sustainability
Welcome to E3: Economy, Energy and the Environment
E3 is an initiative designed to help you thrive in a new business era focused on sustainability and, working together, to promote sustainable manufacturing and economic growth throughout the United States.
E3: Revitalizing American Manufactur
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More info
Reducing Energy Use
Project Framework
Frequently Asked Questions
Leveraging Resources
Tools and Materials
Sustainable Manufacturing in the News
Sacramento Bee - Newlight Expands Production Capacity for Sustainable Bioplastics Made From ...
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E3.gov – Tools & Materials

Lean and Green Tools

- Process Fact Sheets
  - Metal Finishing Operations (PDF, 4 pp, 486 KB)
  - Metal Fabrication Operations (PDF, 4 pp, 517 KB)
  - Parts Washing Operations (PDF, 4 pp, 497 KB)
  - Surface Coating Operations (PDF, 4 pp, 467 KB)
- Green Suppliers Network Calculator (MS Excel, 1.34 MB)
  [We recommend that users view the instructions (PDF, 1 pp, 54 KB) prior to opening and downloading. We also recommend that users save the file to their desktop before opening the file.]
- Competitive Review Questionnaire (MS Word, 344 KB) (or Comparable Tool)
- Electric Utility Industry Sustainable Supply Chain Alliance's Sustainability Evaluation at General Cable (DuQuoin, Illinois)
- Lean Manufacturing and the Environment
- Primer on Value Stream Mapping (PDF, 11 pp, 179 KB)
- Value Stream Mapping Training Videos

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Energy Tools

- Database of State Incentives for Renewables & Efficiency (DSIRE)
- Sample Energy Bill
- U.S. Department of Energy's Industrial Best Practices Software Tools
- U.S. Department of Energy's Office of Science Grants and Contracts
- U.S. Department of Energy's Better Plants Program's State Incentives and Resource Database

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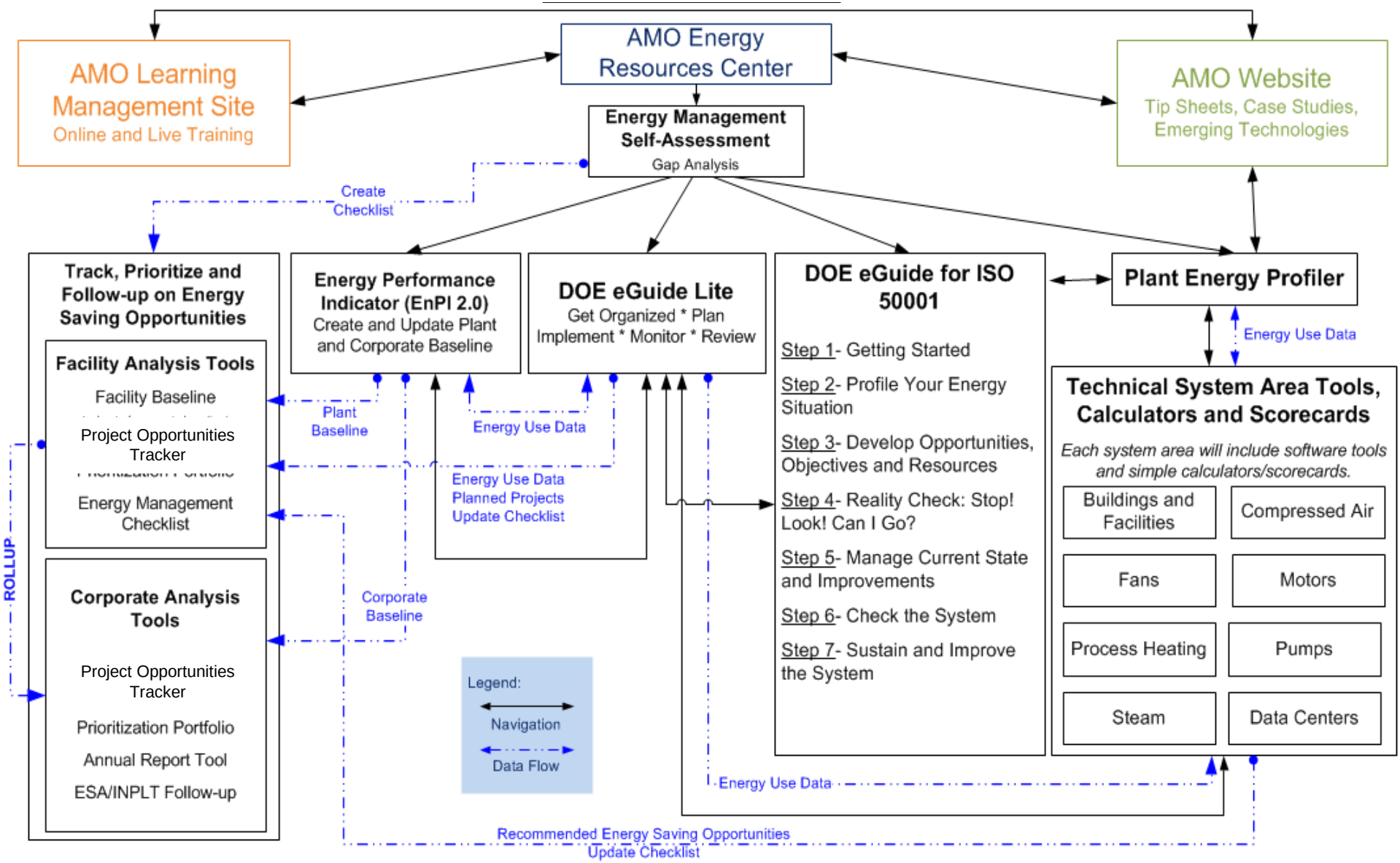
EPA

USDA

SBA
U.S. Small Business Administration

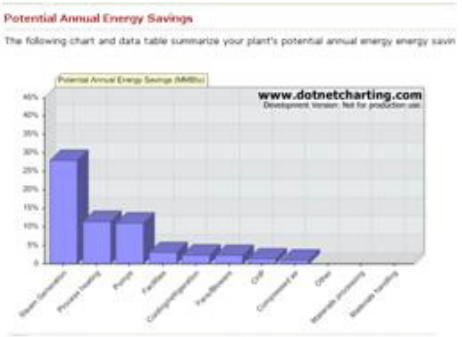
AMO Energy Resource Center (eCenter)

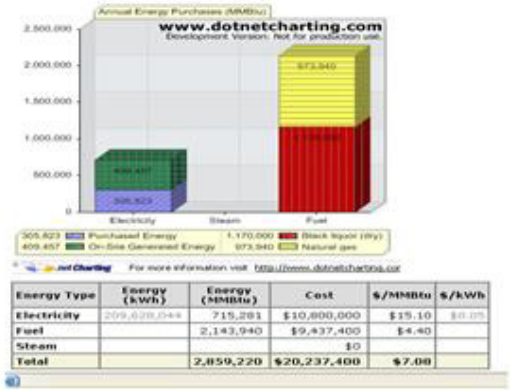


Plant Energy Profiler (PEP)

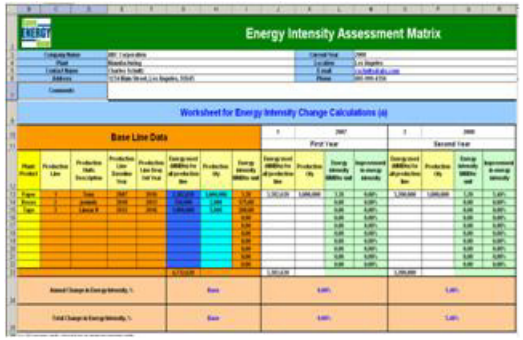
INPUTS

- Plant description
- Utility supply data
- Energy use information





Energy Type	Energy (kWh)	Energy (MMBtu)	Cost	$/MMBtu	$/kWh
Electricity	209,628,044	715,281	$10,800,000	$15.10	$0.05
Fuel		2,143,940	$9,437,400	$4.40	
Steam			$0		
Total		2,859,220	$20,237,400	$7.08	



- Overview of plant energy
- Energy cost distributions
- Preliminary assessment
- Areas for improvement
- Energy reduction potential

OUTPUTS

http://www1.eere.energy.gov/manufacturing/tech_deployment/software_epep.html

Project Opportunities Tracker

- Provide eCenter users a central location for viewing, comparing, and prioritizing energy saving opportunities and projects
- Planning tool, not a tracking tool
  - Designed to provide data to tools that support verification for DOE's pledge programs
  - Will not include verification and validation components
  - Designed to support the export of projects into management software for tracking purposes

Scorecards and Simple Calculators

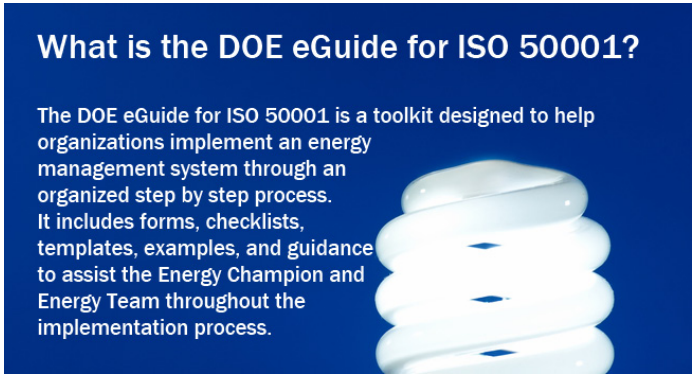
- Industrial Facilities Scorecard
- Daylighting Tool
- Fans Variable Speed Drives (VSD) Calculator
- Pumps VSD Calculator
- Boiler Tune-up Tool
- Photovoltaic Tool
- Air Compressor Optimization Calculator
- Suite of Mechanical Insulation Assessment and Design Calculators
- Notched V-Belt Calculator

Tool Overviews

- **MotorMaster+:** supports motor and motor systems planning by identifying the optimal action for a given repair or motor purchase decision. Includes an extensive database of over 20,000 low-voltage induction motors.
- **AIRMaster+:** helps users analyze energy use and savings opportunities in industrial compressed air systems. Provides a systematic approach to assessing compressed air systems, analyzing collected data, and reporting results.
- **Process Heating Assessment and Survey Tool (PHAST):** helps industrial end users develop a model of the process heating equipment in their facility. Can be applied to systems heated by fuels, steam, or electricity and results in a heat balance identifying the magnitude of major energy flows in the equipment.
- **Pumping System Assessment Tool (PSAT):** helps industrial users assess the efficiency of pumping system operations. Uses field measurements to identify and quantify energy-saving opportunities in both dollars and electrical energy savings.
- **Steam System Assessment Tool (SSAT):** allows users the ability to create models of real steam systems. Using these models, one can predict savings from different system modifications.

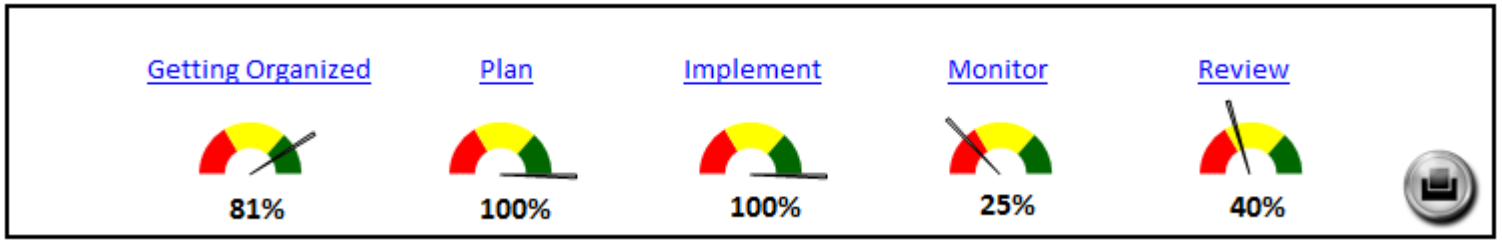
eGuide for ISO 50001

- Based on the International Energy Management Standard ISO 50001
- 7 step process for developing an Energy Management System (EnMS) and improving energy performance
- Guides users through the entire process—from the decision to employ an EnMS to successful implementation and beyond
- Focuses on continual improvement
- Designed to help the organization realize the benefits of implementing an energy management system:
  - Improved operational efficiencies
  - Decreased energy intensity
  - Energy data for fact based decisions
  - Support for organizational and cultural change
  - Drivers for organizational integration
  - Reduced environmental impacts
  - Competitive advantages over firms that neglect resources management
  - Visible demonstration of corporate social responsibility
  - Positioning for carbon accounting

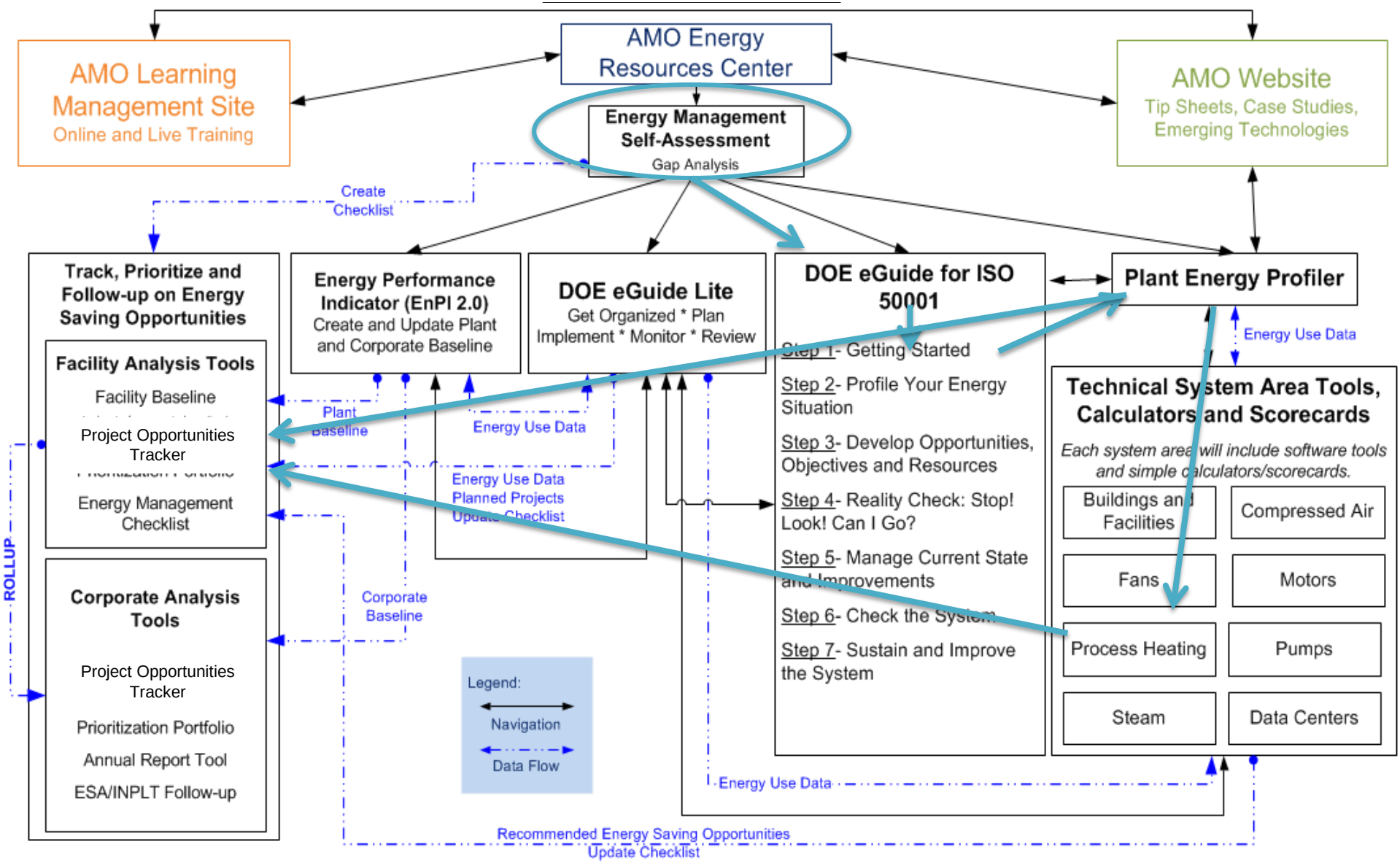


DOE eGuide Lite

- Intended for organizations new to energy management or considering ISO 50001 or Superior Energy Performance.
- Useful for organizations looking to promote better energy management practices within their supply chain.
- Helps organizations understand:
  - What kinds of energy is used
  - How the energy is used
  - How much energy is used
  - Understanding energy costs
  - Options to reduce energy consumption
- Walks users through the steps of implementing basic energy management
- Consistent with EPA's ENERGY STAR Guidelines for Energy Management.
- Includes energy data entry screens, progress reports, dashboards and project tracking.



AMO Energy Resource Center (eCenter)



Software Tool-Related Training

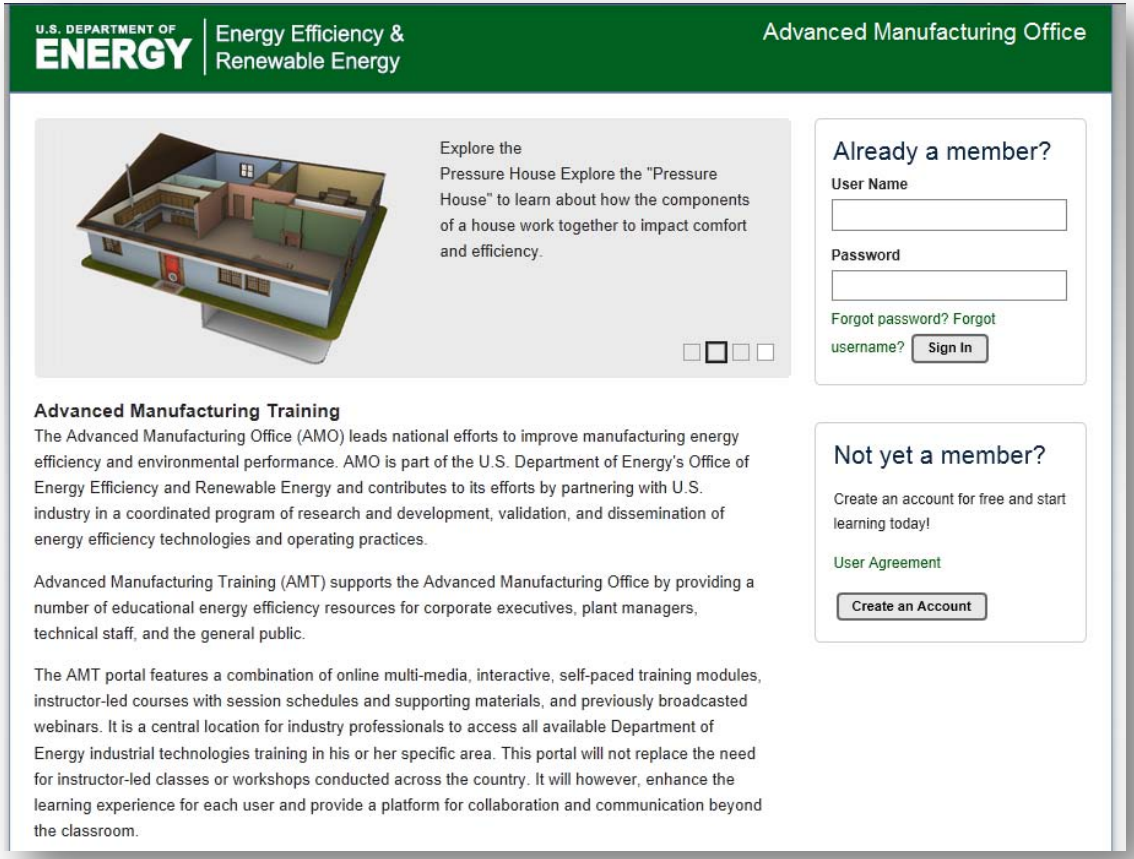
Training at several levels for:

- Awareness webcasts *(1-2 hours)*
  - Four-part energy management series
  - Tool specific
- Online, self-paced, system-focused, end-user training
- System-focused Qualified Specialist training and certification *(2 days)*
- Certified Practitioner training and credentialing *(2-3 days)*
  - Energy Management
  - Systems
- Data Center Energy Practitioner training and certification *(1-3 days)*

See http://www1.eere.energy.gov/manufacturing/tech_deployment/index.html for details

U.S. Small Business Administration

Online Training – Learning Management System



Online Interactive Courses for:

- Mechanical Insulation
- Steam
- Process Heating
- Pumps

Courses currently under development for 2013:

- Fans End User

https://trainingportal.ee.doe.gov/sen

ENERGY STAR - eCenter Linkage

- Consistent energy management principles applied in ENERGY STAR Guidelines for Energy Management, eGuide, and eGuide Lite
- The ENERGY STAR Guidelines for Energy Management and the eGuide both use the Plan-Do-Check-Act approach found in ISO standards such as ISO 14001 and 50001

For additional information please visit:

https://save-energy-now.org/Pages/default.aspx
and
http://www1.eere.energy.gov/manufacturing

or contact:

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Supplemental Information

The following pages contain brief descriptions of eCenter tools

eCenter Tools, page 1 of 4

Resource	Description	Access
Compressed Air Tools		
Compressed Air Scorecard	Determines potential compressed air energy savings and suggests a list of next steps to implement energy-saving measure.	Public
Air Compressor Optimization Calculator	Calculates savings associated with making minor changes to an air compressor system.	Public
AIRMaster+	Analyzes energy use and savings opportunities in compressed air system.	Public
Fans Tools		
Fan System Assessment Tool	Quantifies energy use and savings opportunities in industrial fan systems.	Public
VSD Calculator for Fans	Calculates the estimated energy and cost savings that would result from installing a Variable Speed Drive on a fan system.	Public
Motors Tools		
MotorMaster+	Supports motor and motor systems planning by identifying the optimal action for a given repair or motor purchase decision.	Public
MotorMaster+ International	Includes many of the same capabilities as MotorMaster+ but also allows evaluation of repair or replacement options for a broader range of motors. Has multi-language capabilities.	Public
Notched V-Belts	Calculates the estimated energy and cost savings that would results from installing a v-belt versus a standard belt on a motor.	Public

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Resource	Description	Access
Process Heating Tools		
Combined Heat and Power Scorecard	Determines potential energy savings for a CHP system.	Public
Combined Heat and Power Application Assessment Tool	Helps industrial users evaluate technology and economic feasibility of using gas turbine exhaust gases for different industrial applications.	Public
NOx and Energy Assessment Tool	Helps plants in the petroleum refining and chemical industries analyze NOx emissions and application of energy efficiency improvements.	Public
Process Heating Scorecard	Determine the potential energy savings for a process heating system.	Public
Process Heating Assessment and Survey Tool (PHAST)	Helps industrial and end users develop a model of the process heating equipment in their facility.	Public
Pumps Tools		
Pumps Scorecard	Determines the potential energy savings for a pumps system.	Public
Pump System Assessment Tool (PSAT)	Helps industrial users assess the efficiency of pumping system operations.	Public
VSD Calculator for Pumps	Calculates the estimated energy and cost savings that would result from installing a Variable Speed Drive (VSD) on a pump system.	Public

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Resource	Description	Access
Steam Systems Tools		
Steam System Scoping Tool (SSST)	Provides an up-front assessment of practices associated with the entire steam system for the purpose of identifying potential investigation areas.	Public
Steam System Assessment Tool (SSAT)	Allows users to create models of real steam systems and then predict savings from different system modifications.	Public
3E+ Insulation Program	Determine energy savings associated with insulation projects and in a design mode to determine the optimum insulation thickness and types of insulation for a specific project.	Public
Boiler Tune-up	Calculates the energy savings associated with tuning a boiler to 4.0% exhaust O_2 and cleaning the boiler water side heat exchanger surfaces to increase combustion efficiency.	Public
Steam Generation Equipment Scorecard	Determine the potential energy savings for a steam system.	Public
Mechanical Insulation Assessment and Design Calculators	Provides assistance with common calculations used in the design and analysis of mechanical insulation systems. Includes a mobile application that calculates the simple payback period, annualized rate of return, and net present value of an insulation project.	Public

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Resource	Description	Access
Energy Management Resources		
DOE eGuide for ISO 50001	Toolkit designed to help organizations implement an energy management system through an organized step by step process.	Public
DOE eGuide Lite	Teaches organizations the basics of energy management including understanding what kinds of energy they use, how they use it, and how much of it they use.	Public
Profiling Tools		
Project Opportunities Tracker	Provides a central location for viewing, comparing, and prioritizing energy-saving opportunities and projects.	Public to search, Restricted to registered users to utilize full functionality
Plant Energy Profiler (PEP)	Helps industrial plant managers identify how energy is being purchased and consumed at their plant and identify potential energy and cost savings.	Public for all functionality. Restricted to registered users to save cases in eCenter.
DC Pro v 2.1	Helps organizations identify how energy is being purchased and consumed by their data centers and what energy efficiency improvements and technologies can be employed to save energy and money.	Public for all functionality. Restricted to registered users to save cases in eCenter.
Industrial Facilities Scorecard v 3.0	Designed to help operators of buildings on industrial sites find ways to reduce energy use and costs, lower emissions, boost productivity, and increase energy security.	Public