

Achieving Superior Energy Performance^{cm}: through Energy Management



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For the purpose of this discussion, Energy Management

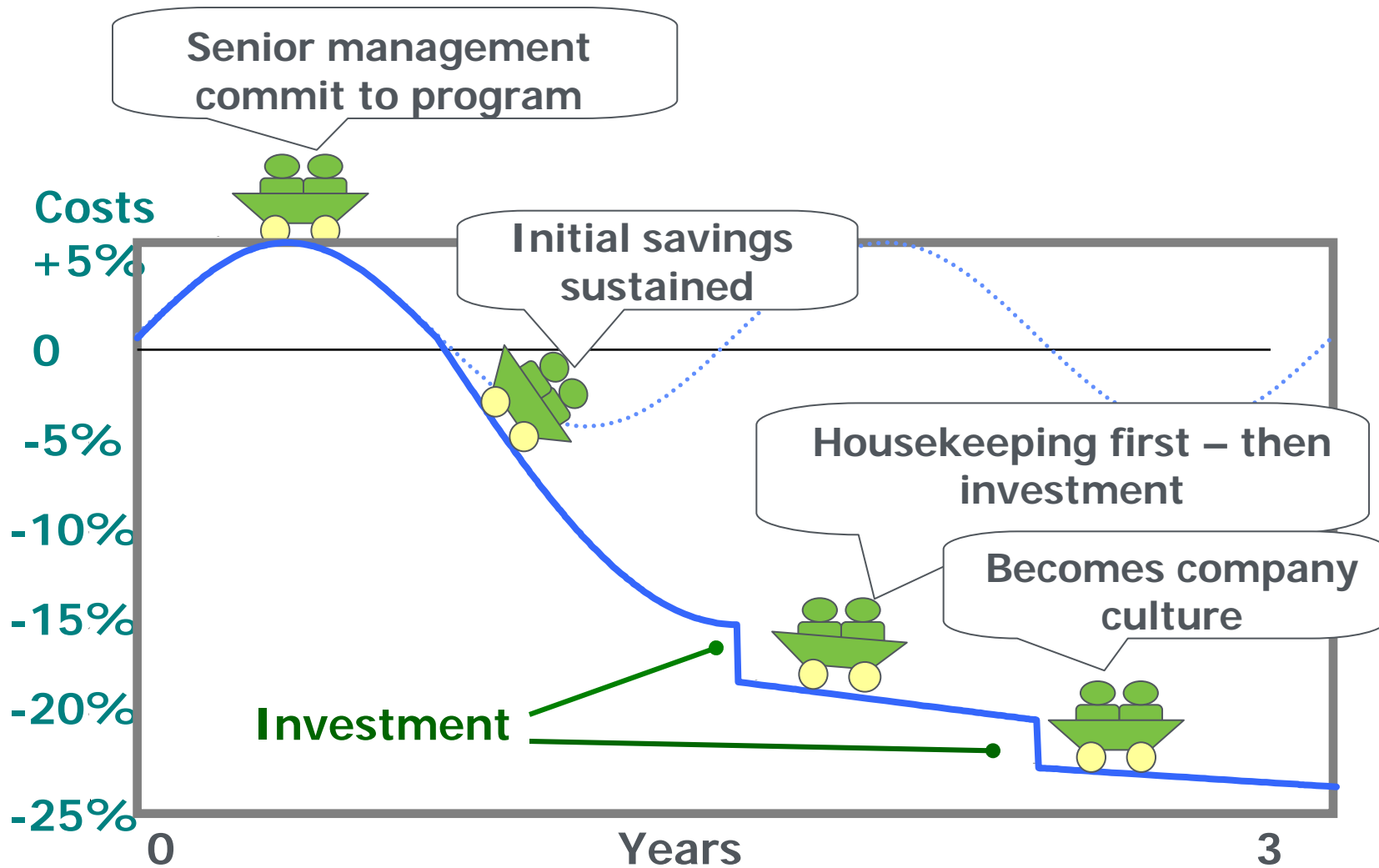
- Is a *framework* for integrating energy into the existing management practices of an organization
- Is based on an *international standard*, ISO 50001- Energy management systems
- Requires that:
 - the top management of an organization make a commitment to *continual improvement of their energy performance*
energy performance (from ISO FDIS 50001)
measurable results related to energy efficiency, use and consumption
 - Energy performance improvements are *measured and documented against a baseline*

Ad hoc Approach to Energy Management...



Source: UNIDO 2010

Structured Approach



Source: UNIDO 2010

- Much of the energy efficiency in *existing* facilities can be achieved through changes in *how energy is managed*, rather than through installation of new technologies
- Effective energy management also provides a context for management to assess the applicability of new technologies
- Energy management requires an organization to *comprehensively examine its energy use and consumption* and to *develop a framework to sustain the change*

facilities

equipment

personnel

systems

processes

Scope of an energy management system

ISO 50001: Energy Management System Standard

ISO 50001 will establish a framework for industrial and commercial facilities and organizations to manage energy.



Potential impacts:

- Could influence up to 60% of the world's energy use across many economic sectors

Uptake of ISO 50001 will be driven by companies seeking an internationally recognized response to:

- Corporate sustainability programs
- Energy cost reduction initiatives
- Demand created along the manufacturing supply chain
- Future national cap and trade programs; carbon or energy taxes; increasing market value of “green manufacturing” / reduced carbon footprint
- International climate agreements

Status of ISO 50001

- Under development by ISO Project Committee 242; United States and Brazil lead effort with the United Kingdom and China
- 56 countries participating, 13 of which are observing
- Final Draft International Standard (FDIS) released March 2011
- Ready for publication by August 2011

What's Different about ISO 50001?

Addresses some practical realities:

- Energy efficiency is not core business of most organizations
- Personnel and business priorities change over time
- As a result, energy efficiency improvements may not be sustained

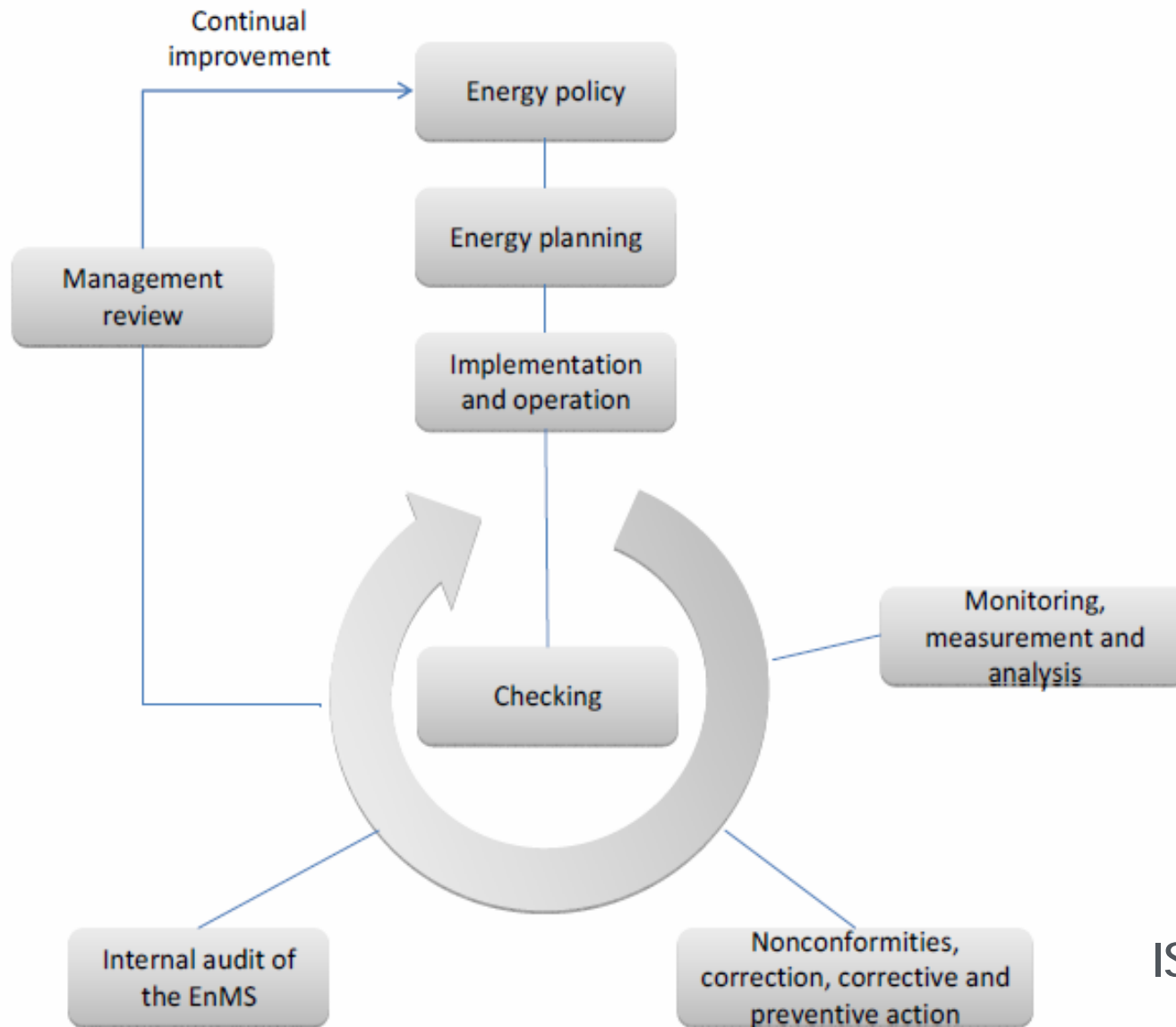
ISO 50001 will prepares an organization to:

- Manage future organizational changes in an energy efficient manner, while preserving profitability/effective operations
- Evaluate what works for the organization based on hard data and build on it
- Provide a structure and framework for communicating results both internally and externally
- Integrate an energy management system into existing management programs

1. *Energy policy* top management's official statement of the organization's commitment to managing energy
2. *Cross-divisional management team* led by a representative who reports directly to management and is responsible for overseeing the implementation of the energy management system
3. *Energy review* to assess current and planned energy use, energy sources and consumption and identify opportunities for improvement
4. *Baseline(s)* of the organization's energy use
5. *Energy performance indicators* (EnPIs) that are unique to the company and are tracked against the baseline to measure progress

6. *Energy objectives and targets* for energy performance improvement at relevant functions, levels, processes or facilities within an organization
7. *Action plans* to meet those targets and objectives
8. *Operating controls and procedures* for significant energy uses
9. *Measurement, management, and documentation* for continuous improvement for energy efficiency
10. *Internal audits and periodic reporting* to advise management on progress based on these measurements.

ISO 50001 Energy Management (EnMS)



ISO FDIS 50001

- Applies to all factors that can be monitored and influenced by the organization to affect energy use
- Designed to be used independently, yet can be aligned or integrated with other management systems (e.g., ISO 9001 and ISO 14001). Applicable to all organizations that use energy
- Can be implemented at the **corporate or facility** level
- **Does not prescribe specific performance criteria or results** with respect to energy
- Needs **enabling policies and programs** to realize its global potential
- **Superior Energy Performance is such an enabling program**



What is Superior Energy Performance?

A market-based, ANSI/ANAB-accredited certification program that provides industrial and commercial facilities with a roadmap for achieving continual improvement in energy efficiency while boosting competitiveness.

Goals:

- Drive continual improvement in energy performance
- Develop a transparent system to validate energy performance improvements and management practices
- Encourage broad participation throughout industry
- Support and build the energy efficiency market and workforce



Superior Energy
Performance for industry
will be launched nationwide
in 2011.

Getting Superior Energy Performance Certified

Certification Requirements:

An ANSI/ANAB-accredited Verification Body will conduct a third-party audit to verify that the following requirements are met:

1. Energy Management System Conformance to ISO 50001
2. Energy Performance Improvement



Resources to Help Facilities Prepare for Certification

Standards & Protocols:

ISO 50001
Energy Management Standard



System Assessment
Standards



Measurement & Verification
Protocol

Certified Practitioners

Certified Practitioner in Energy
Management Systems

Certified Practitioners in
[Type] System

SEP Lead Auditors
SEP Performance Verifiers

Value of Superior Energy Performance to Utilities

SEP provides a framework for continual improvement of energy performance across an entire facility.

- More projects are identified.
- Data supports systematic decision-making and prioritization of projects.
- A broader range of operational and capital projects are implemented.

Implementing an energy management system ...

- Provides greater persistence of energy savings and higher return on energy efficiency investments — increased net present value
- Encourages operational changes that generate additional energy savings beyond capital projects — deeper savings at less cost



Value of Superior Energy Performance to Utilities

Third-party transparency validates energy performance improvement.

- SEP M&V Protocol
 - Offers a standardized methodology for validating energy performance improvements.
 - Provides top-level sanity check that supports project-level M&V.
- Supports a more flexible approach by public utility commissions in validating expenditure of rate payer funds.



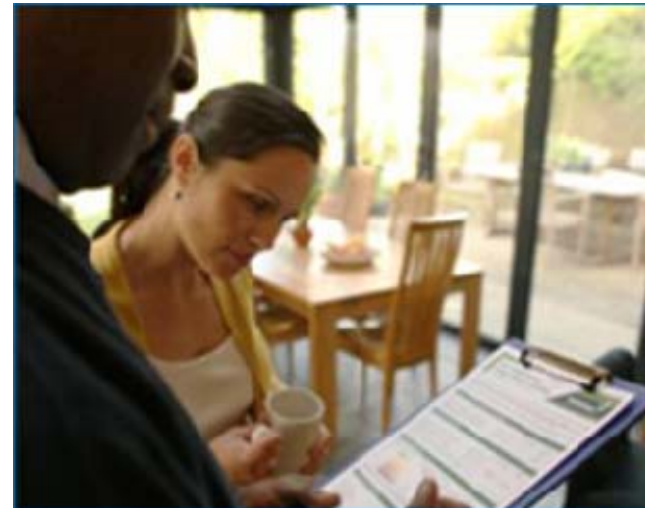
SEP builds energy management expertise in the workforce.

- Certified Practitioner credentialing offers an opportunity for utility representatives to increase energy management expertise.
- Prepares utility representatives to respond to their customers' growing interest in energy management.



The SEP Industrial Measurement and Verification (M&V) Protocol is a methodology to:

1. Verify results and impact from implementing the energy management standard.
2. Track energy performance changes over time for the overall facility.
3. Document energy performance normalized to production and/or other variables.



Significant training and skill are required for appropriate application of the energy management standard, system assessment standards, and the M&V Protocol. Superior Energy Performance will help to build this workforce.

- **Certified Practitioners in Energy Management Systems:**
Help facilities implement the ISO 50001 energy management standard and prepare for SEP certification
- **Certified Practitioner in [Type] System:**
Perform compressed air, process heating, pumping, or steam system assessments using ASME system assessment standards to help facilities meet energy performance improvement requirement
- **SEP Lead Auditors and SEP Performance Verifiers:**
Perform third-party audits to verify that a facility meets Superior Energy Performance requirements

- Fall 2011: First class for Certified Practitioners in Energy Management Systems
- Sign up to receive updates on Superior Energy Performance website.

http://www.superiorenergyperformance.net/certified_practitioners.html

SEP Performance Criteria for Certification Levels

Performance Characteristics		Silver	Gold	Platinum
Energy Performance Pathway	Energy Performance Improvement	Meets 5% energy performance improvement threshold over the last 3 years.	Meets 10% energy performance improvement threshold over the last 3 years.	Meets 15% energy performance improvement threshold over the last 3 years.
Mature Energy Pathway	Energy Performance Improvement	Demonstrates an energy performance improvement of 15% or more over the last 10 years.	Demonstrates an energy performance improvement of 15% or more over the last 10 years.	Demonstrates an energy performance improvement of 15% or more over the last 10 years.
	Score on Best Practice Scorecard <i>Includes credits for energy management best practices and energy performance improvements beyond 15% over the last 10 years.</i>	<ul style="list-style-type: none"> Meets a score of at least 35 and up to 60 out of 100 total points for Best Practice Scorecard Minimum of 25 points required for the energy management best practices. 	<ul style="list-style-type: none"> Meets a score of at least 61 and up to 80 out of 100 total points for Best Practice Scorecard Minimum of 25 points required for the energy management best practices and 10 for energy performance. 	<ul style="list-style-type: none"> Meets a score of at least 81 out of 100 total points for Best Practice Scorecard Minimum of 25 points required for the energy management best practices and 10 for energy performance.

Texas Pilot Project, 2008-2010

Since May 2008, DOE has worked with the University of Texas at Austin to pilot Superior Energy Performance in Texas facilities.

- Field tested elements of Superior Energy Performance
- Conducted audits using ANSI MSE and M&V Protocol
- Established the first ANSI/ANAB-accredited Verification Body for Superior Energy Performance

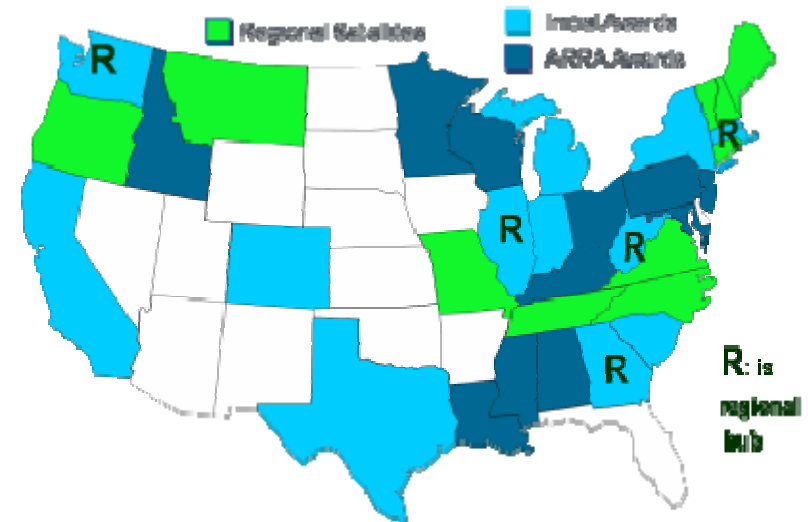
First facilities certified to Superior Energy Performance:	Superior Energy Performance certification
Cook Composites and Polymers Co. Houston, Texas	Gold
Freescale Semiconductor, Inc. West Austin, Texas	Silver
Owens Corning Waxahachie, Texas	Silver
Union Carbide (subsidiary of the Dow Chemical Co.) Texas City, Texas (Manufacturing facility)	Platinum
Union Carbide (subsidiary of the Dow Chemical Co.) Texas City, Texas (Energy systems facility)	Silver

Energy Management Demonstration Projects

DOE's Industrial Technologies Program is conducting State/Regional Energy Management Demonstration Projects. ITP has funded 23 state awards starting in 2009 to help industry save energy.

Energy Management Demonstration Goals

- **Provide a roadmap** to achieve ambitious goals to reduce industrial energy intensity.
- **Test the elements of Superior Energy Performance.**
- **Build energy management expertise** at the regional, state, and plant level by showcasing lessons learned and best practices.
- **Broaden energy savings** throughout the nation.



Kick-Off Dates

- **2009:** Northwest region
- **2010:** Southeast, Midwest, and Mid-Atlantic regions
- **2011:** California, Colorado, Texas (second round) and Northeast region

<http://www.eere.energy.gov/industry/energymanagementdemonstrations/>

Demonstration Approach

1. **State or region identifies an appropriate demonstration plant based on provided guidelines**
2. **Three face-to-face training sessions for the facility and consultants**
3. **Monthly training for the consultants (15-month implementation schedule)**
4. **Consultants coach facility to implement energy management system in conformance with ISO 50001**
5. **Facility and consultants hold quarterly review with facility management and Energy Management Demo team lead**
6. **Facility applies for Superior Energy Performance as early as 18 months after initial training**

PARTICIPANTS

- 3M
- Alcoa
- Amcor PET
- Bridgestone Tire
- Cook Composites & Polymers (2 plants)
- Cooper Tire
- Didion Milling, Inc
- Dow Chemical (2 plants)
- Eaton
- Freescale Semiconductor
- General Dynamics
- Gray Harbor Paper
- Haynes International
- HNI / Allsteel
- JR Simplot
- Kenworth Trucks
- Neenah Foundry Company
- Nissan
- Owens Corning
- Schneider Electric
- Spirax Sarco
- Traco (Alcoa)
- Volvo
- World Kitchen

Benefits of Superior Energy Performance

- Superior Energy Performance provides a facility-wide strategic approach to improve energy performance through the identification and prioritization of a wide range of projects.
- An energy management system provides greater persistence of energy savings and encourages operational changes that generate additional energy savings beyond capital projects.
- Third-party transparency validates energy performance improvements.
- Certified Practitioner credentialing increases energy management expertise in the workforce.



Opportunities for Utilities

- Cosponsor training with DOE on energy management and Superior Energy Performance.
- Assist in creating local energy management professionals:
 - Certified Practitioners in Energy Management Systems
 - Certified Practitioner in System Types: process heating, compressed air, pumps, motors
 - SEP Lead Auditors and SEP Performance Verifiers
- Train utility staff on ITP energy management tool suite to help customers continually improve their energy management
- Encourage most mature industrial customers to pursue SEP certification (starting late 2011).



EXTRA SLIDES

- GSEP is conceived as an international network of national government agencies, national-level certification programs, and other public/private sector organizations that will catalyze continuous energy performance improvements in **commercial buildings and industrial facilities** of all performance levels.
- The GSEP partnership includes Canada, the European Commission, France, India, Japan, Korea, Mexico, Russia, South Africa, Sweden, and the United States.
- GSEP was announced in July 2010 at the Clean Energy Ministerial, which convened 25 energy ministers from 20 countries and the European Commission.
- Clean Energy Ministerial provided a forum for like-minded countries to take specific steps forward to promote clean energy technologies.
- See www.cleanenergyministerial.org/gsep



The two-tiered approach accommodates:

- Maturity of facility's energy management program
- Level of external validation desired
- Business climate/cycle

Two Program Tiers

Partner

Self Declaration

Criteria

- Conformance to ISO 50001
- Measure and audit energy performance improvement

Performance Levels

- Energy performance improvement required

Method of Verifying Results

- Self Declaration

Certified Partner

ANSI/ANAB-accredited certification

Criteria

- Conformance to ISO 50001
- Measure, verify, and certify energy performance improvement

Performance Levels

- Energy performance improvement required, minimum requirements set by program
- Two Pathways Available: Energy Performance or Mature Energy

Method of Verifying Results

- ANSI/ANAB-accredited certification with on-site visit



Assessment standards for specific energy systems provide immediate opportunity for energy performance improvement in many facilities. Use of the standards is **not** required for certification but will help plants define a pathway for achieving energy savings.

Standards address:

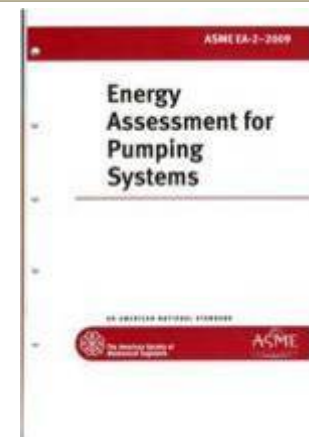
- Organizing an assessment
- Conducting an assessment
- Analyzing the data collected and developing efficiency recommendations
- Reporting and documentation

Purchase standards and guidance documents from ASME for \$35 (print or digital):

- <http://catalog.asme.org/home.cfm?CATEGORY=CS&TaxonomyItemID=3191>
- The guidance document for the compressed air system standard will be available by the end of February 2011.

Available Standards:

- Pumping
- Compressed Air
- Steam
- Process Heating



DOE will work with utilities and other partners to deliver energy management training to end-users.

Four-Part Energy Management Webinar Training series

- Helps facilities implement ISO 50001 and Superior Energy Performance requirements.
- Supports ITP Energy Management Tool Suite.
- Available in May 2011.

ITP Energy Management Tool Suite

- Identifies energy savings opportunities and tracks implementation
- Tools include:
 - Quick PEP
 - Self-Paced Module
 - Project Savings Tracker Module
 - Carbon Footprint Calculator
- Basic and advanced levels:
 - Steam
 - Process Heating
 - Pumps
 - Fans
 - Compressed Air
 - Motors

