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Superior Energy Performance^{cm}: A Roadmap for ISO 50001 Implementation

IEA - IIP Policy Pathway on Energy Management Programmes Workshop
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ISO 50001 - Energy Management Standard

ISO 50001 energy management standard 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

- Developed by ISO Project Committee 242; United States and Brazil lead effort with United Kingdom and China
- 56 countries participating, 13 of which are observing
- Published June 15,2011
- ISO PC 242 transitioned to TC 242, developing standards and guidance related to implementation of ISO 50001

Key Elements of ISO 50001- Energy Management System Standard

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 (EnMS).
3. **An energy planning process** to assess energy uses and identify opportunities for improvement
4. **A baseline** of the organization's energy use.
5. **Identification of energy performance indicators** (EnPIs) that are unique to the organization and are tracked to measure progress.

Key Elements of ISO 50001- Energy Management System Standard

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** to address all aspects of energy purchase, use, and disposal.
9. **Measurement, management, and documentation** for continuous improvement for energy efficiency .
10. **Internal audits and periodic reporting of progress** to management based on these measurements.

Industry and Energy Management

- *Significant (10-30 percent) energy efficiency in industry can be achieved* through operational changes in how energy is managed in an industrial facility; installation of new technologies will further improve energy efficiency;
- Actively managing energy requires an *organizational change in culture*
- *Top management needs to be engaged* in the management of energy on an ongoing basis.
- At its core, energy management requires a group of people to *change their behavior* and *sustain the change*

Scope of energy management

facilities	***equipment***	***personnel***	***systems***	***processes***

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 June 2012.

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 Energy Management Standard
2. Energy Performance Improvement (5% minimum over 3 years

ISO 50001 is a foundational tool that any organization can use to manage energy.

ISO 50001

Components in place:

- Baseline
- Policy
- Plan
- Team/Leader

Superior Energy Performance

Single facility ISO 50001 conformance with validated energy performance improvement

ISO 50001

Superior Energy Performance Program Design

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

SEP Performance Criteria for Certification Levels

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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 *Includes credits for energy management best practices and energy performance improvements beyond 15% over the last 10 years.*	• 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.	• 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.	• 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.

System Assessment Standards

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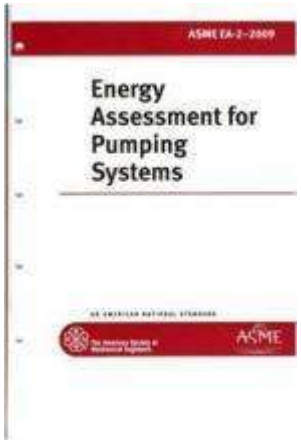
Assessment standards for specific energy systems provide immediate opportunity for energy performance improvement in many facilities. Use of the standards is **not** required for certification but will help plants define a pathway for achieving energy savings.

Available Standards:

- Pumping
- Compressed Air
- Steam
- Process Heating

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://www.asme.org/search.aspx?searchText=EA&#page=1,category=STANDARD

Measurement and Verification Protocol

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.

Personnel Certification

Qualified Workforce

1. **Certified Practitioner in Energy Management Systems:** Helps facilities implement the ISO 50001 Energy management system standard and prepare for SEP application
2. **ISO 50001 Auditor:** Conducts third party audit of facilities for conformance with ISO 50001
3. **SEP Lead Auditor**: Leads team conducting third-party audit of facilities seeking to become SEP Certified Partners; verifies conformance to ISO 50001 and SEP Additional Requirements (future ANSI MSE 50021)
4. **SEP Performance Verifier**: Audit team member qualified to verify the energy performance improvement of facilities seeking to become SEP Certified Partners
5. **Certified Practitioner in Systems**: Perform compressed air, process heating, pumping, or steam system assessments using ASME standards to help plants meet the SEP energy performance improvement criteria

Program Certification Structure

Verification Bodies

1. Perform third-party audit for facilities applying to become Certified Partners
2. Audits led by SEP Lead Auditor and SEP Performance Verifier
3. Audits based on M&V Protocol

SEP Verification Bodies & Certified Personnel

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Verification Bodies will be accredited by ANSI/ANAB, based on requirements of the ANSI MSE 50028 standard (Dec 2011)

ANSI MSE 50028
(Requirements for Verification Bodies)

ANSI/ANAB Accreditation includes:

- Off-site review of the VB candidate's documented management system
- Observations of the candidate's audit team
- Assessment of the recordkeeping and competence of candidate's office personnel
- Annual verification of continued conformance

All Certified Personnel must meet ***ANSI/ISO/IEC 17024 accredited certification requirements***, including education, experience, and standardized exam

Accredited Verification Bodies, under agreement w/ the SEP Program Administrator, will contract w/ Applicants to conduct SEP audits using *Certified SEP Auditors and Performance Verifiers*.

Verification Bodies
(governed by ANSI MSE 50028 requirements)

Certified SEP Audit Team

SEP Performance Verifier

SEP Lead Auditor

Can be one cross-qualified person

CP EnMS + additional Performance Verifier Exam required

CP EnMS & ISO 50001 Auditor + additional Team Leader Exam required for provisional SEP Auditor; becomes Lead Auditor based on experience

Certified Practitioner in Energy Management Systems (CP EnMS)

Certified ISO 50001 Auditor
(US National Exam)

Note: CP EnMS & ISO 50001 Auditor are general; specialty certifications can be added in response to market needs

Texas Pilot Project, 2008-2010

DOE 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
- **Certified the first plants to Superior Energy Performance**

First facilities certified to Superior Energy Performance	% Energy Performance Improvement
Cook Composites and Polymers Co. Houston, Texas	**14.9**
Freescale Semiconductor, Inc. West Austin, Texas	**6.5**
Owens Corning Waxahachie, Texas	**9.6**
Union Carbide, subsidiary of the Dow Chemical Co. Texas City, Texas (manufacturing facility)	**17.1**
Union Carbide, subsidiary of the Dow Chemical Co. Texas City, Texas (energy systems facility)	**8.1**

Companies Adopting SEP and ISO 50001

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Superior Energy Performance demonstrations with 34 companies in 19 states:

- 3M (IL)
- Alcoa (IN)
- Allsteel (IA)
- Amcor PET (WA)
- Bentley Prince Street (CA)
- Bridgestone Tire (NC)
- Cook Composites & Polymers (TX, WI)
- Cooper Tire (AR)
- Cummins (NC)
- Didion Milling, Inc. (WI)
- Dixie Chemical (TX)
- Dow Chemical (TX, WV)
- Eaton (SC)
- Freescale Semiconductor (TX)
- General Dynamics (PA)
- Harbec Plastics (NY)
- Haynes International (IN)
- Holcim (TX)
- JR Simplot (ID)
- Lockheed Martin (CA)
- Kenworth Trucks (WA)
- MedImmune (MD)
- Neenah Foundry Company (WI)
- Nissan NA (TN)
- Olam Spices (CA)
- Owens Corning (TX)
- Schneider Electric (TN)
- Sherwin-Williams (KY)
- Spirax Sarco (SC)
- Traco (PA)
- UTC/Sikorsky (CT)
- United States Mint (NY)
- Volvo (VA)
- World Kitchen (PA)

September 2011

Clean Energy Ministerial (CEM)

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- Ministers and other high-level representatives from 24 governments convened for the Clean Energy Ministerial in Washington in July 2010 and in Abu Dhabi in April 2011 to collaborate on policies and programs that accelerate the global transition to clean energy technologies
- UK is hosting the third meeting in April 2012, India is hosting the fourth meeting in 2013, and Korea is hosting the fifth meeting in 2014

>90% of Global Clean Energy Investment > 80% of Global GHG Emissions


Australia


European Commission


Brazil


Canada


China


Denmark


Finland


France


Germany


Hungary


India


Indonesia


Italy


Japan


Korea


Mexico


Norway


Russia


South Africa


Sweden


Spain


United Arab Emirates


United Kingdom


United States

Global Superior Energy Performance (GSEP) Partnership

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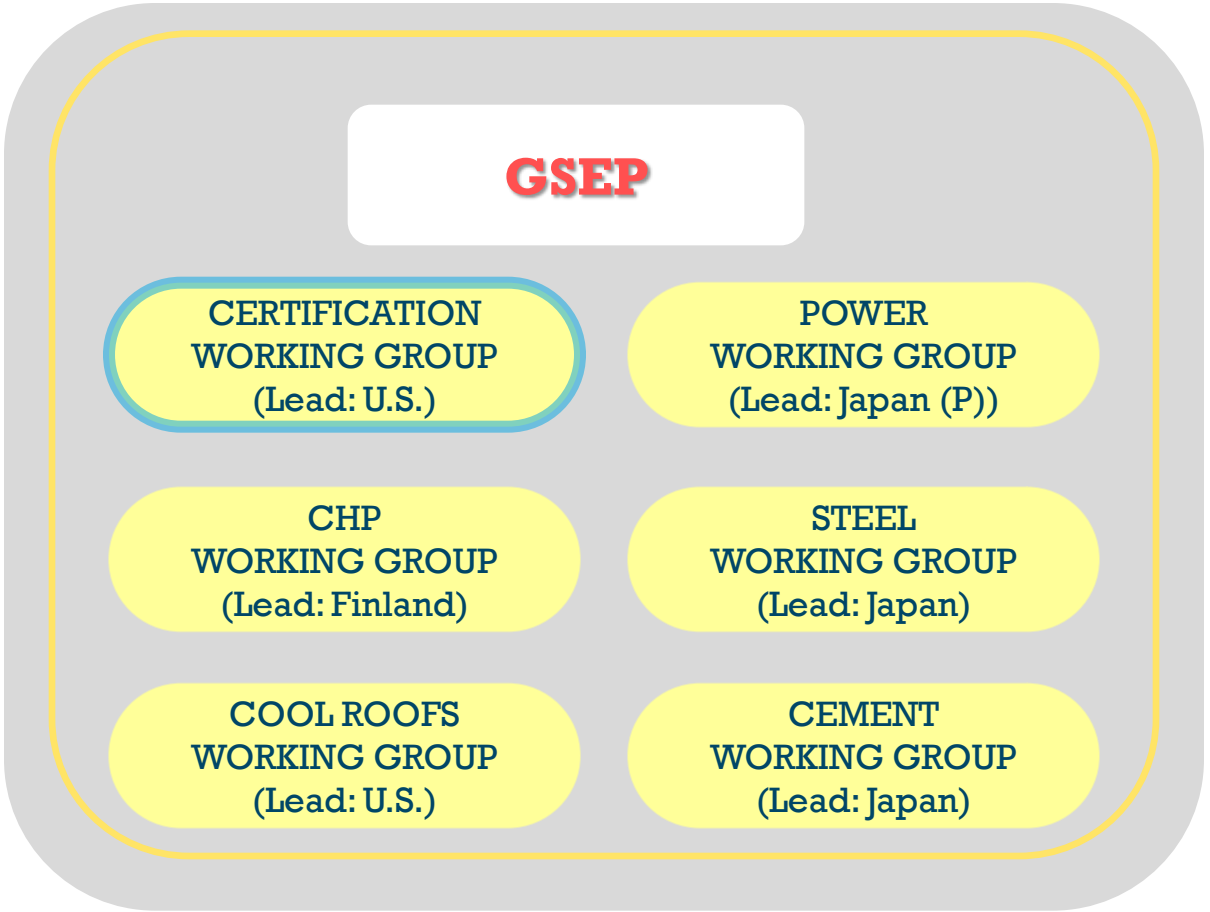
GSEP objective is to reduce global energy use by:

- Encouraging industrial facilities and commercial buildings to pursue **continuous improvements** in energy efficiency
- Promoting **public-private partnerships** for cooperation on specific technologies or in individual energy-intensive sectors



GSEP is a CEM initiative that has also been accepted as a task group in the International Partnership for Energy Efficiency Cooperation (IPEEC)

GSEP Certification Working Group (CWG)

- CWG aims to foster and accelerate energy management and continuous energy performance improvements in industrial facilities and commercial buildings by
  - Sharing strategies and best practices
  - Leveraging existing resources
  - Helping participating governments shape national programs
  - Moving toward greater harmonization across national certification programs

- Participating countries include the following:


Australia


Canada


Denmark


European Commission

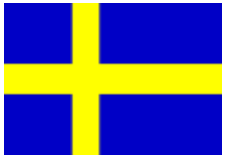

India


Japan


Korea


Mexico


South Africa


Sweden


United States

GSEP CWG Strategic Objectives

- The first GSEP CWG Workshop was held on 20-21 June 2011 in Washington, D.C.
- The CWG agreed on the following collective strategic objectives:
  1. **Energy Management:** Increase the implementation of energy management in the industrial and buildings sectors in order to improve energy efficiency and energy performance on an ongoing basis
  2. **Measurement and Verification (M&V):** Measure and verify energy performance improvements on a consistent basis
  3. **Qualified Workforce:** Build a qualified workforce of professionals with expertise in the fields of energy management, energy efficiency, and measurement and verification
- Workshop participants agreed to form three task forces that focus on achieving each of those three strategic objectives

For More Information

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ISO 50001:
www.eere.energy.gov/energymanagement

Superior Energy Performance:
www.superiorenergyperformance.net/

Energy Management Demonstrations:
www.eere.energy.gov/industry/energymanagementdemonstrations/

Texas Pilot Program, Superior Energy Performance Case Studies:
www.superiorenergyperformance.net/texas_pilot.html