

U.S. Council for Energy Efficient Manufacturing (U.S. CEEM)

Presented by

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CIBO Energy Committee Meeting

Who We Are

Voluntary partnership with a mission to enable U.S. industry to achieve global leadership in energy efficiency while maintaining competitiveness and reducing greenhouse gas emissions

How do we reach this goal?

- Encouraging participation, increasing effectiveness of energy-efficiency programs
- Working to identify gaps in programs and identifying resources to close these gaps

Current members represent a broad cross-section of energy-intensive industries including: chemical, steel, petroleum, and auto manufacturing



Our non-manufacturing partners include:



Texas Industries of the Future

Relationship among members and partners



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 2012.

www.superiorenergyperformance.net

Superior Energy Performance Strategy

- Foster a corporate culture of **continual improvement** in energy efficiency
- Use **ISO 50001** standard as foundational tool for energy management
- Establish a **tiered program** that provides an entry point for companies at all levels of experience with energy management
- Create a **verified record** of energy performance improvement.
- Potentially **create value** for corporate energy savings and carbon reductions in utility, state, regional, national, and international trading markets



Our Structure

Members and Partners participate in an Executive Committee and in two working groups

•Executive Committee

- ❖ Oversees U.S. CEEM's mission, goals, by-laws, and operating procedures
- ❖ Defines scope of working groups
- ❖ Guides the work of the support staff

•SEP/Technical Committee (working group)

- ❖ Reviews and comments on industrial energy efficiency programs, tools and resources

•Outreach and Communications Committee (working group)

- ❖ Develops outreach strategies and external communication materials, recruits new members, and identifies strategic partnerships

Our Strategies

- Provide strategic guidance for SEP during and after its launch to ensure that it meets industry needs
- Review and assess existing government and utility energy efficiency programs, decision tools, and resources to assess their value to U.S. industry
- Facilitate the development of standards and best practices to enable effective energy management within the U.S. manufacturing sector
- Raise awareness about issues related to industrial energy efficiency to elected officials and policy makers

Our Activities

- Supported the development of the ISO 50001 Energy Management Standard. U.S. CEEM will promote this standard, which serves as the foundational tool for SEP
- Guiding the launch of SEP, an energy-efficiency certification program for industrial and large commercial facilities
- Supported the development of the ASME system assessment standards and guidance documents that provide a common framework for assessing major, cross-cutting industrial systems

Our Activities

- Establishing approved methodologies to assist companies in measuring energy intensity baselines, quantifying energy savings and documenting energy efficiency improvements
- Leading the development of measurement and verification protocols for certifying industrial plants for energy efficiency
- Supporting the development of Certified Practitioners to help plants assess energy efficiency measures and verify performance improvements

Our Future

U.S. CEEM will strive to become a trusted resource for the industrial sector; articulating industry's unique characteristics, providing insights to the policy/program development community into development of tools, materials, standards and news related to industrial energy efficiency.

This will include guiding the final development of SEP as well as identifying other technical resources and programs that will be of value to the industrial sector.

To this end, U.S. CEEM seeks to continue to build relationships with:

- Manufacturing and industrial trade associations
- The SEP program administrator
- U.S. DOE (SEP and Better Buildings/Better Plants)
- The U.S. EPA (ENERGY STAR® for Industry Program)
- The U.S. DOC (NIST and MEP)
- Regional energy efficiency organizations
- NGO-led groups
- Utilities and utility organizations
- Technical resource developers
- Stds Developers, Conformity Assessment Bodies, and ANSI

More information on U.S. CEEM available at
www.usceem.org

Superior Energy Performance^{cm}:

A Roadmap for Achieving Continual Improvements
in Energy Performance

Background and Details

Getting Superior Energy Performance Certified

Certification Requirements:

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

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



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

Facility-level conformance to ISO 50001 with validated energy performance improvement

ISO 50001



ISO 50001 - Energy Management Standard

ISO 50001 energy management standard establishes a framework for industrial and commercial facilities and organizations to manage energy.

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

- Published on June 15, 2011
- Available for purchase from ANSI
- Developed by ISO Project Committee 242; United States and Brazil led effort with the United Kingdom and China
- 59 countries participated, 14 of which observed

ISO 50001 - Energy Management Standard

- Requires an organization to establish, implement, maintain, and improve an energy management system, enabling **systematic** achievement of **continual improvement in energy performance**, energy efficiency, and energy conservation.
- **Imposes requirements on energy supply and consumption:**
 - **Measurement**
 - **Documentation and reporting**
 - **Design and procurement practices for energy-using equipment and systems**
 - **Processes and personnel**
- Applies to all factors that can be monitored and influenced by the organization to affect energy use.
- **Does not prescribe specific performance criteria** with respect to energy.
- 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.



Key Elements of ISO 50001

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, energy sources, and consumption and identify opportunities for improvement
4. **Baseline** of the organization's energy use
5. **Identification of energy performance indicators** (EnPIs) that are unique to the company and are tracked 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** 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

Roles within Superior Energy Performance

Industry

- Drives strategy through **U.S. Council for Energy Efficient Manufacturing**
- Pilots elements of Superior Energy Performance prior to program launch
- Adopts the Superior Energy Performance program by getting plants certified to ANSI/ANAB-accredited Superior Energy Performance program

Government

- Facilitates industry collaboration to develop Superior Energy Performance program: fund program development activities, e.g., standards development, pilot projects
- Cost-shares Superior Energy Performance program start-up
- Leverages Superior Energy Performance program to deploy federal energy programs, e.g., *Save Energy Now* LEADER

Benefits to Companies

- **Recognition**

- Publicly recognized as leader in sustainable use of energy resources (local and financial community)
- Customers may grant preferred supplier status

- **External financial incentives**

- Potential energy efficiency credits (electric utility & others)
- Potential carbon credits (state, region, and national)

- **Systematic framework for continual improvement**

- Consistent with ISO 50001 energy management and ASME system assessment standards
- Provides tools and resources to assist implementation and validation of sustained energy performance improvement



Industry and Construction stock CD 01030FRL



Crealas Power & Energy CD 005776

Benefits in the Industrial and Commercial Energy Efficiency Market

- **Utilities**

- Empowers a facility-wide, systems-oriented approach
- Helps justify industrial and commercial energy efficiency program investments, including permanent operational changes, to public utility commissions

- **State Agencies**

- Build local energy management expertise

- **ESCOs**

- Builds greater credibility with industrial and commercial customers and a stronger business case for providing third-party energy efficiency services and off-balance sheet capital investments

- **Supply Chains**

- Provides a proactive turn-key program for major OEMs and retailers to request their suppliers to meet the program requirements



Superior Energy Performance Program Design

Superior Energy Performance Program Design

PREPARE FACILITIES FOR SUPERIOR ENERGY PERFORMANCE CERTIFICATION

DOE ITP Energy Management System (EnMS) Implementation Self-Paced Module
Seven-step module provides guidance for implementing an energy management system based on ISO 50001

ISO 50001
Facilities pursuing certification must conform to the international energy management system standard

**Certified Practitioners
In Energy Management Systems**
Assist facilities in conforming to ISO 50001

End-User Training
Four-part webinar training series that provides an overview of ISO 50001, Superior Energy Performance, and benefits of implementation

System Assessment Standards
Use of these standards can help facilities meet required energy performance improvement

**Certified Practitioners
In [System Type]**
Assist facilities in assessing energy efficiency opportunities

U.S. DOE, U.S. CEEM , Advisory Group for Buildings (TBD)
Advise SEP Program Administrator and provide program guidance

SEP Program Administrator
Manage and operate program, process applications, assign auditors, issue certificates, and communicate with organizations involved

Industrial and Commercial Facilities
Apply through SEP Program Administrator

To earn Superior Energy Performance certification, applicants must:

- Conform to ISO 50001
- Demonstrate energy performance improvement

VERIFY APPLICANTS PURSUING SUPERIOR ENERGY PERFORMANCE CERTIFICATION

Measurement & Verification (M&V) Protocol
Methodology to verify energy performance improvement and conformance to Superior Energy Performance. [Separate for industry and commercial buildings.]

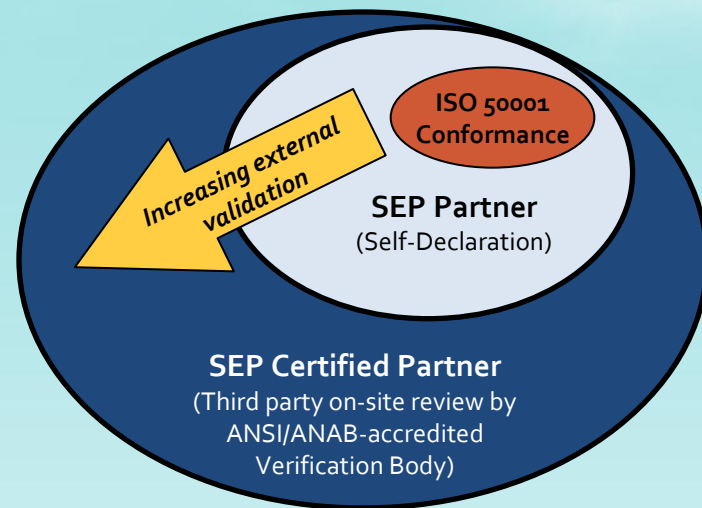
**Certified Practitioners
SEP Lead Auditors and
SEP Performance Verifiers**
Perform third-party audit in facilities applying to become Certified Partners; use M&V Protocol

Verification Bodies
Perform third-party audit or assign SEP Lead Auditors and SEP Performance Verifiers for facilities applying to become Certified Partners; use M&V Protocol

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 review

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 after the baseline period	Meets 10% energy performance improvement threshold over the last 3 years after the baseline period	Meets 15% energy performance improvement threshold over the last 3 years after the baseline period
Mature Energy Pathway	Energy Performance Improvement	Demonstrates an energy performance improvement of 15% or more over the last 10 years after the baseline period	Demonstrates an energy performance improvement of 15% or more over the last 10 years after the baseline period	Demonstrates an energy performance improvement of 15% or more over the last 10 years after the baseline period
	Score on Superior Energy Performance Industrial Facility Best Practice Scorecard <i>Includes credits for energy management best practices and energy performance improvements beyond 15% over the last 10 years after the baseline was developed.</i>	<ul style="list-style-type: none"> Meets a score of at least 35 out of 100 total points for Superior Energy Performance Industrial Facility Best Practice Scorecard Minimum of 30 points required for the energy management best practices. 	<ul style="list-style-type: none"> Meets a score of at least 61 out of 100 total points for Best Practice Scorecard Minimum of 40 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 40 points required for the energy management best practices and 10 for energy performance.

Criteria for Demonstrating Performance Levels in Shorter Time Periods

To qualify for the Energy Performance pathway, the energy performance improvement may be demonstrated over a period of 1 or 2 years rather than 3 years if one or more of the following reduced timeframe justifications is true:

- Changes have occurred in operations and product such that a meaningful baseline cannot be constructed from the earlier year(s) requiring a shorter period of analysis.
- Data are not available from earlier years to allow construction of normalized consumption.
- The facility began its Energy Management System (EnMS) program less than 3 years ago, and wishes to use the year immediately prior to its EnMS start as the baseline.

To qualify for the Mature Energy pathway, the energy performance improvement may be demonstrated over a period of 5 to 9 years rather than 10 years if one or more of the following is true:

- Changes have occurred in operations and product such that a meaningful baseline cannot be constructed from the earlier year(s) requiring a shorter period of analysis.
- Data are not available from earlier years to allow construction of normalized consumption.
- The facility began its EnMS less than 10 years ago, and wishes to use the year immediately prior to its EnMS start as the baseline.

Best Practice Scorecard

- The **Best Practice Scorecard**¹ provides facilities on the Mature Energy Pathway with:
 - Framework to earn credits to qualify for silver, gold, or platinum designation
 - Approaches that can be implemented to earn the credits
- A tool will be available to help users apply the scorecard.

Credits are awarded in seven major categories:

Energy Management Credits²:

1. Energy data, monitoring, and measurement
2. Management of significant energy uses
3. Energy supply management
4. Management of energy projects
5. System sustainability

Energy Performance Credits:

6. Energy performance improvement
7. Innovation in energy performance

¹ The Best Practice Scorecard is undergoing revisions and is not yet final.

² Activities, processes, or procedures that exceed the requirements of ISO 50001.

ISO 50001: Get Started Today

DOE and EPA resources are available to help your facility today. Visit DOE's new ISO 50001 website to learn more.

Action	Resources to Help
Secure support from top management	<ul style="list-style-type: none">• “Guidelines for Energy Management” discusses how to form an energy team and set corporate energy policy
Collect, track, and analyze energy data	<ul style="list-style-type: none">• ePEP tool diagnoses how energy is used at a facility• Technical publications increase knowledge about facility energy use
Identify key energy uses	<ul style="list-style-type: none">• ePEP identifies major energy-consuming systems
Establish a baseline	<ul style="list-style-type: none">• ePEP baselines current energy use; Superior Energy Performance baseline tools & training coming
Identify energy-saving opportunities	<ul style="list-style-type: none">• Tools to evaluate common energy systems• ASME Energy System Assessment Standards• Case studies on how others saved energy
Prioritize opportunities	<ul style="list-style-type: none">• ePEP identifies potential energy and cost savings by energy system and prioritizes projects

DOE helps companies get started: <http://www.eere.energy.gov/energymanagement.html>

Overall Energy Management Toolkit Structure

Track, Prioritize and Follow-up on Energy Saving Opportunities

Corporate Analysis Tools

- Corporate Baseline Creation
- Annual Report Generator

Facility Analysis Tools

- Facility Baseline
- Recommendations Portfolio
- Project Prioritization Tool
- Project Tracker Tool

Project Analysis Tools

- Prioritize projects
- Follow-up tool

Energy Management System Implementation Self-Paced Module
(Based on ISO 50001)

- Step 1: Getting started
- Step 2: Profile Your Energy Situation
- Step 3: Develop Opportunities, Objectives, and Resources
- Step 4: Reality Check: Stop! Look! Can I Go?
- Step 5: Manage Current State & Improvements
- Step 6: Check the system
- Step 7: Sustain & Improve the System

Technical System Area Tools, Calculators, & Scorecards

(Each system area will include software tools and simple calculators/scorecards)

- Industrial Buildings & Facilities
- Data Centers
- Motors
- Process Heating
- Compressed Air
- Fans
- Plant Energy Profiler
- Pumps
- Steam

Supplier Self-Paced Module (Lite)

System Assessment Standards

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:

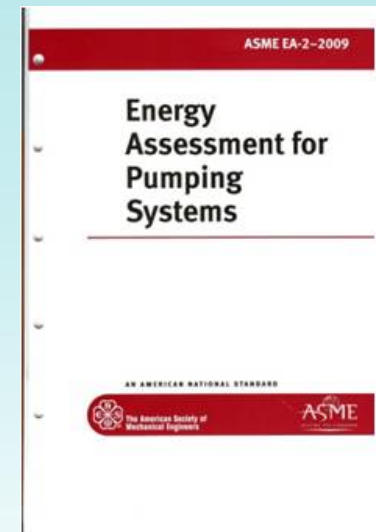
- Organizing an assessment
- Conducting an assessment
- Analyzing the data collected and developing efficiency recommendations
- Reporting and documentation

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

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

Initial Four Standards:

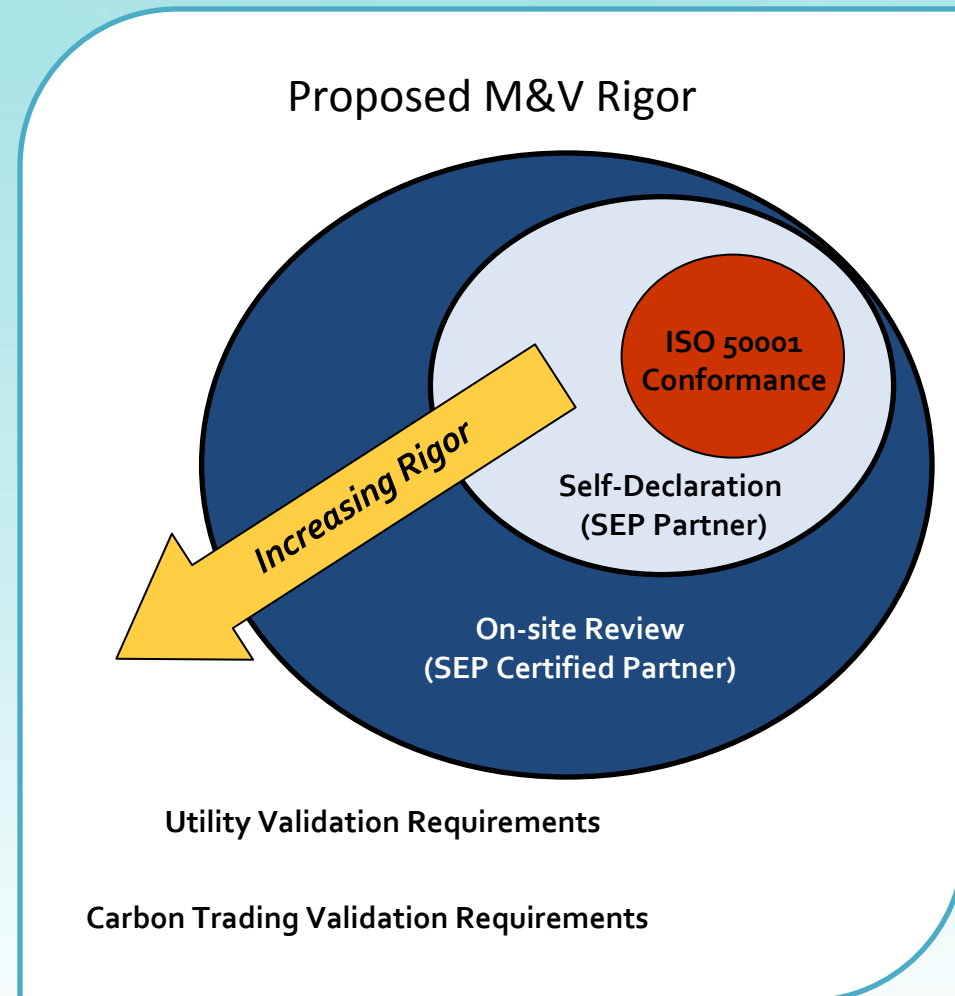
- Compressed Air
- Pumping
- Process Heating
- Steam



Measurement and Verification (M&V) Protocol

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

1. Verify results and impact from implementation of energy management.
2. Track energy performance changes over time for the overall facility.
3. Document energy performance normalized to production.




Certified Practitioners

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 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

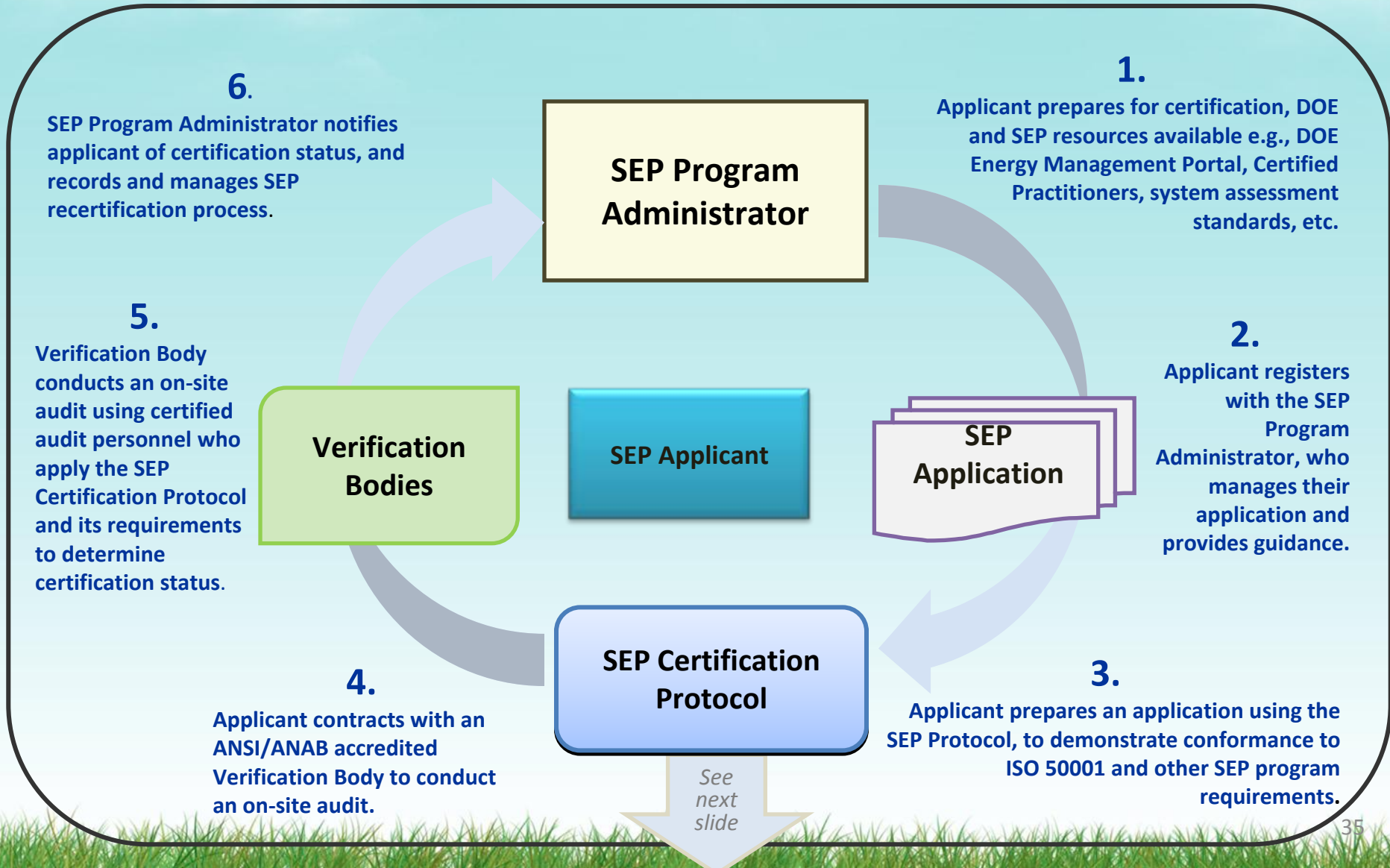
- Spring 2012: First class for Certified Practitioners in Energy Management Systems
- Sign up to receive updates on Superior Energy Performance website.



Superior Energy Performance Program Infrastructure

ANSI-ANAB SEP Certification Process

(for Certified Partner)



SEP Certification Protocol

(Program requirements)

ISO 50001 Energy Management Systems is a core requirement for SEP.

Verification Body requirements are linked to, but maintained separately from SEP requirements.

ISO 50001
(normative reference)

ANSI MSE 50021
(SEP Requirements beyond ISO 50001)

ANSI MSE 50028
(Requirements for Verification Bodies)

Sector-Specific Requirements
(separate normative annexes)

Sector-Specific M&V Protocols
(separate normative references)

M&V Experts Group (Advisory)

Industry

Industry

Best Practice Scorecard

Commercial Buildings

Commercial Buildings

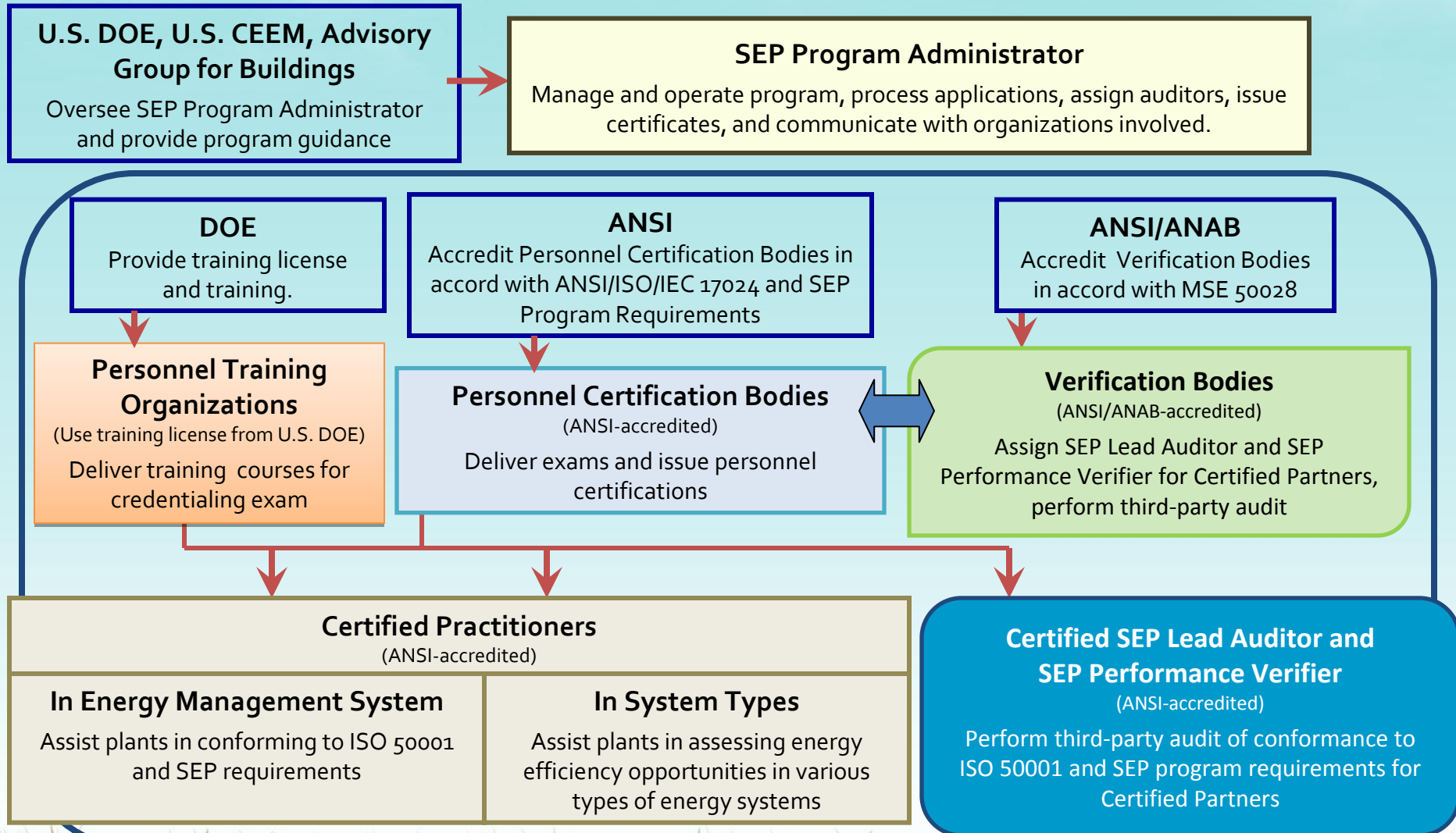
Next Sector

Next Sector

Each sector has SEP energy performance requirements detailed in **normative annexes**, allowing sector-specific requirements to be amended easily and independently of each other.

Each sector has individual M&V protocols detailed in **normative references** allowing sector-specific protocols or amendments to be added without modifying standards.

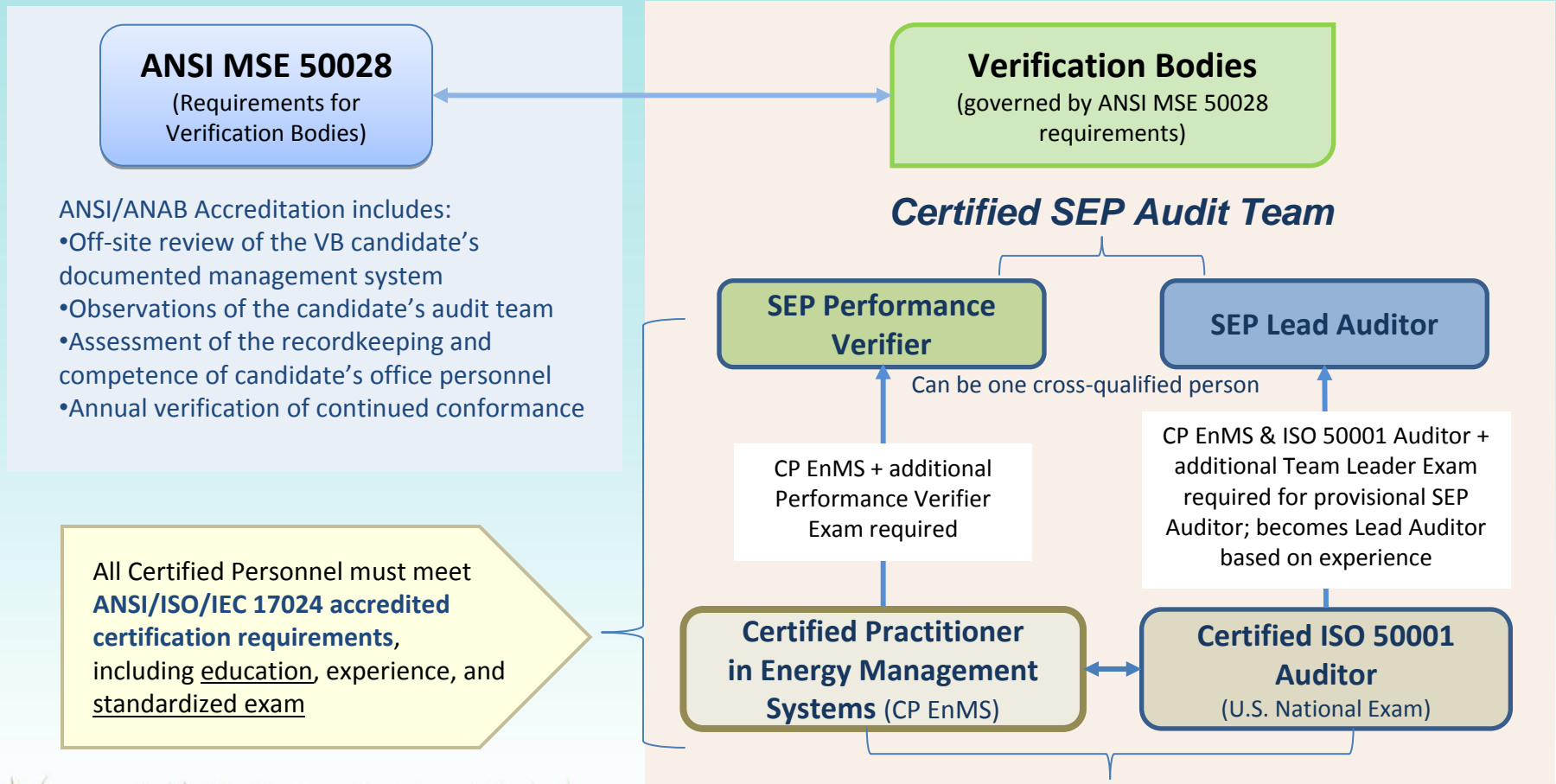
Behind the Scenes: Accreditation and Certification



SEP Verification Bodies & Certified Personnel

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

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



Note: CP EnMS & ISO 50001 Auditor are general, specialty certifications can be applied in response to market needs.

ANSI/ISO/IEC 17024 accredited certification

ANSI ISO/IEC 17024 Accreditation:

- Scientifically developed exam and strict controls on conflict of interest provides greater assurance that individuals will have the necessary knowledge and skills to be competent

Elements:

- Certification Scheme
- Scope and Job Task Analysis (Blueprint)
- Both training and professional exam are based on the Scope and Blueprint
- ANSI requires a fire wall between training and professional qualification exams
- **Personnel Certification Body (PCB):**
An organization that develops and manages professional qualifications and associated exams.
- **Personnel Training Organization (PTO):**
An organization that provides training.

Program Status and Moving Forward

Texas SEP (Alpha) 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
- Implemented energy management systems using ANSI MSE 2000:2008, which is consistent with ISO 50001
- Conducted audits and tested SEP measurement and verification
- 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	Superior Energy Performance Certification	Energy Performance Improvement
Cook Composites and Polymers Houston, TX	Gold	14.9%
Freescale Semiconductor, Inc. West Austin, TX	Silver	6.5%
Owens Corning Waxahachie, TX	Silver	9.6%
Dow Chemical Company Texas City, TX (manufacturing facility)	Platinum	17.1%
Dow Chemical Company Texas City, TX (energy systems facility)	Silver	8.1%

Superior Energy Performance Demonstrations

States, regions, and utilities are partnering with U.S. DOE to further **test Superior Energy Performance** and to **build energy management expertise**.



Industrial Participants:

- 3M
- Alcoa
- Allsteel
- Amcor PET
- Bentley Prince Street
- Bridgestone Tire
- Coca-Cola
- Cook Composites & Polymers
- Cooper Tire
- Cummins
- Didion Milling, Inc
- Dixie Chemical
- Dow Chemical
- Eaton
- General Dynamics
- Harbec Plastics
- Haynes International
- Holcim
- JR Simplot
- Kenworth Trucks
- Lockheed Martin
- MedImmune
- Neenah Foundry Company
- Nissan
- OLAM Spices
- Schneider Electric
- Sherwin-Williams
- Spirax Sarco
- Traco
- UTC/Sikorsky
- United States Mint
- Volvo
- World Kitchen

Demonstration Approach

1. The state or region identifies an appropriate demonstration plant based on provided guidelines
2. Three face-to-face trainings 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

Southeast Region



Mid-Atlantic



Midwest



California



Global Superior Energy Performance (GSEP)

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



For More Information

ISO 50001:

www.eere.energy.gov/energymanagement

Superior Energy Performance:

www.superiorenergyperformance.net/

Superior Energy Performance Demonstrations:

www.eere.energy.gov/industry/energymanagementdemonstrations/

Texas Pilot Program, Superior Energy Performance Case Studies:

www.superiorenergyperformance.net/texas_pilot.html