
How **Industrial Energy Efficiency** Can Support State Climate and Energy Planning

energy.gov/eere/slsc/EEopportunities

About this Presentation

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This short presentation is intended give states and their stakeholders a vision for what it would look like to include industrial energy efficiency in their climate and energy plans.

Industrial Energy Efficiency as an Emission Reduction Approach

Possible Leads

- State Energy Offices (SEOs)
- Utilities / Program Administrators
- Industrial End-Users
- ESCOs

E-Savings

- Metered electricity savings after installing measures or making operational and behavioral changes compared to project start

Potential Program Components

- Better Buildings, Better Plants
- Strategic Energy Management (SEM)
- ISO50001
- Superior Energy Performance (SEP)

Potential Savings in 2030
140-170 million MWh
80-97 million short tons CO2

Activities	EM&V
Energy Savings Approaches	
<ul style="list-style-type: none"> • SEOs, program administrators, industrial end users, ESCOs generate energy savings from: <ul style="list-style-type: none"> – Energy management – Energy management system – Training – Metering – Technical assistance – Capital improvements 	<ul style="list-style-type: none"> • Third-party verification of savings occurs within Superior Energy Performance in accordance with Superior Energy Performance EM&V Protocol • Forthcoming resources: <ul style="list-style-type: none"> – Library of common industrial EE projects/practices and accepted savings calculation methodologies – Uniform Methods Project Protocols for Strategic Energy Management/Superior Energy Performance (Summer 2016)
State Policy Options	
<ul style="list-style-type: none"> • Could include: <ul style="list-style-type: none"> – Energy efficiency resource standard (EERS) – Registry of energy savings from ISO50001 certification or Superior Energy Performance 	
Low Income Opportunities	
<ul style="list-style-type: none"> • Possible if facility located in a low income community 	

What Is Included in Industrial Energy Efficiency?

- Industrial energy efficiency can be improved through equipment, process, or organizational changes. A wide range of approaches are available:
 - Individual facilities make **project-by-project** capital investments to improve the energy efficiency of one process or piece of equipment at a time.
 - Partners in DOE's **Better Plants** Initiative pledge a 25% reduction in energy intensity across their facilities over 10 years; how they determine which investments to make and how to measure the improvements varies.
 - Some utilities offer **Strategic Energy Management (SEM) programs** to support facility-level energy efficiency. Most SEM programs conduct billing analyses to track savings.
 - **ISO 50001** provides an international best practice standard for structuring a strategic energy management system that takes a systematic view across the organization, in addition to the facility's processes.
 - DOE's **Superior Energy Performance** (SEP) program requires implementation of ISO 50001 and adherence to DOE's SEP EM&V protocol to create and measure continual and persistent energy savings for all types of fuels, including electricity.
- Significant cost-effective opportunities (less than two-year payback) are available for industrial (and large commercial) facilities that adopt ISO 50001 and SEP.

Why ISO 50001 and Superior Energy Performance?

How Does ISO 50001 and Superior Energy Performance (SEP) Work?

- Provides a structured approach to establishing an energy management system facility-wide (ISO 50001)
- Results in continual energy performance improvements (ISO 50001 and SEP)
- Quantifies savings via credible, third-party verification by accredited entity (SEP)
- Reduces energy costs for any industrial or large commercial facility, building, or complex. Facilities with over \$1 million in annual energy bills likely to see payback in under two years.

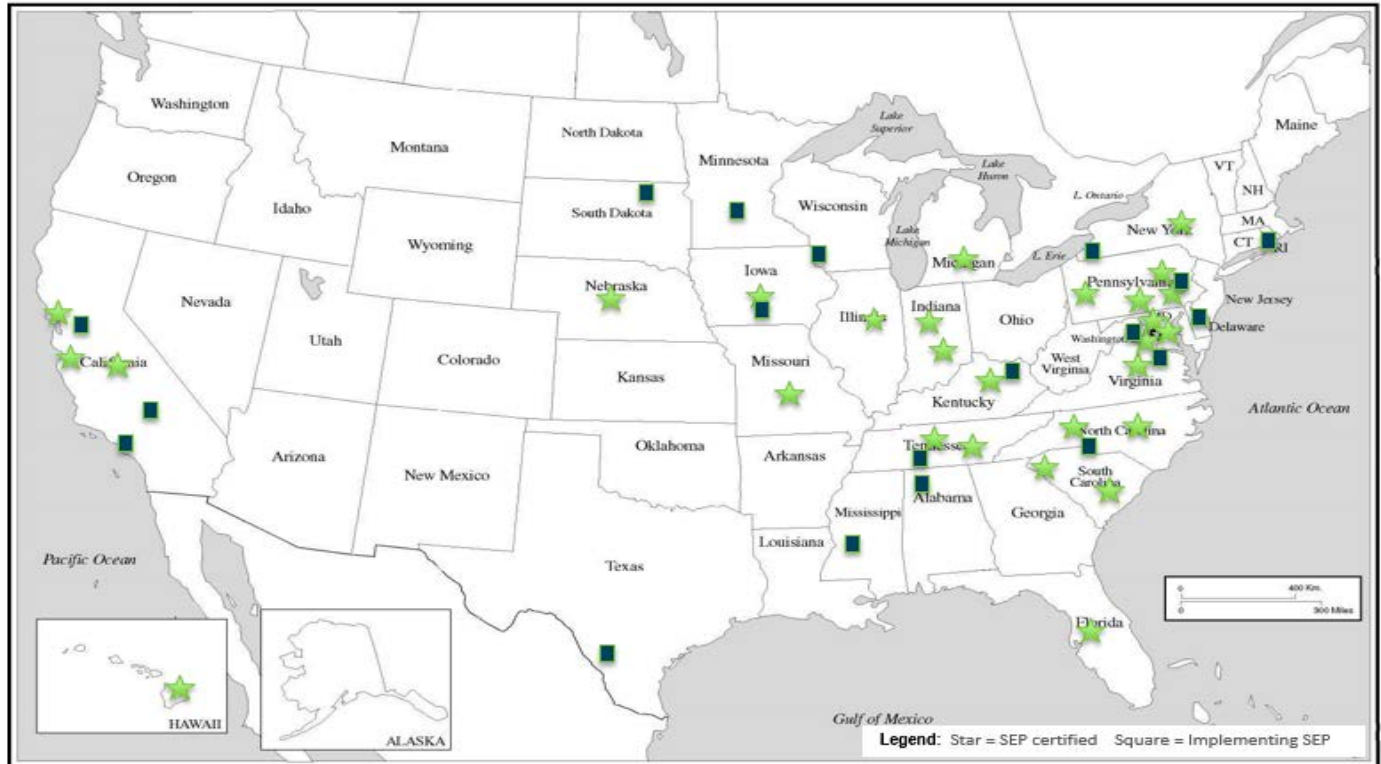
Benefits of ISO 50001 & SEP

- Average energy savings from SEP-certified facilities is **12%** within the first 18 months of program implementation; achieving up to \$1 million in annual savings per facility
- On average, three-fourths of SEP savings come from operational improvements; remaining from capital investment
- Reduces electricity and other fuel uses with third-party verified energy performance improvement

Current Status of ISO 50001 & SEP

- ISO 50001 certification: estimated 3,850 facilities/buildings in US
- SEP Certification: 28 U.S. facilities (17 states & DC), 4 Mexico, 2 Canada

SEP partners:



GENERAL DYNAMICS



Energy Efficiency & Renewable Energy

State and Local Role in ISO 50001 and SEP

ISO 50001 and SEP can be supported by state and local action

Policy Actions

- Public utility commissions can facilitate ISO/SEP expansion by:
 - Promoting inclusion of ISO/SEP in ratepayer-funded efficiency programs
 - Approving the energy savings from ISO/SEP audited results, both as part of mandated efficiency programs and those conducted voluntarily
 - Developing a statewide registry of ISO/SEP facilities and energy savings
- State and local policymakers can facilitate ISO/SEP expansion by:
 - Leading by example and pursuing ISO/SEP in state and local facilities
 - Advancing ISO/SEP as part of economic development and large energy user engagement/retention strategy

Implementation Actions

State and local implementation can be supported through:

- Providing technical assistance, tools, and incentives to encourage users to adopt SEP
- Providing support for training and certification of Certified Practitioners in Energy Management Systems (CP EnMS), SEP Lead Auditors, and SEP Performance Verifiers

Best Practices for SEP

- Follow the [SEP requirements](#) including the [SEP Measurement and Verification Protocol](#)
- [Find a Certified Practitioner in Energy Management Systems \(CP EnMS\)](#). A CP-EnMS can help facilities implement an ISO 50001 energy management system and prepare to meet SEP requirements.
- [Hire an ANAB-accredited SEP Verification Body](#): To certify savings, an ANAB-accredited verification body will audit the facility(ies) to ensure it meets SEP requirements.



National Savings Estimates

Current: Between 2012 to 2014, **industrial energy efficiency** resulted in approximately **19.9 million MWh** of savings from:

- Improvements in electric intensity across the industrial sector

Future:

In 2030, **industrial energy efficiency*** could result in **115 to 175 million MWh** and **66-100 million short tons CO₂** of savings if:

- 50-75% of industrial plants achieved double EIA forecasted annual energy intensity improvements.

In 2030, **SEP*** could result in **13 to 45 million MWh** and **7-26 million short tons CO₂** of savings if:

- 5-18% of large industrial facilities (>0.16 TBtu/year) and 13-38% of large commercial facilities (>200,000 sq. ft) adopt SEP

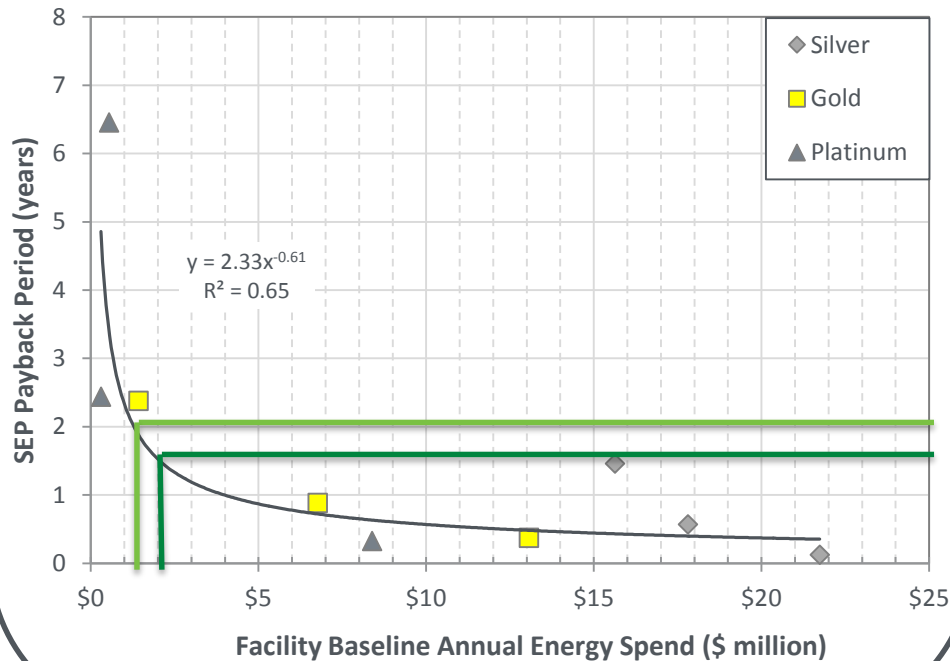
**Savings estimates are NOT additive.*

SEP Is Cost-effective for Large Facilities

Short Payback Periods:

Less than 2 year payback for facility with a baseline annual energy spend greater than \$1M

Less than 1.5 year payback for facility with a baseline annual energy spend greater than \$2M



2015 study of 10 SEP-certified facilities found:

- 12% average reduction in energy costs within 18 months of starting to implement SEP
- Average facility saved over **\$430,000/year** from **low/no cost operational improvements**
- SEP also results in valuable data to analyze potential capital investments in energy efficiency



EM&V Methods for SEP program

[SEP Measurement & Verification protocol](#) forms the basis for quantifying energy savings across an SEP facility.

EM&V steps include:

1. Industrial end user gathers energy consumption data and develops normalized energy savings compliant with SEP M&V protocol
2. Third-party, ANAB-accredited SEP verification body reviews and approves that SEP facility energy numbers meet SEP M&V protocol
3. Third-party sends verified energy savings report to DOE

Forthcoming DOE resources (2016) will expand EM&V resources beyond SEP:

- Library of common industrial EE projects/practices and accepted savings calculation methodologies
- *Uniform Methods Project Protocols for Strategic Energy Management / Superior Energy Performance*

DOE Support and Tools



Technical Tools & Support (for facilities)

- **eGuide tool**: Comprehensive, step-by-step online toolkit
- **EnPI tool**: Supports quantifying facility-wide energy performance improvement
- **Energy Footprint Tool**: Helps gather energy bills; identify all fuel consumption and costs; determine where energy is going
- **Energy System Tools**:
 - Steam System Modeler Tool
 - Process Hearing Modeler Tool
 - Pump System Assessment Tool
 - Fan System Assessment Tool
 - Compressed Air Master
- **Industrial Assessment Centers**: Provides energy assessments for facilities across the country
- **Case studies**: Facilities describe their SEP implementation and lessons

Program Design Tools (for EE programs)

- **Program Planning Guide**: Step-by-step guide for effective program plans and reports for SEP offerings
- **Cost-Effectiveness Screening Tool**: Estimate expected benefits and costs of SEP projects for a state/utility territory
- **Program Template**: Form designed to facilitate development of SEP offerings
- **Transition Tables**: Information on level of effort required to move from offering a traditional, industrial incentive program to Strategic Energy Management, ISO 50001, or SEP
- **Presentation Materials**: Separate introductions to ISO 50001 and SEP for customers, participants, and EE program administrators

energy.gov/ISOSEP

On the Horizon

- Enterprise scaling, allowing for multiple facilities in an organization to be SEP certified
- Launch of ½ day “Importance of Energy Management” training
- DOE-developed energy system trainings (*ongoing through 2020*)
- New resources (Summer 2016):
 - Library of common industrial EE projects/practices and accepted savings calculation methodologies
 - Uniform Methods Project Protocols for Strategic Energy Management / Superior Energy Performance
 - New version of eGuide tool
 - Revision of the DOE energy system tools (*ongoing through 2020*)

Get More Information on This Pathway and Others

Visit: energy.gov/eere/slsc/EEopportunities

[How Energy Efficiency Programs Can Support State Climate and Energy Planning](#)

Overview and individual presentations on features and benefits associated with including energy efficiency in climate and energy plans, covering:

- National electricity savings potential estimates for 2030
- Current activity at the national and state levels, best practices, energy savings examples, cost-effectiveness, measurement approaches, and DOE support for:
 - Building energy codes
 - City-led efficiency efforts
 - Combined heat and power
 - Energy savings performance contracting
 - Industrial efficiency, including superior energy performance
 - Low income energy efficiency
 - Ratepayer-funded programs
- Technical assistance available

[Guide for States: Energy Efficiency as a Least-Cost Strategy to Reduce Greenhouse Gases and Air Pollution, and Meet Energy Needs in the Power Sector](#)

State and Local Energy Efficiency Action Network (SEE Action) resource presents pathways thru:

- Case studies of successful regional, state, and local approaches
- Resources to understand the range of expected savings from energy efficiency
- Common protocols for documenting savings
- Sources for more information