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

energy.gov/eere/slsc/EEopportunities

About this Presentation

Slide Overview

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- Purpose and Benefits
- Current Status
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- Best Practices in Implementation
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- Evaluation, Measurement, & Verification (EM&V)
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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 energy plans.

Industrial Energy Efficiency as an Energy Savings Approach

Possible Lead

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

Energy Savings

- Metered kWh or Btu 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)
- 50001 Ready
- ISO50001 Certification / Superior Energy Performance (SEP)

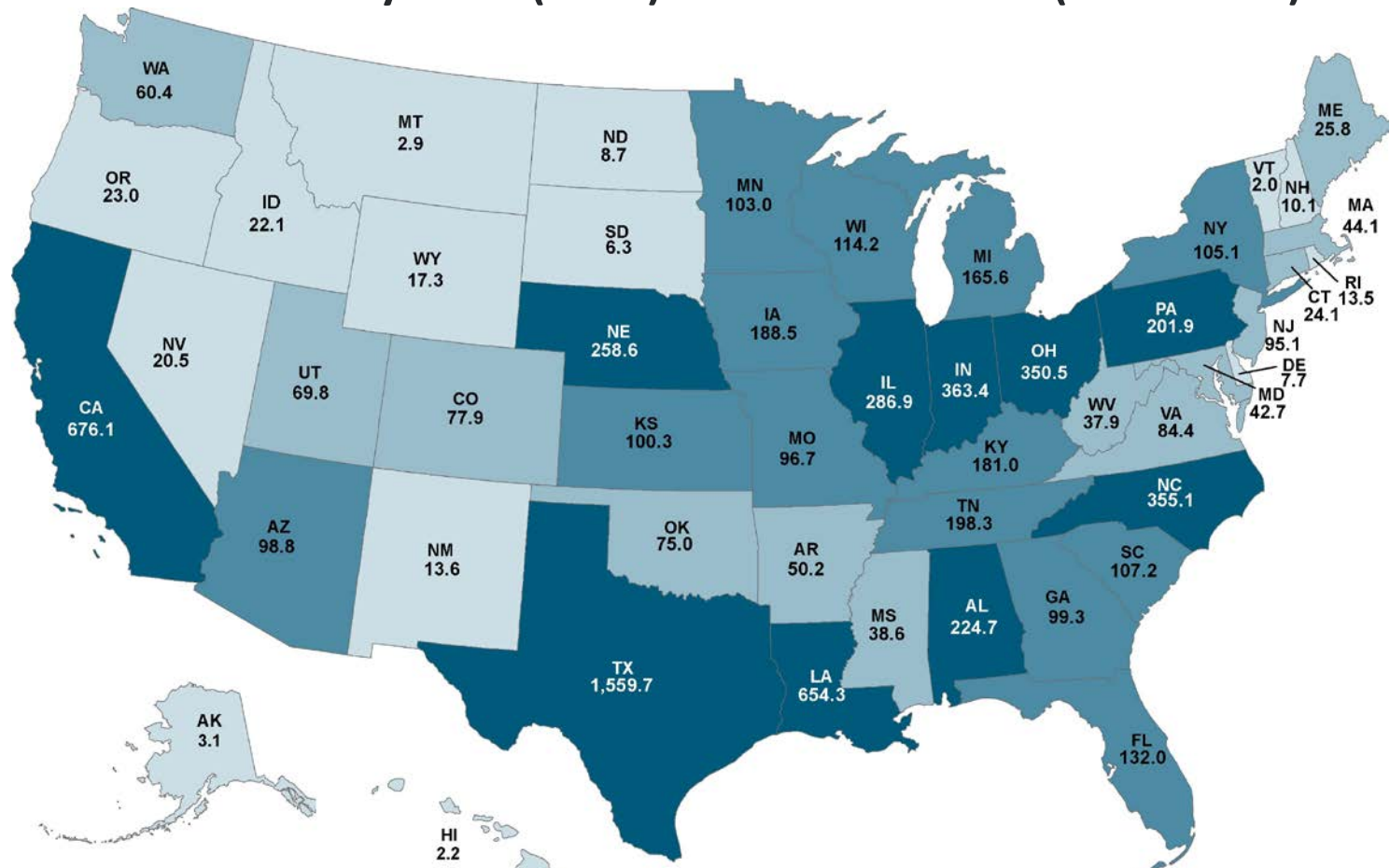
Opportunity:

7,500 Trillion Btu national energy savings
2.2 to 1,560 Trillion Btu per state

Activities	EM&V
<h3>Energy Savings Approaches</h3> <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"> • Verification protocol developed for regression-based energy performance improvement through 50001 Ready Protocol and 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
<h3>State Policy Options</h3> <ul style="list-style-type: none"> • Could include: <ul style="list-style-type: none"> – Energy efficiency resource standard (EERS) – Registry of energy savings from IACs, 50001 Ready or ISO50001/SEP certification 	

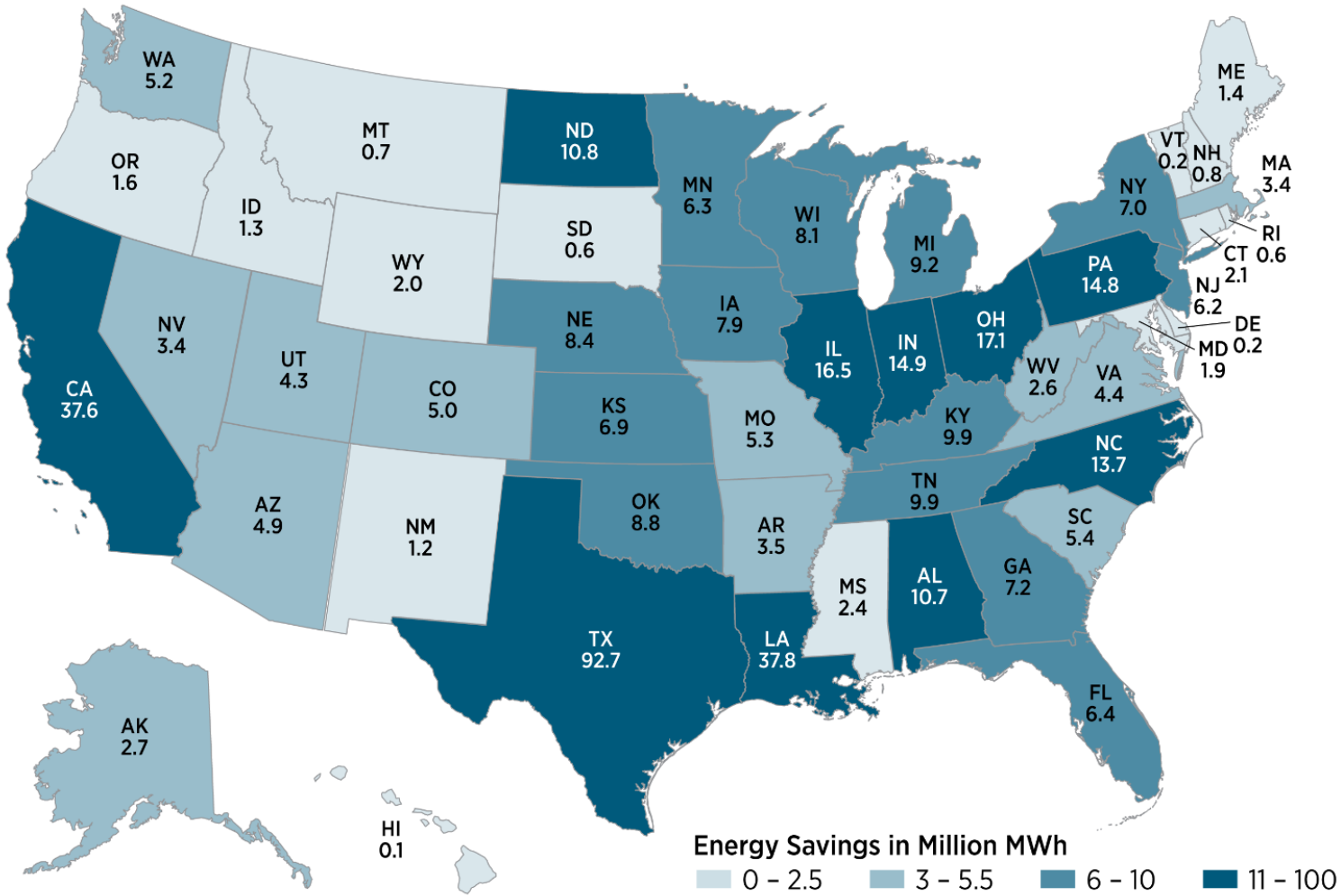
Sizable Opportunity: State-Level Energy Savings Estimates

Estimated Economic Potential Energy Savings (all fuels) by State (2030) from Industrial EE (trillion Btu)



Sizable Opportunity: State-Level Electricity Savings Estimates

Estimated Economic Potential Electricity Savings by State (2030) from Industrial EE (million MWh)



Energy Savings in Million MWh
0 - 2.5 3 - 5.5 6 - 10 11 - 100

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.
 - **50001 Ready** Voluntary program that recognizes a facility's self-attestation to the requirements of ISO 50001 with companion 50001 Ready Protocol for verification.
 - **ISO 50001 Certification** provides an approach to implement 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 (often less than one-year payback) are available for industrial, institutional, and commercial facilities that adopt ISO 50001.

Why 50001 Ready, ISO 50001, and Superior Energy Performance?

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

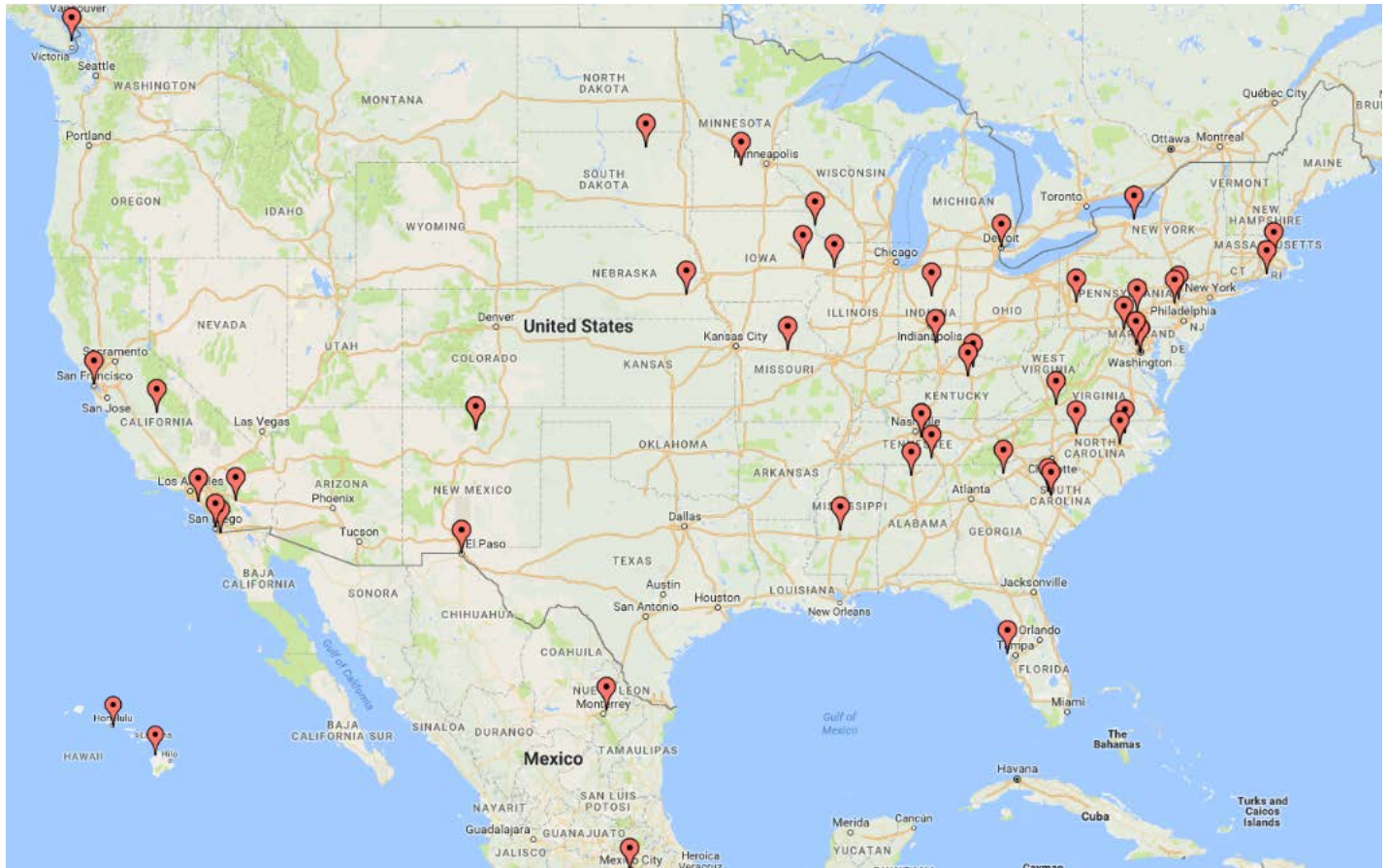
- Instills a practice around energy within a corporate culture
- Executive commitment prioritizes energy improvement opportunities
- Formalized processes move energy from individual to corporate structure
- Results in continual energy performance improvements
- Quantifies, reports and can verify savings (50001 Ready and SEP)

Benefits of 50001 Ready, 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, 3/4 of savings come from operational improvements; remaining from capital investment
- Established energy team means energy practice survives personnel changes
- Reduces electricity and other fuel uses
- Recognition from DOE, EPA, and other entities available

Current Status of ISO 50001 & SEP

- ISO 50001 Certification: estimated 3,850 facilities/buildings in U.S.
- SEP Certification: 43 U.S. facilities (41 states & 2 DC), 5 Mexico, 1 Canada



SEP partners:



A member of the AstraZeneca Group



State and Local Role in 50001 Ready and ISO 50001/SEP

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

Policy Actions

- Public utility commissions can facilitate ISO 50001 by:
 - Promoting inclusion of 50001 Ready/ISO 50001/SEP in ratepayer-funded efficiency programs
 - Approving the energy savings from 50001 Ready/ISO 50001/SEP audited results, both as part of mandated efficiency programs and those conducted voluntarily
 - Developing a statewide registry of 50001 Ready/ISO 50001/SEP energy savings
- State and local policymakers can facilitate ISO 50001 by:
 - Leading by example and pursuing 50001 Ready/ISO 50001/SEP in state and local facilities
 - Advancing 50001 Ready/ISO 50001/SEP as part of economic development and large energy user engagement/retention strategy
 - Develop and support workforce to enable and support ISO 50001
 - Providing technical assistance, tools, and incentives to encourage users to adopt 50001 Ready/ISO 50001/SEP

Best Practices for ISO 50001

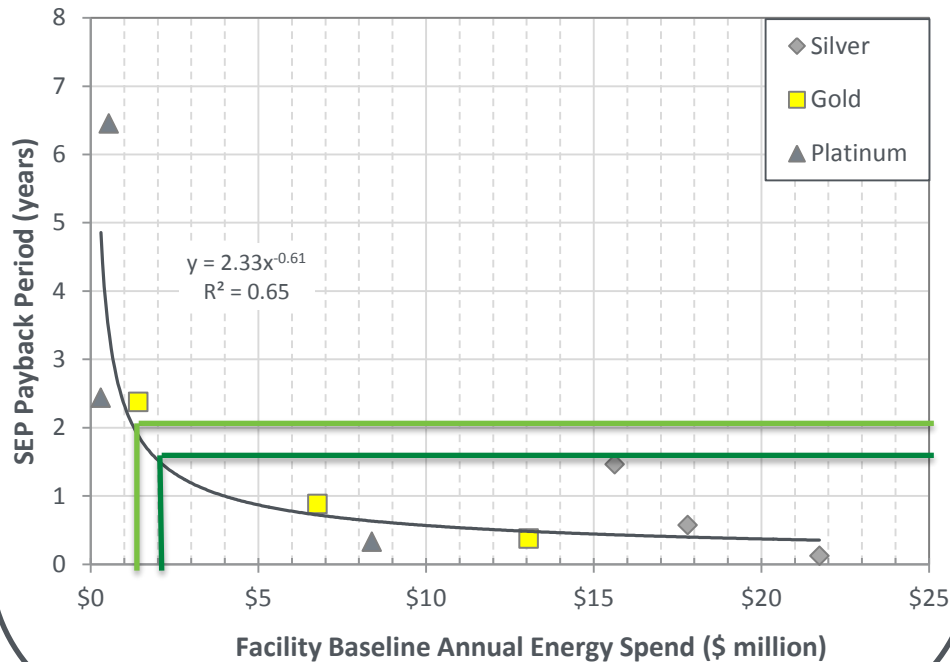
1. Utilize the 50001 Ready Navigator as the gateway into the ISO 50001 world
2. Provide recognition for facilities meeting ISO 50001 Ready or certification
3. After achieving 50001 Ready, [support certification to ISO 50001 or SEP](#)
4. [Utilize Certified Practitioners in Energy Management Systems \(CP EnMS\)](#) to support ISO 50001 uptake
5. With SEP, an ANAB-accredited verification body will verify the energy improvement (and energy savings)

Case Study: 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 DOE 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 ISO 50001

[Measurement & Verification protocols](#) form the basis for quantifying energy savings across a facility.

EM&V levels (from simple to complex) include:

1. Energy bill reconciliation to determine ongoing savings
2. Incorporating external factors (production, weather, etc.) and normalizing the results through regression tools or calculators
3. Adding a [registry of activities](#) to reconcile regression results with documented activities

[DOE resources](#) for formal EM&V:

- Library of common industrial EE projects/practices and accepted savings calculation methodologies
- *Uniform Methods Project Protocols for Strategic Energy Management*
- *50001 Ready Protocol*
- *SEP Protocol*



Technical Tools & Support (for facilities):

- **50001 Ready Navigator**: Online tool, with simple, step-by-step approach to ISO 50001 implementation
- **EnPI/EnPI Lite Tools**: Support 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 Heating Assessment Tool 4.0
 - Pump System Assessment Tool
 - Fan System Assessment Tool
 - Compressed Air Master Tool
- **Industrial Assessment Centers**: Provides energy assessments for facilities across the country
- **Case Studies**: Facilities describe their SEP implementation and lessons

Ongoing Expansion of Activities within ISO 50001 (*coming soon*)

- DOE release of 50001 Ready Navigator (Open Source tool)
- DOE recognition for facilities achieving 50001 Ready
- Enterprise scaling, allowing for multiple facilities in an organization to utilize 50001 Ready or SEP
- EnPI Lite tool developed for online energy savings calculations
- New resources:
 - Library of common industrial EE projects/practices and accepted savings calculation methodologies
 - Conversion of EnPI tool to more robust, online platform
 - Revision of the DOE energy system tools and training (*ongoing through 2020*)
 - Resources to support utility programs to implement / deliver 50001 Ready (*ongoing through 2018*)

Get More Information on This Pathway and Others

Visit: energy.gov/eere/slsc/EEopportunities

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

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

- National and state-level energy savings potential estimates for 2030 and beyond
- 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
 - 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