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# How **Ratepayer-Funded Efficiency** Can Support State Energy Planning

[energy.gov/eere/slsc/EEopportunities](https://energy.gov/eere/slsc/EEopportunities)

# About this Presentation

- Summary
- State-Level Savings Estimates
- Savings Examples from States
- Purpose and Benefits
- Current Status
- State and Local Role
- Program and Partner Types
- Best Practices in Implementation
- Complementary / Related Efforts
- Cost-Effectiveness
- Evaluation, Measurement, & Verification (EM&V)
- Resources for States

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

# Ratepayer-Funded Efficiency as an Energy Savings Approach

## Possible Lead

- Utilities (investor-owned, municipal, rural cooperative)
- Non-utility program administrators

## Energy Savings

- Savings at end of each year, as determined through EM&V, relative to prior year

## Potential Program Components

- New and existing residential buildings (single family, multi-family, low income)
- Small, medium & large commercial buildings
- Industrial facilities

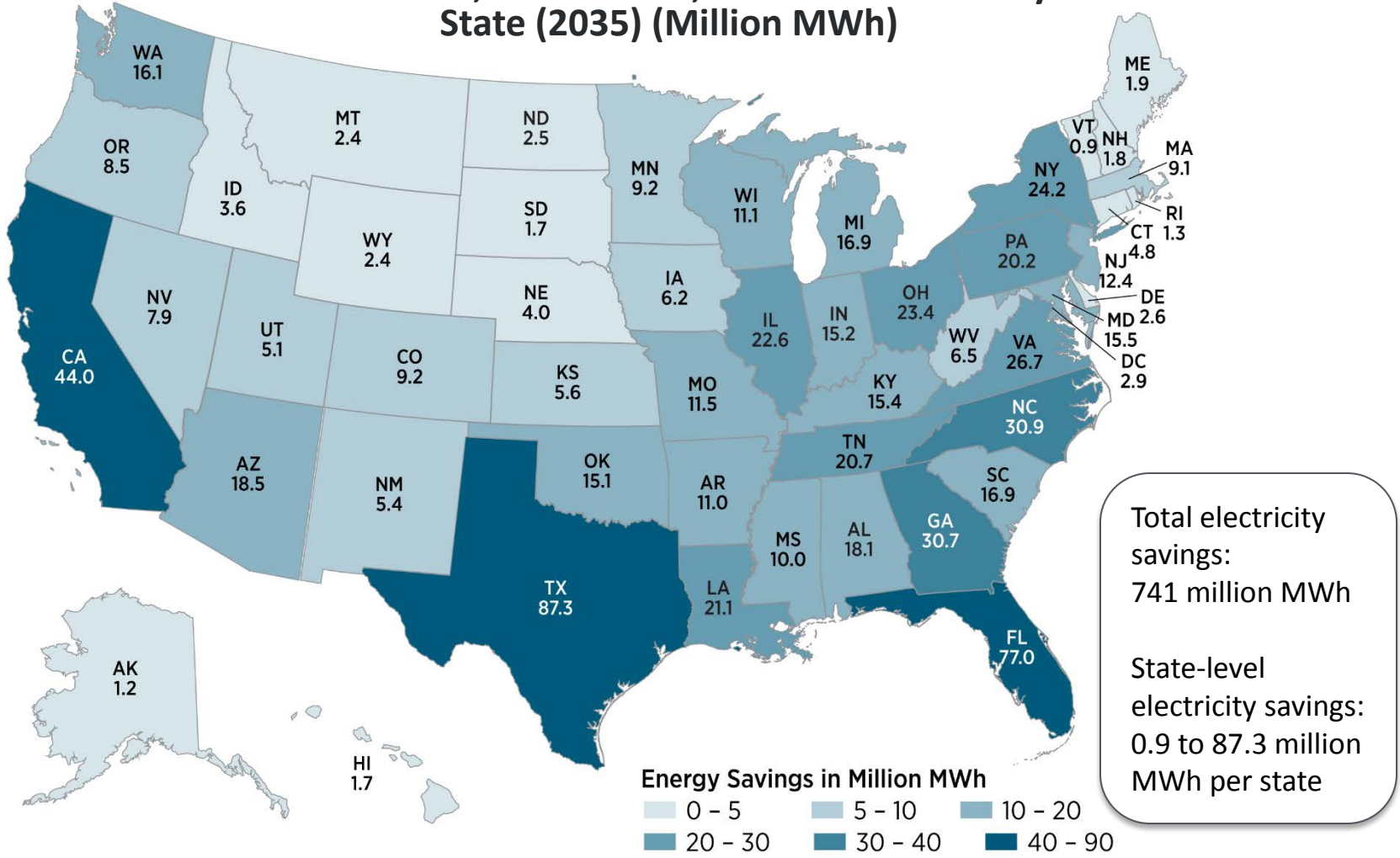
## Opportunity:

741 million MWh (16%) in national electricity savings 2016-2035  
 12% to 22% savings as a percent of sales per state 2016-2035

Activity	EM&V
Energy Savings Approaches	
<ul style="list-style-type: none"> <li>• Program administrators generate energy savings from:                             <ul style="list-style-type: none"> <li>- EE programs that support improvements to residential, commercial, industrial buildings</li> </ul> </li> </ul>	Recent resources provide guidance, including: <ul style="list-style-type: none"> <li>- <a href="#">SEE Action Energy Efficiency Program Impact Evaluation Guide</a></li> </ul>
State Policy Options	
<ul style="list-style-type: none"> <li>• Could include:                             <ul style="list-style-type: none"> <li>- Requiring a specified level of EE savings (e.g., EERS)</li> <li>- Requiring inclusion of EE as a resource in capacity planning (e.g., Integrated Resource Planning)</li> <li>- Regulatory policies to incentivize successful utility delivery of EE</li> <li>- Consider options for energy efficiency delivery agent</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- <a href="#">SEE Action EM&amp;V Resource Portal</a></li> <li>- <a href="#">DOE Uniform Methods Project</a></li> <li>- <a href="#">NEEP EM&amp;V Forum</a></li> <li>- <a href="#">Regional Technical Forum of the Northwest Power and Conservation Council</a></li> </ul>

# Sizable Opportunity: Cost-Effective Efficiency Across Sectors by State

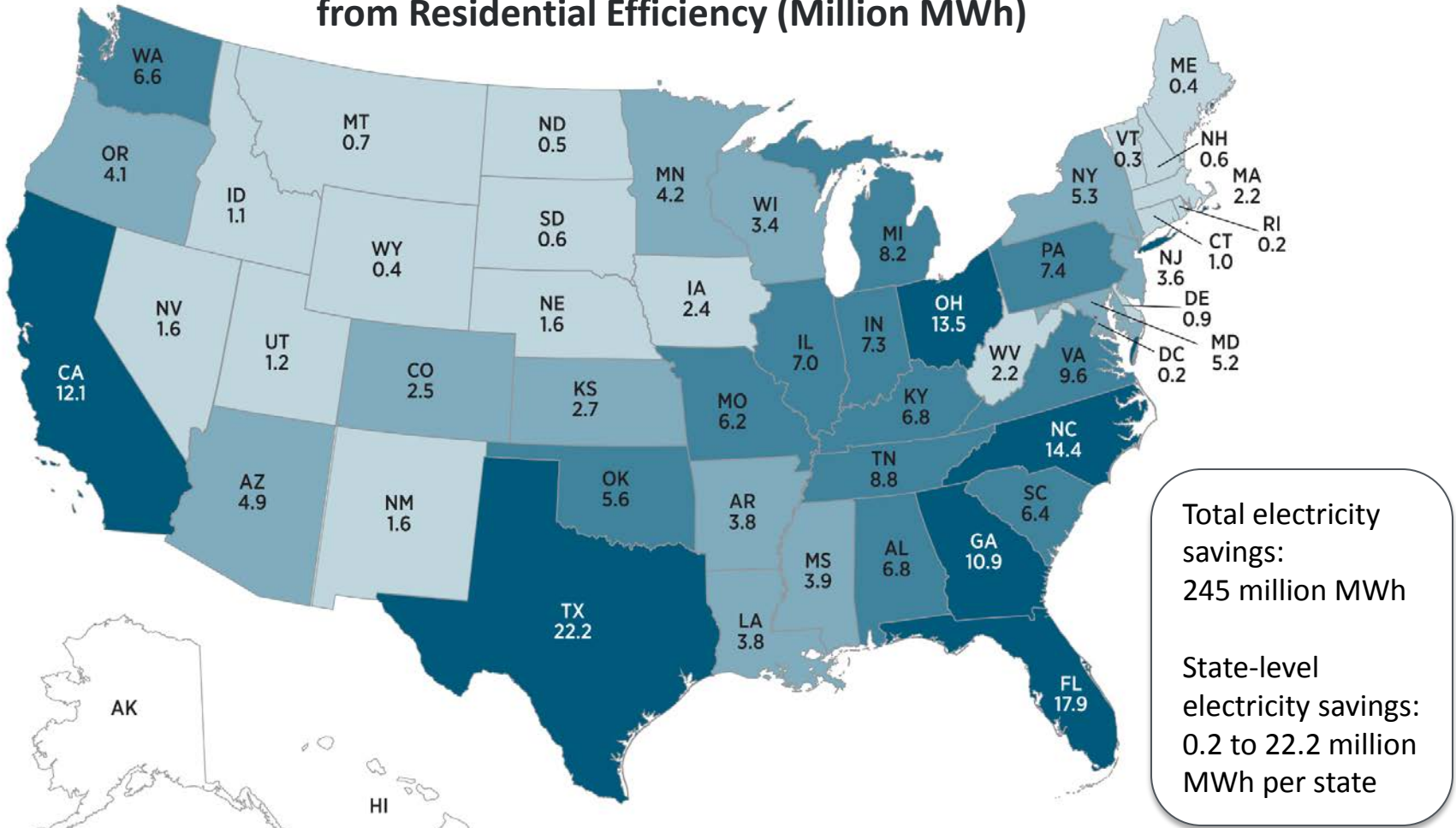
Economic Electricity Savings Potential for Residential, Commercial, Industrial Sectors by State (2035) (Million MWh)



4 Source: Electric Power Research Institute (EPRI), 2017. State-Level Electric Energy Efficiency Potential Estimates

# Example: Large Savings Opportunity from Efficiency in Existing Homes

**Economic Electricity Savings Potential by State (2030)  
from Residential Efficiency (Million MWh)**

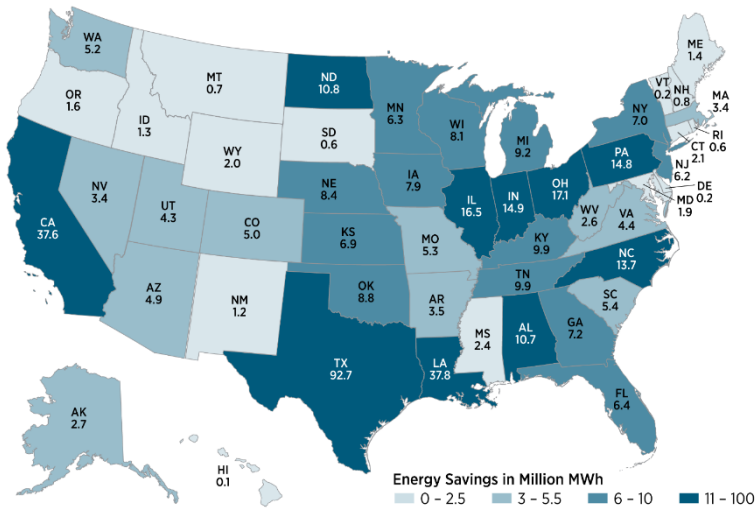


This map was produced by the National Renewable Energy Laboratory, supported by the U.S. Department of Energy (February 22, 2017)

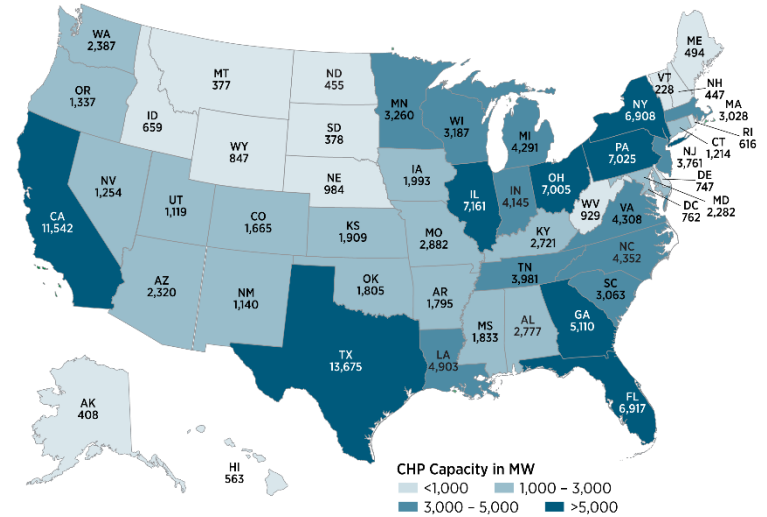


# Additional Examples: Industrial EE, CHP, Building Codes

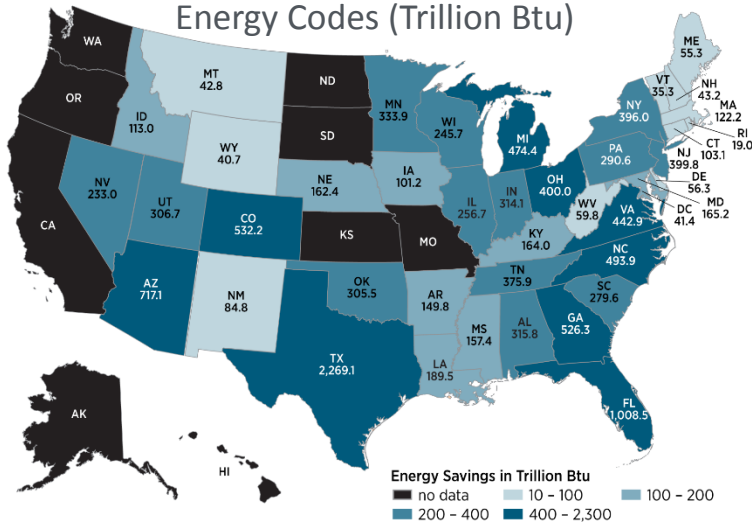
Estimated Economic Potential Electricity Savings by State (2030) from Industrial EE (million MWh)



Estimated On-Site Technical Potential by State from Combined Heat and Power (CHP) (MW)



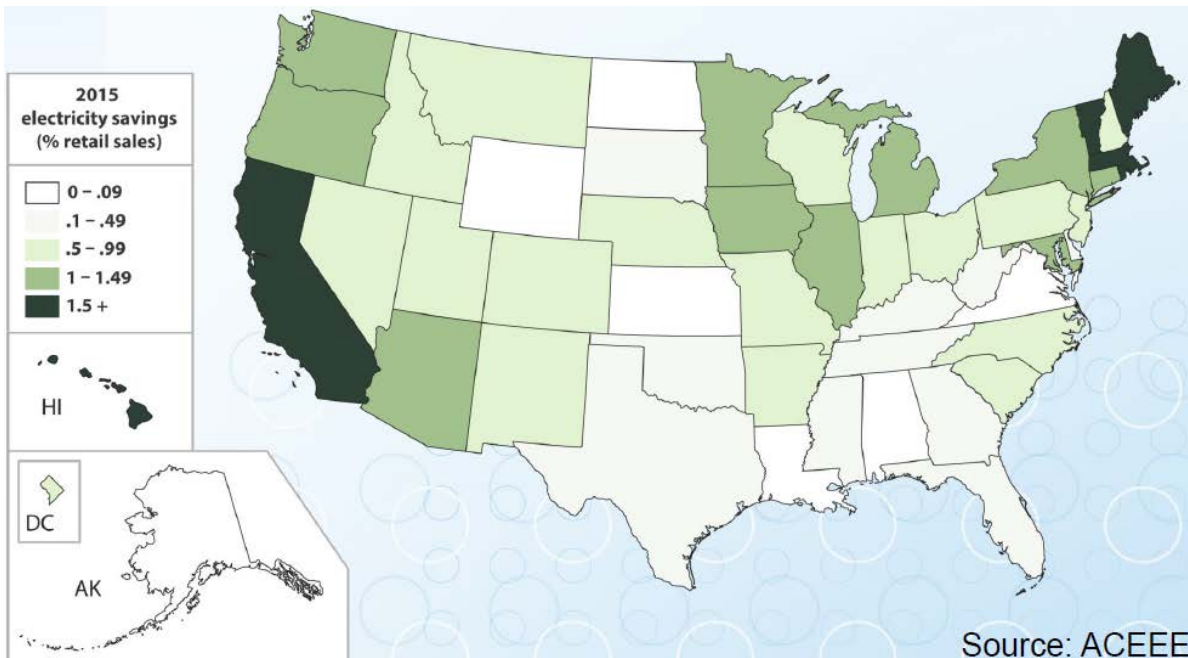
Estimated Achievable Potential Total Energy Savings by State (2010-2040) from Building Energy Codes (Trillion Btu)



See: U.S. DOE, 2017. [Energy Efficiency Savings: Opportunities and Benefits](#) for details, links to analyses, and explanatory materials

# Ratepayer-funded EE is Producing Results across States

## Total Savings in 2015 from Utility Efficiency Programs



- 1/3 states achieving  $\geq 1\%$  annual incremental electricity savings
- 2/3 states achieving  $\geq 0.5\%$ \*

## Top 10 States

State	2015 net incremental savings, MWh	% of 2015 retail sales
RI	222,822	2.91%
MA	1,472,536	2.74%
VT	110,642	2.01%
CA	5,040,603	1.95%
ME	183,347	1.53%
HI	144,240	1.52%
CT	435,740	1.48%
WA	1,275,447	1.42%
AZ	918,582	1.19%
MI	1,177,277	1.16%

Sources: ACEEE, 2016. [The 2016 State Energy Efficiency Scorecard](#).

ACEEE, 2017. [Energy Efficiency and Market Transformation Progress](#)

7 \* Includes states achieving  $\geq 1\%$  annual incremental electricity savings

# Why Ratepayer-Funded Energy Efficiency?

## Purpose of Ratepayer-Funded Energy Efficiency

- Support state policy goals
- Use energy efficiency as a least-cost energy resource
- Lower customer bills by saving energy in thousands of ways, including through:
  - Retrofitting commercial buildings with energy efficient equipment and lighting
  - Installing high-efficiency A/C, reducing infiltration losses, and installing additional insulation in wall, floor and attic
  - Embedding professional energy managers in industrial facilities

## Benefits of Ratepayer-Funded Energy Efficiency

- Programs typically generate a significant portion of statewide electricity savings; have been refined over decades
- Can be offered in all market sectors; opportunities in nearly every building / facility
- Can be readily incorporated into state and regional power planning
- Increases grid reliability, reduces grid congestion and need for new costly infrastructure (i.e. power plants, lines)
- States determine energy savings goals and cost-effectiveness threshold for programs



# Ratepayer-Funded Efficiency Is Cost-Effective

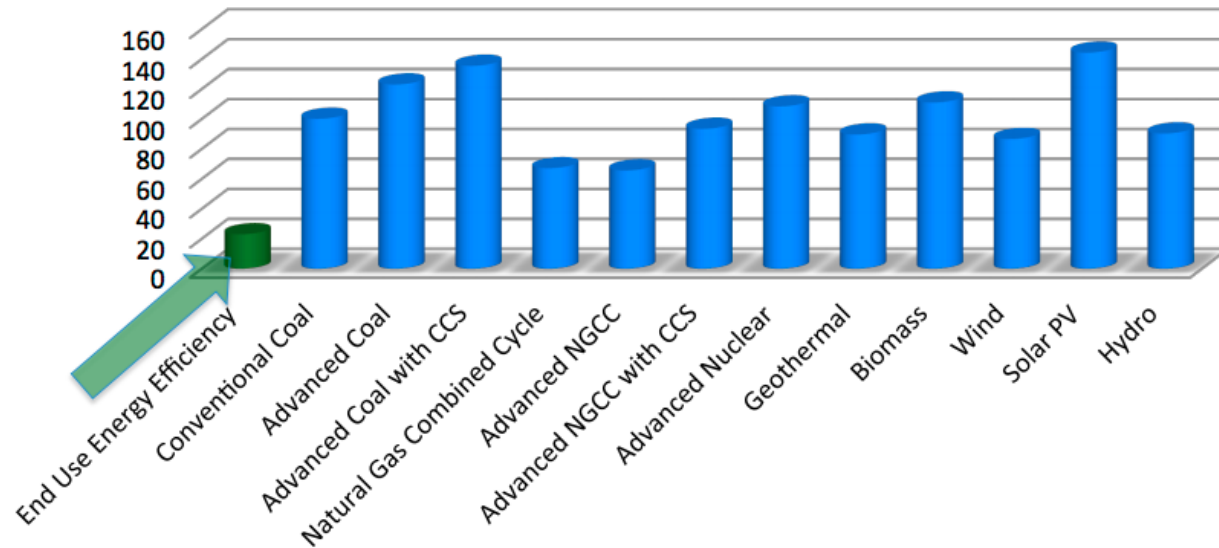
EE is relatively cheap.

- Total cost of saved energy: **\$0.046/kWh\*** (program administrator and participants splitting this cost almost exactly in half)



## Levelized Cost of New Electricity Resources in \$/MWh \*\*

From a Utility Investment Perspective



The savings-weighted total resource cost for all efficiency programs in the U.S. is well below the cost of most generating resources

Sources: \* [LBNL The Total Cost of Saving Electricity through Utility Customer-Funded Energy Efficiency Programs](#)

9 \*\* Schiller; [LBNL Program Administrator Cost of Saved Energy](#) and [EIA Annual Energy Outlook 2013](#)

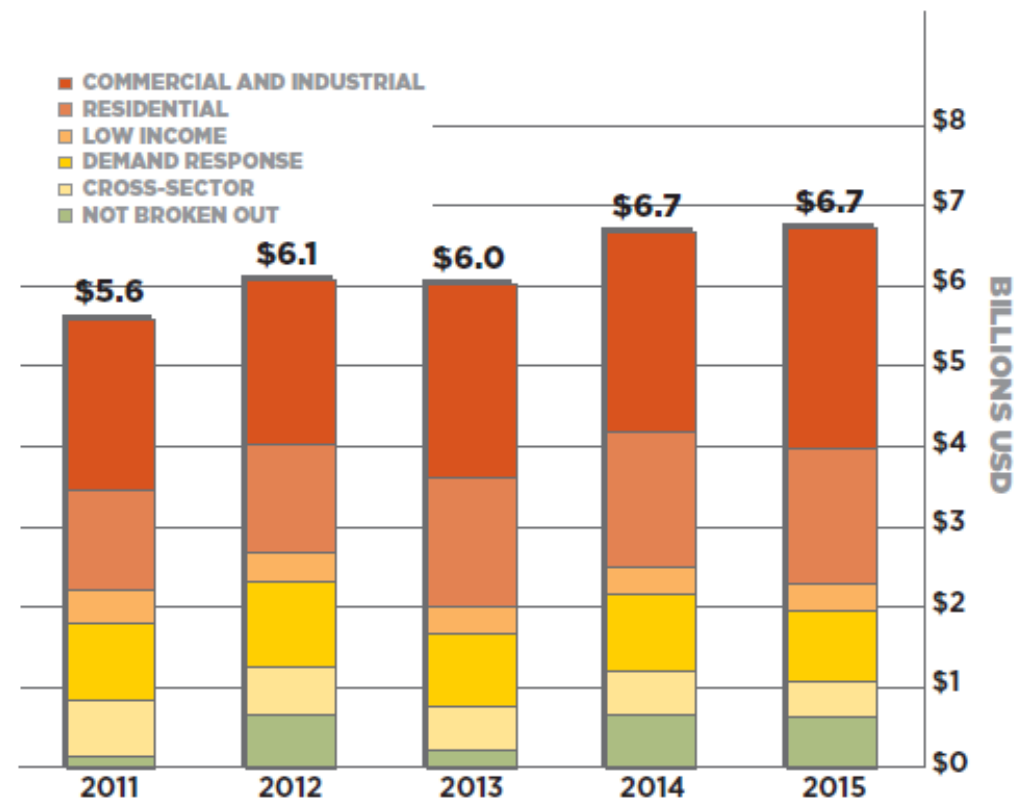
# Current Status of Ratepayer-Funded Energy Efficiency

- Programs exist in all 50 states and DC
- Nationwide reported savings from utility and public benefits electricity programs in 2015 totaled 26.5 million MWh, equivalent to 0.7% of sales.<sup>1</sup>

In 2015, program administrators\* spent \$6.7B on electric demand side management (DSM) programs

*\*Utilities, state or local governments, and third-party entities contracted to administer, design and manage delivery of energy efficiency programs*

US Electric DSM Expenditures 2011-2015



Source: Consortium for Energy Efficiency, 2016. [State of the Efficiency Program Industry](#)

# State and Local Role in Ratepayer-Funded EE

## Policy Actions

- State legislatures and public utility commissions can:
  - Set EE targets for program administrators to meet (e.g., EE resource standard)
  - Require that a utility plan to meet forecasted demand include EE (e.g., integrated resource plan [IRP])
  - Designate an EE program administrator if not utility
- Public utility commissions can independently:
  - Require utilities to offer energy efficiency programs
  - Incentivize utilities to deliver energy efficiency (i.e., program and administrative cost recovery, recovery of lost revenues, and incentive payments)


## Implementation Actions

- Energy savings are generated when customers install EE measures or change behavior to save energy, as encouraged by ratepayer-funded EE programs

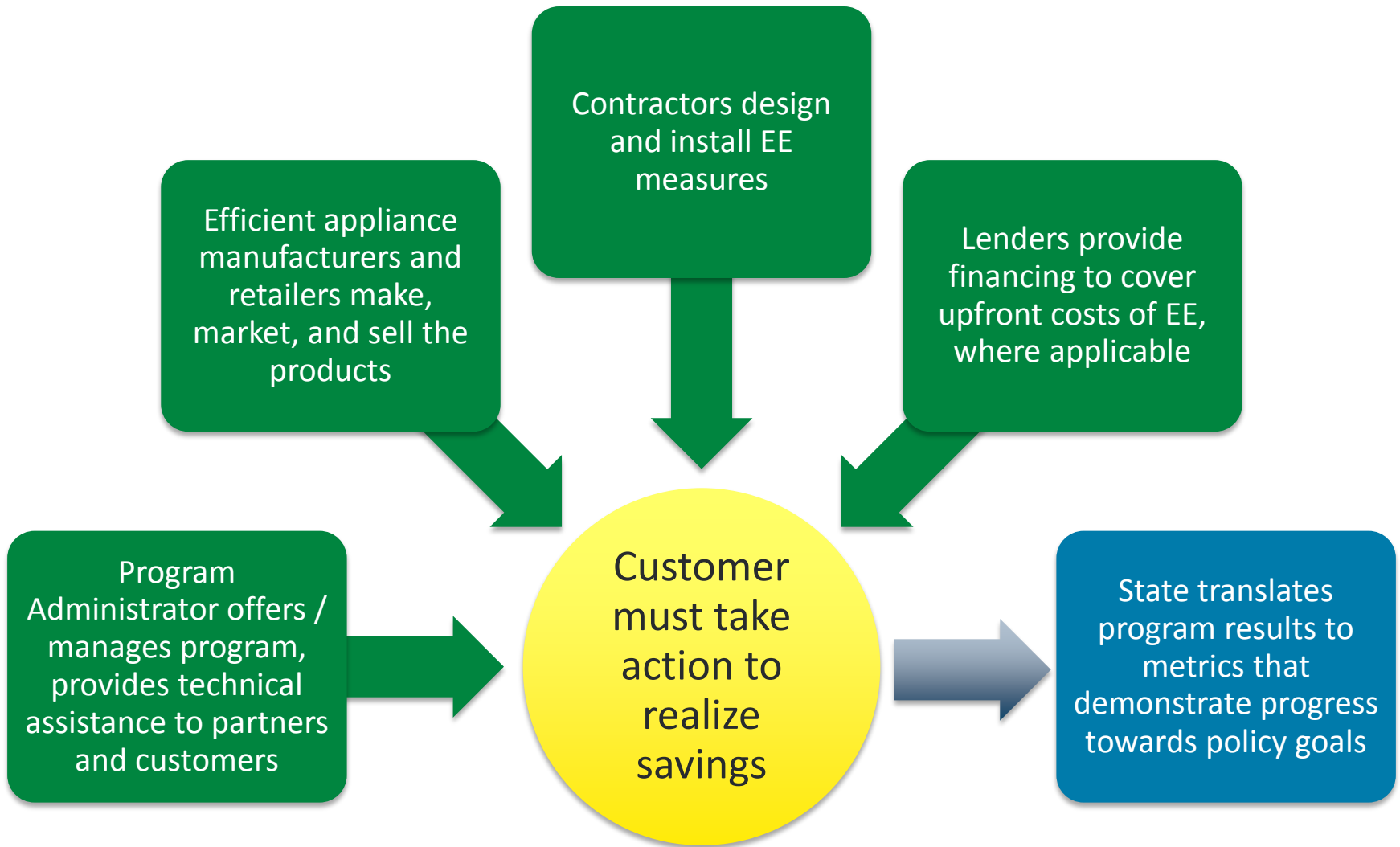
## States employ a variety of accountability and oversight structures to ensure savings

- Investor-owned utilities (IOUs): are regulated by state public utility commissions (PUC)
- Independent administrators: can be overseen by PUC, state energy office, or other agency
- Non-profit and public power: rural electric co-ops and municipal utilities are overseen by co-op boards and municipal governments, respectively, or by PUCs in some states

# Example Program Types: Quick Start and Deep Savings

	Quick Start 	Deep Savings
<b>Summary</b>	Proven, high-impact, programs that can be deployed quickly, are easy to operate, and build infrastructure for comprehensive programs to follow	Long-term initiatives that target significant energy savings through multi-measure approaches and outreach to customer segments that are more challenging to engage
<b>Example program 1</b>	Incentives to homeowners for purchasing high efficiency appliances, equipment and lighting	Home Performance with ENERGY STAR® - Comprehensive home energy retrofit program
<b>Example program 2</b>	Rebate incentives for high efficiency lighting, equipment, motors and refrigeration in commercial/institutional buildings	Custom programs for industrial or large commercial customers to make site-specific energy improvements

# Partners Needed for Implementation



# Best Practices in Ratepayer-Funded EE

States with successful track records have:

- Articulated overarching policy objectives such as least-cost resource planning or loading orders
- Set aggressive yet achievable EE targets that increase over time
- Included energy efficiency in an energy resource planning process (IRP)
- Established an EE stakeholder collaborative\* to support a transparent and inclusive decision process
- Analyzed and managed customer bill impacts of energy efficiency programs
- Used industry standards for evaluating programs and measuring savings
- Developed energy efficiency programs to:
  - Offer support in all economic sectors
  - Address customer needs when designing programs
  - Evolve in response to changing state electricity use baseline
  - Account for EE's full range of benefits in cost-effectiveness testing
  - Provide sufficient, timely, and stable program funding
  - Align utility business incentives with the delivery of EE

Good models:

- Quick Start - AR, MS, LA, GA
- Deep Savings – OR, MN, CO, MA

*\* A PUC-convened stakeholder collaborative could include: regulated utilities, large utility customers, state's consumer advocate, environmental organizations, other relevant state/local government agencies, etc.*

# Complementary / Related Efforts

<p><b>Set energy efficiency target:</b> Drive programs through goal setting; half of states have targets.</p>	<p>SEE Action <a href="#">Setting Energy Savings Targets for Utilities</a></p>
<p><b>Do Integrated Resource Planning:</b> Allow cost-effective EE as a demand-side energy resource to compete with supply-side resources.</p>	<p>SEE Action <a href="#">Using Integrated Resource Planning to Encourage Investment in Cost-Effective Energy Efficiency</a></p>
<p><b>Align utility and customer incentives:</b> Allow program cost recovery, address disincentives, and provide incentives.</p>	<p>National Action Plan for Energy Efficiency <a href="#">Aligning Utility Incentives with Investment in Energy Efficiency</a></p>
<p><b>Consider options for energy efficiency program administrator:</b> Successful models for EE administration and delivery range from utility, independent, government, or hybrid administrator.</p>	<p>Regulatory Assistance Project <a href="#">Who Should Deliver Ratepayer-Funded Energy Efficiency?</a></p>

# Ratepayer-Funded Efficiency Cost-Effectiveness

- 5 typical cost-effectiveness tests used by state commissions for over 20 years to review and approve wide ranges of energy efficiency programs
- Each test offers different perspective; multiple tests often used together
- Many non-energy EE benefits (incl. avoided environmental compliance costs) are not captured in screening as usually applied today
  - Result is efficiency is under-valued; less efficiency is implemented; compliance and customer costs higher than necessary
- Expert recommendations:
  - Identify the full set of public policy goals addressed by EE
  - Use the benefit-cost test most appropriate to meet those goals
  - Identify the policy goals that the chosen test does not address
  - Address those goals outside the test framework
    - Ex: Use other evaluation methods; get stakeholder input; improve understanding to inform decisions
- For detailed analyses and recommendations see:  
Synapse Energy Economics, [Energy Efficiency Cost Effectiveness Screening: How to Properly Account for Other Program Impacts and Environmental Compliance Costs](#) and [Best Practices in Energy Efficiency Program Screening: How to Ensure that the Value of Energy Efficiency is Properly Accounted For](#)



# EM&V Methods for Ratepayer-Funded Efficiency

## DOE [Uniform Methods Project](#)

- Set of easy-to-follow protocols for determining the energy savings from commonly-installed energy efficiency measures and programs, based on commonly accepted engineering and statistical methods.
- The protocols provide a straightforward method for evaluating gross energy savings for common residential and commercial measures offered in ratepayer-funded initiatives in the U.S.

## SEE Action [Energy Efficiency Program Impact Evaluation Guide](#)

- Definitive EM&V resource for both novices and experts to assist with energy efficiency program evaluation. It focuses on the most common approaches to estimating energy efficiency savings: M&V approaches (based on IPMVP), deemed savings values, and large-scale billing analysis.
- Includes a comprehensive glossary of EM&V terms, concepts, and steps for calculating savings, avoided emissions, and other non-energy impacts of energy efficiency programs.

More resources at SEE Action [EM&V Resource Portal](#)

# Resources for States

- [DOE/EPA State and Local Energy Efficiency Action Network](#) - Lessons learned from states using utility regulatory policy to encourage EE
- [DOE/EPA National Action Plan for Energy Efficiency](#) - Guides on critical issues in designing utility regulatory policy and EE programs
- [Lawrence Berkeley National Lab Electricity Markets and Policy Group](#) - Technical, economic and policy analysis on ratepayer-funded EE topics
- [Regulatory Assistance Project](#) - Nonprofit team of experts (including former state utility regulators and staff) provide assistance to PUCs and government officials on EE
- [Synapse Energy Economics](#) - develop climate and energy planning tools and analyses; work with states to identify cost-effective approaches that meet their goals
- [American Council for an Energy-Efficient Economy](#) - Nonprofit EE research and advocacy organization providing assistance to state and local governments
- [Regional Energy Efficiency Organizations](#) - Six regional nonprofits providing tools and resources to states to advance EE as a first order resource
- [Consortium for Energy Efficiency](#) - Consortium of US and Canadian gas and electric efficiency program administrators

# Get More Information on This Pathway and Others

Visit: [energy.gov/eere/slsc/EEopportunities](https://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