

Industrial Energy Efficiency: Designing Effective State Programs for the Industrial Sector

Report prepared for the SEE Action Network

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IIP, SEE Action Network & Clean Energy Solutions webinar
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Outline

- Purpose of the report
- Importance of Industrial Energy Efficiency Programs
- Ongoing and Useful Types of State Programs
- Programs profiled in the report
- Lessons in Designing and Delivering Programs
 - Industrial and program examples
- Self-Direct Programs
- Emerging New Directions



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Designing Effective State Programs for the Industrial Sector

Scope and Purpose

- Provide guidance on successful design & implementation of state IEE programs
- Focus on utility ratepayer-funded EE programs; Does not address issues of institutional planning and utility regulations

Objectives

- Demonstrate the significant benefits of IEE programs
- Explore how all states can promote IEE, even in diverse policy and local contexts
- Outline program features that respond to industry needs
 - Supported by numerous examples and case studies

Audience

- State regulators, utilities and other program administrators



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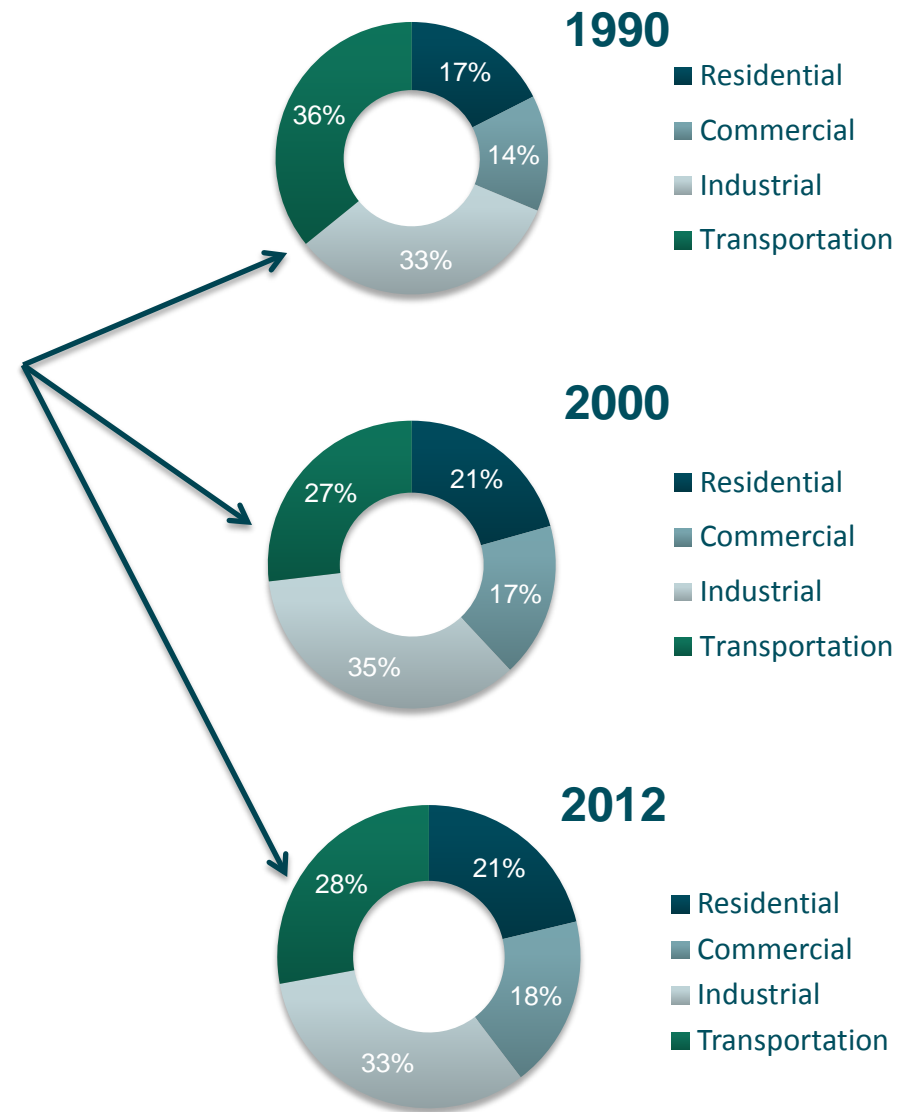
Industry is a Significant Portion of the U.S. Economy

The industrial sector:

- Consumes more energy than any other sector and accounts for **~1/3 of all end-use energy**
- Remains the largest energy user even though industrial efficiency continues to improve
- Will consume 34.8 quads of primary energy in 2020*
- Has the **potential to reduce energy consumption by ~20% by 2020****

* Energy Information Administration (2013). Annual Energy Outlook

**The McKinsey non-transportation industrial estimates were used to calculate the potential for the full industrial sector.



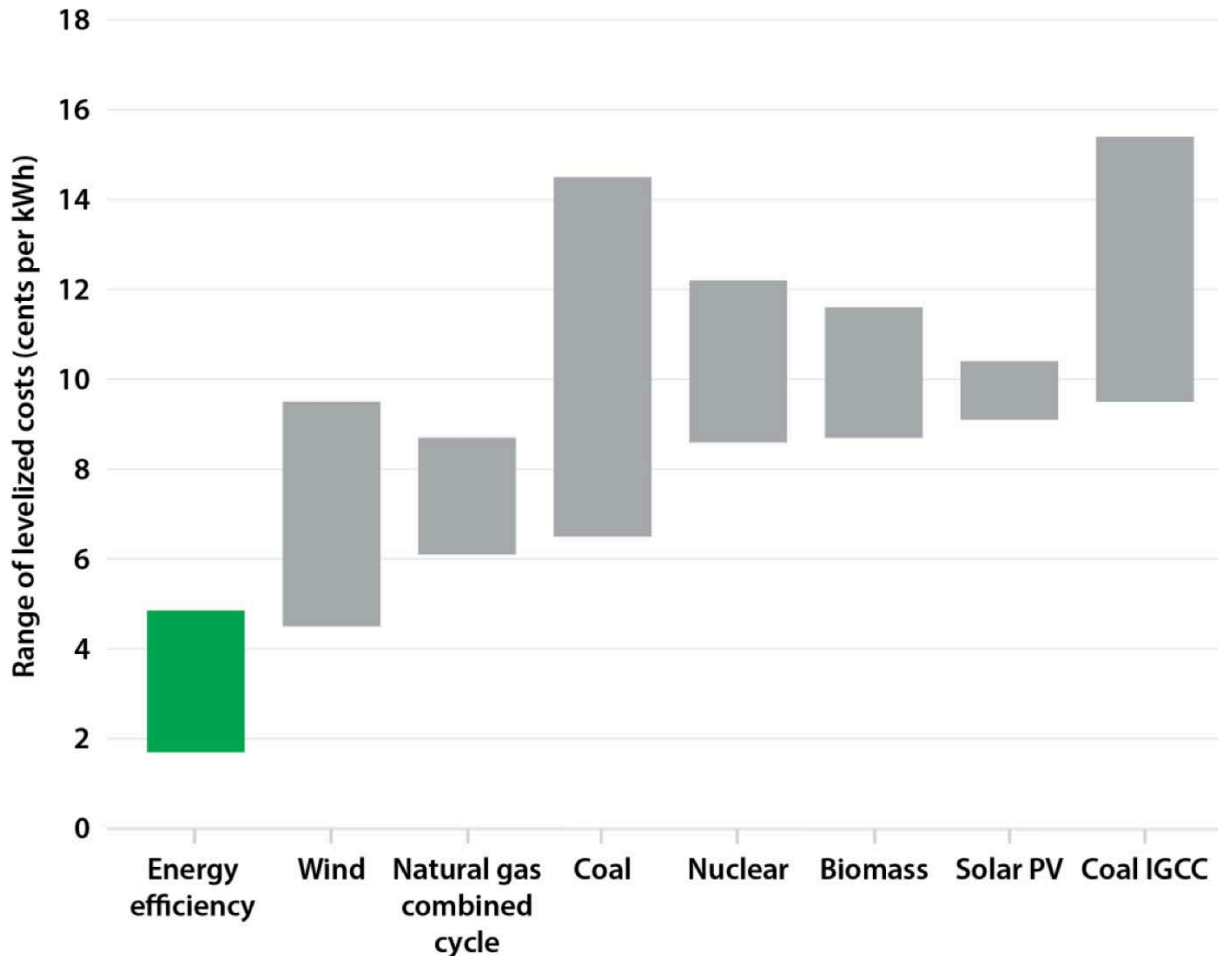
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Energy Efficiency is a Low Cost Resource



Levelized costs of electricity resources (utility program costs over 2009-2012)

Source: ACEEE/Molina (2014). Energy supply data from Lazard (2013)

Electric energy resources:

Cost of energy efficiency is cheaper than conventional supply side resources: EE program administrator costs average \$0.028 per kWh (Molina, 2014), compared to \$0.07-0.15 per kWh for supply resources (Nowak et al. 2013).

Natural gas resources:

Natural gas EE resources cost program administrators on average \$0.35/therm across 10 states (Molina 2014). This value is lower than the average citygate price of natural gas of \$0.49/therm nationally in 2013 (EIA 2014).



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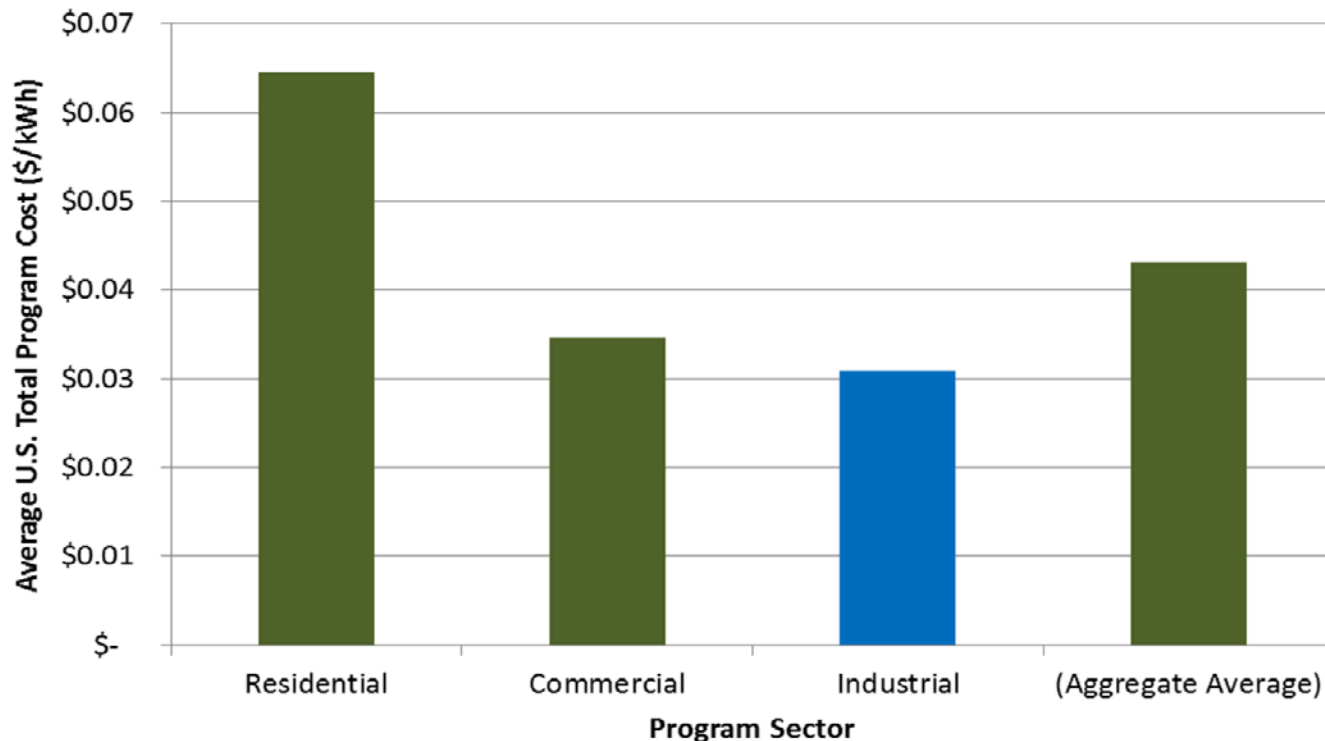
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Industrial Energy Efficiency is Cost Effective

Cost of industrial EE resources vs. other customer classes



Source: Aden (2013) based on EIA 2012 DSM, energy efficiency and load management programs data for more than 1,000 utilities
www.eia.gov/electricity/data/eia861

- Industry has the lowest cost of saved energy on a national level, although it is important to note that cost structures vary by program and sector at the state level
- Possible factors that may influence program costs: 1) program administrator experience 2) Scale of program, 3) Labor costs, 4) State policy environment, 5) Retail rates
(LBNL/Billingsley et al. 2014)



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Inclusion of Industrial Programs is Important

- IEE resources are cost-effective
- IEE creates value for companies and society
- Industry programs will be needed to meet overall state-level energy efficiency goals in many states

Benefits for manufacturers

- Hedge against energy price spikes & volatility
- Increased productivity & competitiveness
- Improved product quality, reduced waste

Benefits for society

- Economic development and job retention/creation
- Environmental & health benefits
- Reduced local and regional strain on energy infrastructure



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The Spectrum of Industrial Energy Efficiency Programs

KNOWLEDGE SHARING

- Low-cost or no-cost technical assistance
- Workshops and other outreach
- Peer exchange between industrial clusters or groups of companies
- Success story dissemination

PRESCRIPTIVE INCENTIVES

- Explicit incentives or rebates for specific eligible energy efficient equipment and technologies

CUSTOM INCENTIVES

- Specific EE projects tailored to individual customers
- May be a mix of technologies
- Incentives or rebates often based on entire energy savings

MARKET TRANSFORMATION

- Streamlined path for introduction of new EE products to market
- Address structural barriers to EE

ENERGY MANAGEMENT

- Operational, organizational and behavioral changes through strategic energy management
- Continuous energy improvement (e.g. embedded energy manager to provide leadership and continuity for implementing change)

SELF-DIRECT

- Customer fees directed into EE investments in their own facilities instead of an aggregated pool of funds
- Eligibility for participation often based on threshold amount of energy use capacity
- Verified energy savings



Programs Profiled in the Guide

- AEP Ohio Continuous Energy Improvement Program
- AlabamaSAVES*
- BC Hydro Power Smart
- Bonneville Power Administration Energy Smart Industrial and Energy Project Manager
- Centerpoint Energy Custom Process Rebate Program
- Efficiency Vermont
- Energy Trust of Oregon Production Efficiency and energy management
- Michigan Public Service Commission Self-Direct Energy Optimization Program
- NEEA Market Transformation
- New York State Energy Research and Development Authority (NYSERDA) FlexTech and Industrial Process Efficiency (IPE)
- Puget Sound Energy Large Power User Self-Direct Program
- Rocky Mountain Power (RMP) Energy Wattsmart Business (formerly FinAnswer and FinAnswer Express)
- SWEEP's Colorado Industrial Energy Challenge*
- West Virginia Industries of the Future*
- Wisconsin Focus on Energy
- Xcel Energy (Colorado and Minnesota): Process Efficiency Program and Self-Direct

*non-ratepayer program



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Characteristics of Industrial Energy Users

- Energy use is complex and larger industrials are sophisticated energy consumers
- Heterogeneous segments and sub-sectors
- Energy Efficiency often not integrated into a company's decision-making process, and can be split across business units
- Energy Efficiency competes with core business investments
- Energy Efficiency investments can be heavily dependent on a plant's operational cycles
- Co-benefits often not included in the cost-benefit analysis of Energy Efficiency
- Industrials are not fluent in the EM&V world of utilities and other program administrators (free riders, spillover, etc.)



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Ten Program Features that Contribute to Success

1. Clearly demonstrate the value proposition of energy efficiency projects to companies
2. Develop long-term relationships with industrial customers that include continual joint efforts to identify energy efficiency projects
3. Ensure program administrators have industrial sector credibility and offer quality technical expertise
4. Offer a combination of prescriptive and custom offerings to best support diverse customer needs
5. Accommodate scheduling concerns
6. Streamline and expedite application processes
7. Conduct continual and targeted program outreach
8. Leverage partnerships
9. Set medium to long term goals as an investment signal for industrial customers
10. Undertake proper project M&V and complete program evaluations



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1. Demonstrate the Value Proposition of EE to Companies

- Document and communicate operating cost savings and other benefits
- Use case studies of companies within the service territory, state or region that have participated in IEE programs
 - Bonneville Power Administration (NORPAC)
 - Rocky Mountain Power (BD Medical)



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Industry Example - NORPAC

Company:

- NORPAC, located in Washington, is the largest newsprint and specialty paper mill in North America
- The 33-year-old mill produces 750,000 tons of paper per year
- Uses 200 MW annually; largest industrial electricity consumer in WA



Project:

- Bonneville Power Administration and Cowlitz County PUD funded \$25 million of a \$60 million project for installation of new screening equipment between refiners to reduce electricity and chemical use

Benefits:

- Estimated to save 100 million kWh per year
 - Equivalent to ~12% reduction in power use
 - Equivalent to enough energy to power 8,000 Northwest homes
- Construction phase of project created 64 full-time family-wage jobs



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Industry Example – BD Medical

Company:

- BD Medical, located in Utah, is a medical technology company that manufactures medical supplies, devices, laboratory equipment and diagnostic products



Project:

- Rocky Mountain Power provided \$712,900 in incentives for a \$1,880,500 project
- Completed 62 energy efficiency projects since 2001, including 29 lighting projects, as well as compressed air upgrades/replacements

Benefits:

- Totaling 10.4 million kWh per year in electricity savings
- Resulting in \$580,000 in annual energy cost savings
- Projects have facilitated maintenance of ISO certifications



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2. Build Relationships

3. Industrial Sector Credibility & Technical Expertise

- Develop long-term relationships with industrial customers that include continual joint efforts to identify energy efficiency projects
- Stability in program personnel and savvy account managers can help build trust between program administrator and customers
 - ETO's customer support has encouraged more cost-effective savings
- Addressing industrial companies' core needs requires understanding a plant's production processes, operating issues, and the market context the plant operates within.
- Employing staff/contractor experts that understand the industrial segment and have the technical expertise to provide quality technical advice and support issues specific to that industry and customer
 - Wisconsin Focus on Energy's "cluster approach"



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4. Address Diverse Industrial Customer Needs

- Manufacturers use energy differently than the commercial sector, typically having significant process-related consumption. Focusing on simple common technology fixes alone will miss many of the opportunities.
- A combination of both prescriptive offerings for common crosscutting technology and customized project offerings for larger, more unique projects can best meet diverse customer needs and provide flexible choices to industries.
- Energy management programs can help mature customers get continued savings
 - Xcel Energy's programs have been lauded by industrial customers for offering simple incentive applications for providing a full suite of programs – prescriptive, custom, self-direct and process efficiency.



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5. Project Scheduling

- Scheduling of energy efficiency investments can be heavily dependent on a plant's operational and capital cycle, as proposed equipment changes must be guided through rigorous, competitive, and time-consuming approval processes
- Programs with multi-year operational planning can best accommodate company scheduling requirements, as scheduling of capital project implementation must consider both operational schedules that dictate when production lines may be taken out of operation as well as capital investment cycles and decision-making processes
 - NYSERDA



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6. Streamline Application Processes

7. Continual Program Outreach

- Industrial customers may perceive the application and implementation procedures for IEE programs to be administratively complex and burdensome.
- Balance between meeting key program administration needs and keeping program procedures simple and efficient
 - BPA uses a 3rd party to evaluate and streamline procedures, and helps individual companies navigate application procedures.
- Various industrial customers may be unaware of relevant industrial program offerings.
- Steady and continual outreach and dissemination of information is important to encourage participation
 - Wisconsin Focus on Energy
 - AlabamaSAVES loan program



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8. Leverage Partnerships

9. Medium- and Long-term Goals

- Successful IEE programs often partner with federal, state, and regional agencies and organizations to leverage their expertise, access to customers, and program implementation support capacities.
 - DOE Better Plants, EPA ENERGY STAR® for Industry, state energy offices, the Manufacturing Extension Partnership.
- Regulators and program administrators can set energy savings goals or targets for the medium- to long-term, coordinated with funding cycles (e.g., in three-year cycles) to give companies market certainty and reduced risk in IEE project implementation
 - 28 states now have EERS/CEPS
 - Michigan Self- Direct Energy Optimization Program
 - SWEEP Colorado Industrial Energy Challenge



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10. Measurement, Verification & Evaluation

- Guidelines for M&V need to be clearly defined and periodically reviewed and adjusted
 - M&V required as a condition for funding in most programs
 - Consistent methodologies increasingly relevant, e.g. IPMVP, SEP's M&V Protocol, DOE's Uniform Methods Project
- Periodic impact and process evaluations help identify where IEE program efficiency and results can be further improved
 - Energy Trust of Oregon
- Non-energy benefits (NEBs) can be a key element of both project M&V and program evaluation.
 - Examples of programs that incorporate a relatively large range of NEBs include NYSERDA and BPA



Self-Direct Programs

- Industrial customers often raise concerns about the extent to which ratepayer-funded programs will be able to meet their specific needs
 - Some states allow industrials to “opt out” of paying fees collected for energy efficiency programs
- Rather than allowing industrial customers to opt out, some states have designed “self-direct” programs:
 - Fees from larger customers can be directed into energy efficiency investments in their own facilities instead of a broader aggregated pool of funds
 - Good self-direct programs produce cost-effective energy savings equal to or greater than what would have been realized in a traditional, administrator-directed program, ensuring EE public policy goals are met
 - Clear self-direct obligations and M&V of results are necessary to ensure least-cost electricity or gas service at a level on par with the contributions of other customers.
 - Consider escrow-like accounts to structure a “use it-or-lose-it” fund base that encourages greater participation.
 - Puget Sound Self-Direct Program

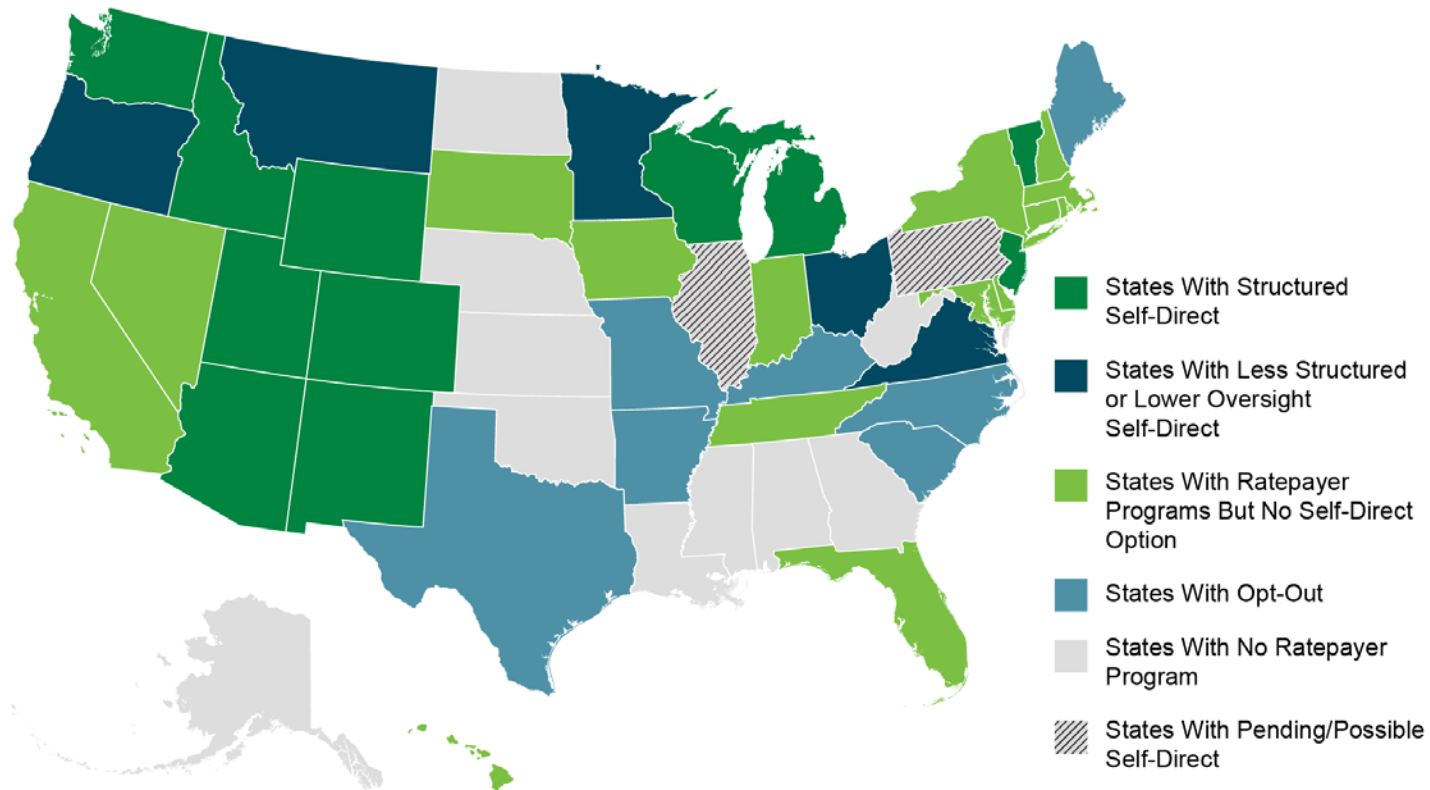


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Self-Direct Programs

A snapshot of self-direct programs among the states as of January 2014:



Source: ACEEE, R.N. Elliott, Presentation to the ACEEE Energy Efficiency as a Resource Conference, September 2013

Emerging New Directions

Four key areas of interest for further program evolution:

1. Increasing support for Strategic Energy Management/ Energy Manager programs
 - Established programs: ETO, WFE, BPA, Efficiency Vermont
 - New programs and pilots emerging: RMP (UT), AEP Ohio, ETO for SMEs, Minnesota, NEEA SEM Cohorts
2. Developing approaches for providing energy efficiency incentives for whole-facility performance
3. Capturing more energy efficiency projects by expanding quantification and recognition of project non-energy benefits
4. Continuing efforts to expand industrial natural gas efficiency programs



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For more information on the IEE report, visit:

http://www.iipnetwork.org/US_IEEprograms

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Backup Slides



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Industry Example – Irving Tissue

Company:

- Irving Tissue, located in Fort Edward, New York, is one of North America's leading manufacturers of household paper products



Project:

- NYSERDA provided a \$1.8 million incentive for a \$4.3 million project to construct a new pulp processing and paper machine with built-in energy efficiency processes and systems

Benefits:

- Resulted in electricity savings of 14.8 million kWh per year compared to the standard paper machine installation



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Industry Example – Wise Alloys

Company:

- Wise Alloys, located in Alabama, is the third leading U.S. producer of aluminum can stock for the beverage and food industries



Project:

- Alabama State Energy Office provided a loan for \$3.75 million to complete an energy efficiency project that included improving lighting and compressed air systems
- Partnered with Poplar Hill, Blake & Pendleton, and iZ Systems for the project implementation

Benefits:

- Totaling 30.6 million kWh per year in electricity savings
- Resulting in \$1.5 million in annual energy cost savings



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Industry Example – Arctic Cold Storage

Company:

- Arctic Cold Storage, located in Minnesota, has more than 5.5 million cubic feet of temperature-controlled warehouse space for storing meat, poultry, packaged foods, and raw materials



Project:

- Xcel Energy provided an \$8,300 rebate for a \$16,965 project to install a high-speed roll door with operating speeds of more than eight feet per second, which reduces energy by keeping the cold air from escaping

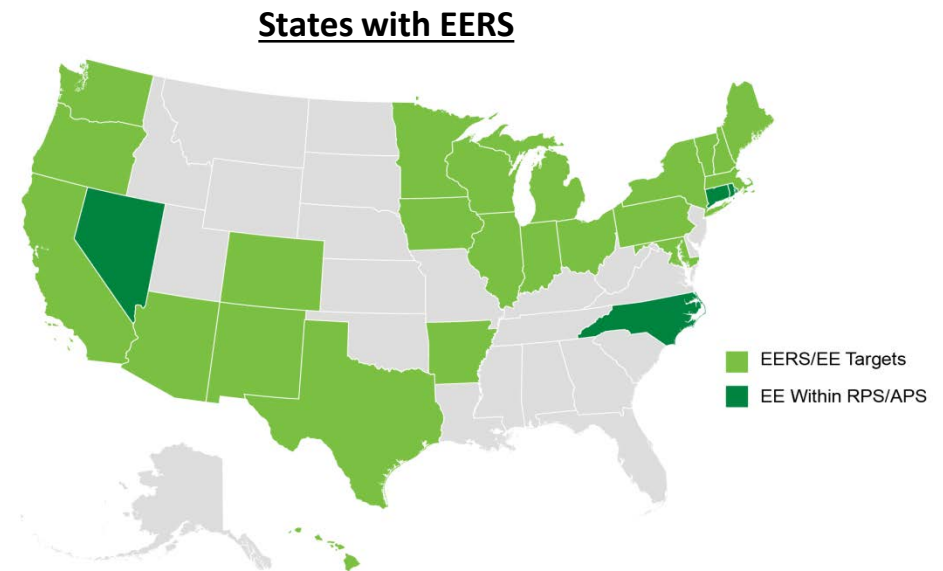
Benefits:

- Estimated 110,000 kWh per year in electricity savings
- Totaling \$8,130 in annual energy cost savings
- Resulting in a payback period of 1.1 years



Current State of IEE Programs

- Just over one-half of all states operate ratepayer-funded programs with Clean Energy Portfolio Standards / Energy Efficiency Resource Standards or utility energy efficiency targets



Source: ACEEE State Energy Efficiency Resource Standards Policy Brief, July 2013

- 41 states have ratepayer-funded energy efficiency programs
- At least 35 state energy offices operate some type of *industrial* energy efficiency program separate from, or in support of, ratepayer-funded programs

Types of State Programs

Technical Assistance and Knowledge-Sharing Programs

- Low-cost or no-cost technical assistance that can include workshops, networking, and success story dissemination

Prescriptive Incentive Programs

- Standard incentives or rebates that are straightforward to administer for common efficient technologies, like lighting, motors, and drives

Custom/process Incentive Programs

- Financial and technical support for potentially complex EE projects tailored to individual customers or specific industrial facilities or processes

Market Transformation Programs

- Addresses structural barriers in order to streamline introduction of new EE products or practices to market for consumer acceptance

Strategic Energy Management and Energy Manager Support Programs

- Embedded energy manager taps operational, organizational, and behavioral changes through SEM rather than only technology or equipment

