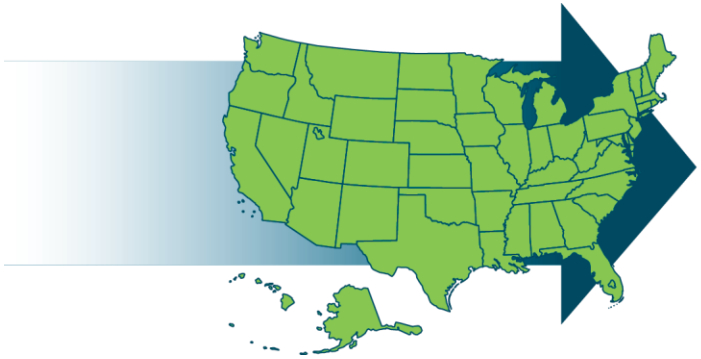

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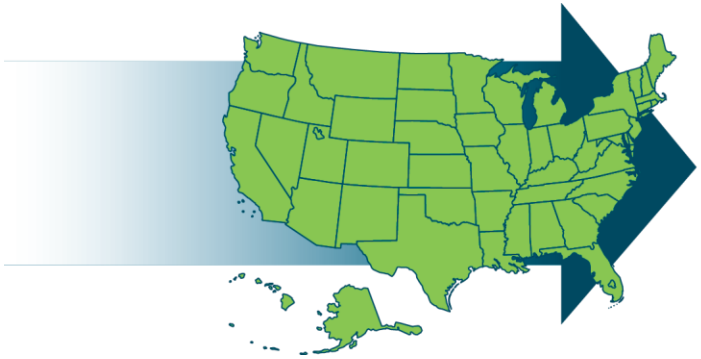
Industrial Energy Efficiency: Designing State Programs

SEE Action Report

September 23, 2013

Presented at the 2013 ACEEE National Conference on Energy Efficiency as a Resource



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Presentation Outline

1. State and Local Energy Efficiency Action Network (SEE Action)
2. Overview of SEE Action report on state IEE programs
3. Importance of IEE programs
4. Current landscape and types of state IEE programs
5. Successful IEE programs elements that respond to industry needs
6. Next steps

State and Local Energy Efficiency Action Network

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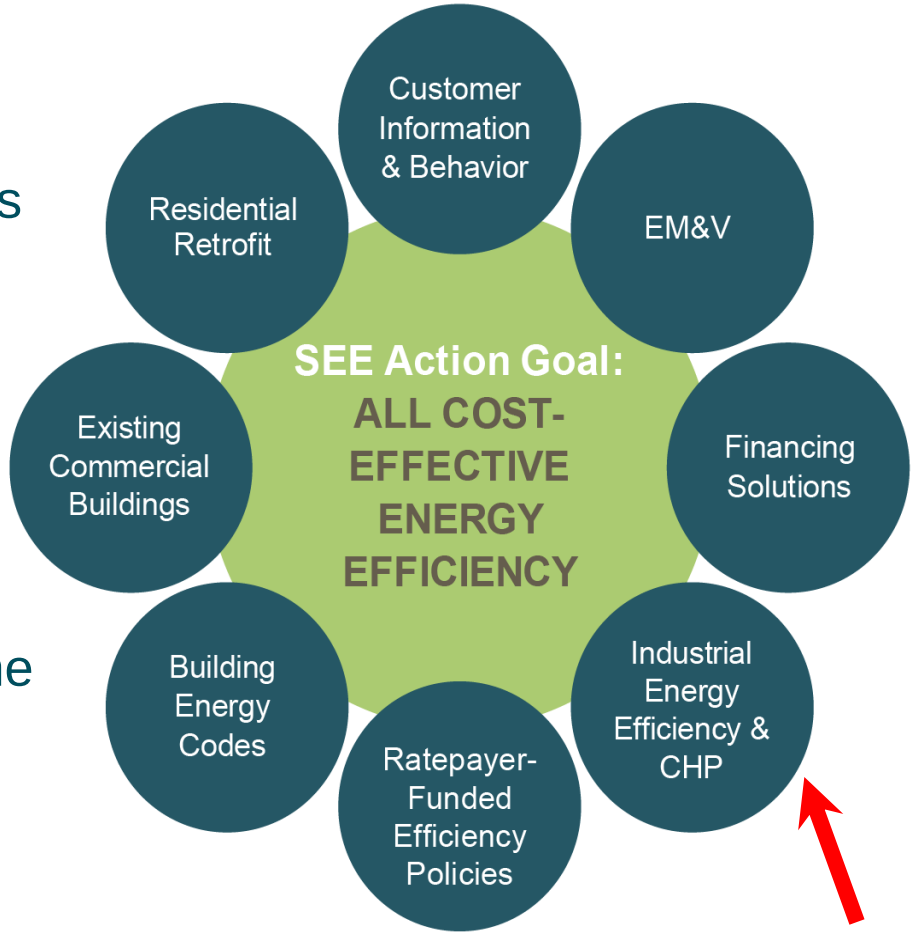
SEE Action

- Network of 200+, led by state and local policymakers, bringing EE to scale
- Provides best practices and recommended approaches on key EE policy/program areas based on state/local experience
  - Guidance Documents
  - Trainings
  - Dialogues and Events
  - Technical Assistance
- Facilitated by DOE and EPA; builds upon the National Action Plan for Energy Efficiency
- Goal: achieve all cost-effective EE by 2020
  - EE, not RE
  - Built environment, not transportation
  - State/local policy, not federal policy



8 working groups focus on largest areas of opportunity/challenge for greater investment in EE at state & local levels

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SEE Action IEE & CHP Working Group Overview

Industrial EE & CHP Working Group

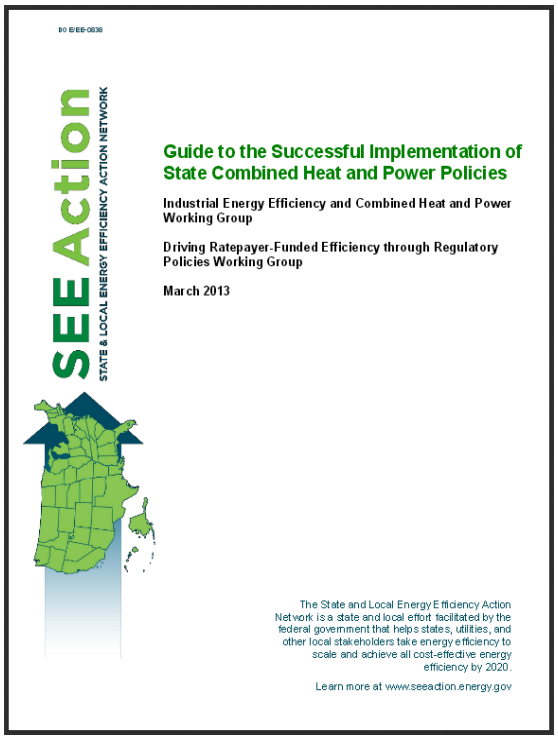
- Co-chairs:
  - Todd Currier, Washington State University Extension Energy Office
  - Joshua Epel, Colorado Public Utilities Commission
- 2 DOE staff leads and 2 EPA staff leads
- 21 Working Group Members
  - State Programs, Coordinating Organizations, Utilities, Research/Academia, Industry

Industrial EE & CHP Working Group Goals

- Achieve a 2.5% average annual reduction in industrial energy intensity through 2020
- Install 40 gigawatts (GW) of new, cost-effective CHP by 2020

IEE& CHP Resources & Activities

- IEE & CHP Working Group Blueprint
- IEE/CHP Webinar Series
  - FY12 Webinar Series: 3 webinars with over 300 individuals participating in one or more
  - Speakers discussing how to advance IEE & CHP policies & programs
  - Future webinars on IEE & CHP targeting specific stakeholder groups (e.g. policymakers, regulators, utilities)
- Guide to the Successful Implementation of State CHP Policies
  - Completed March 2013
  - Targeted State CHP Workshops in 2014



Upcoming report: *Industrial Energy Efficiency: Designing State Programs for the Industrial Sector*

Overview of SEE Action Report on State IEE Programs

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Report on Designing 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 as well as other state 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
- **Timeline for publication**
  - Anticipate late fall / early winter publication

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The Importance of Industrial Energy Efficiency Programs

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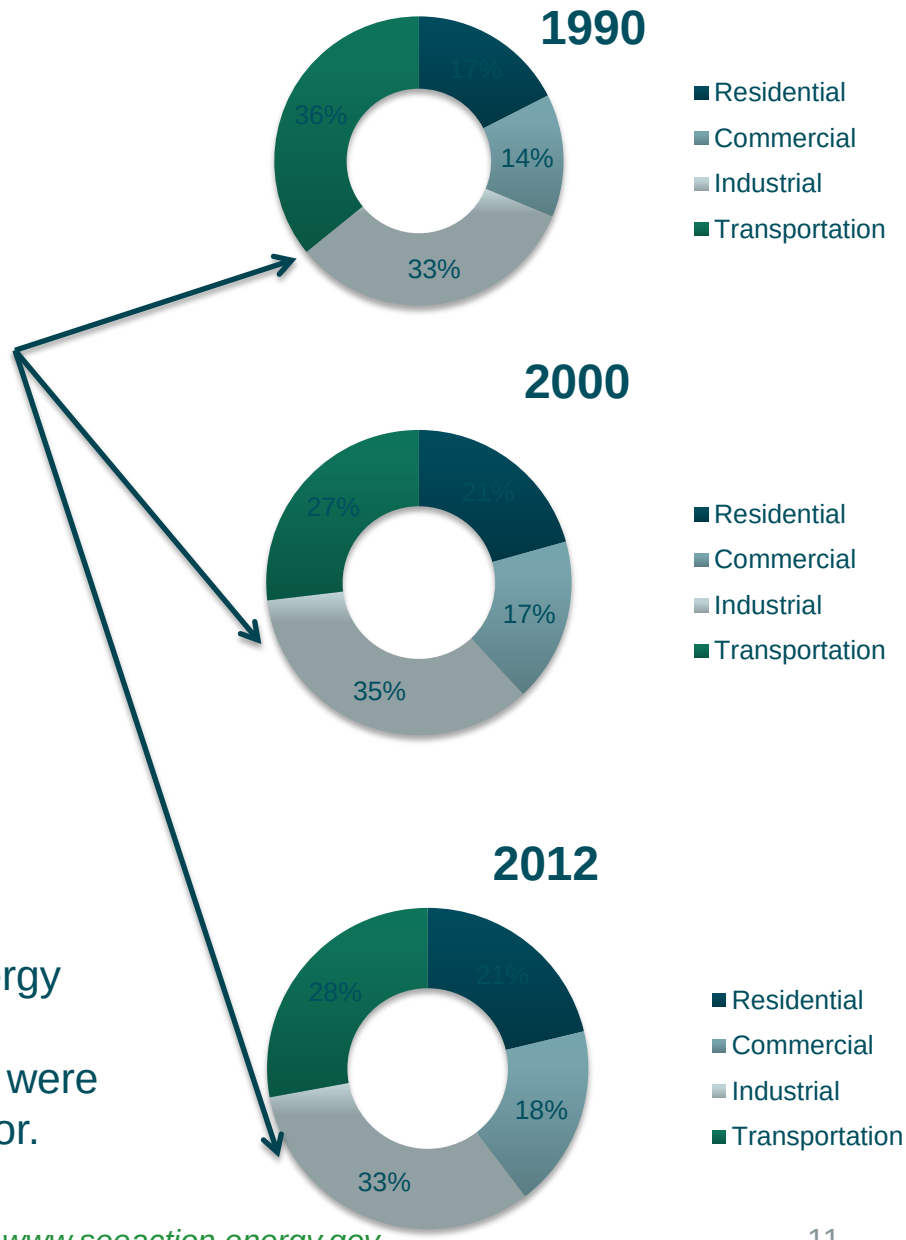
Industry is a Significant Sector in the U.S. Economy

The Industry 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 EE 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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Reshoring of U.S. manufacturing

Reshoring of U.S. manufacturing is bringing expansion in many sub-sectors

- Lower American energy prices could result in 1 million more manufacturing jobs
- Companies such as Dow Chemical and Vallourec (steel tube producer) have announced new investments to take advantage of low gas prices and to supply extraction equipment
- The U.S. government is tracking over $80 billion in planned manufacturing investments in fertilizer, chemicals, steel, and assembly industries

Source: The Economist (January 2013),
"Reshoring Manufacturing – Coming Home"

Inclusion of Industry in EE programs is Important

- IEE creates value for companies and society
- IEE resources are cost-effective (next slide)
- Industry programs will be needed to meet overall state-level energy efficiency goals in almost all cases

Benefits for manufacturers

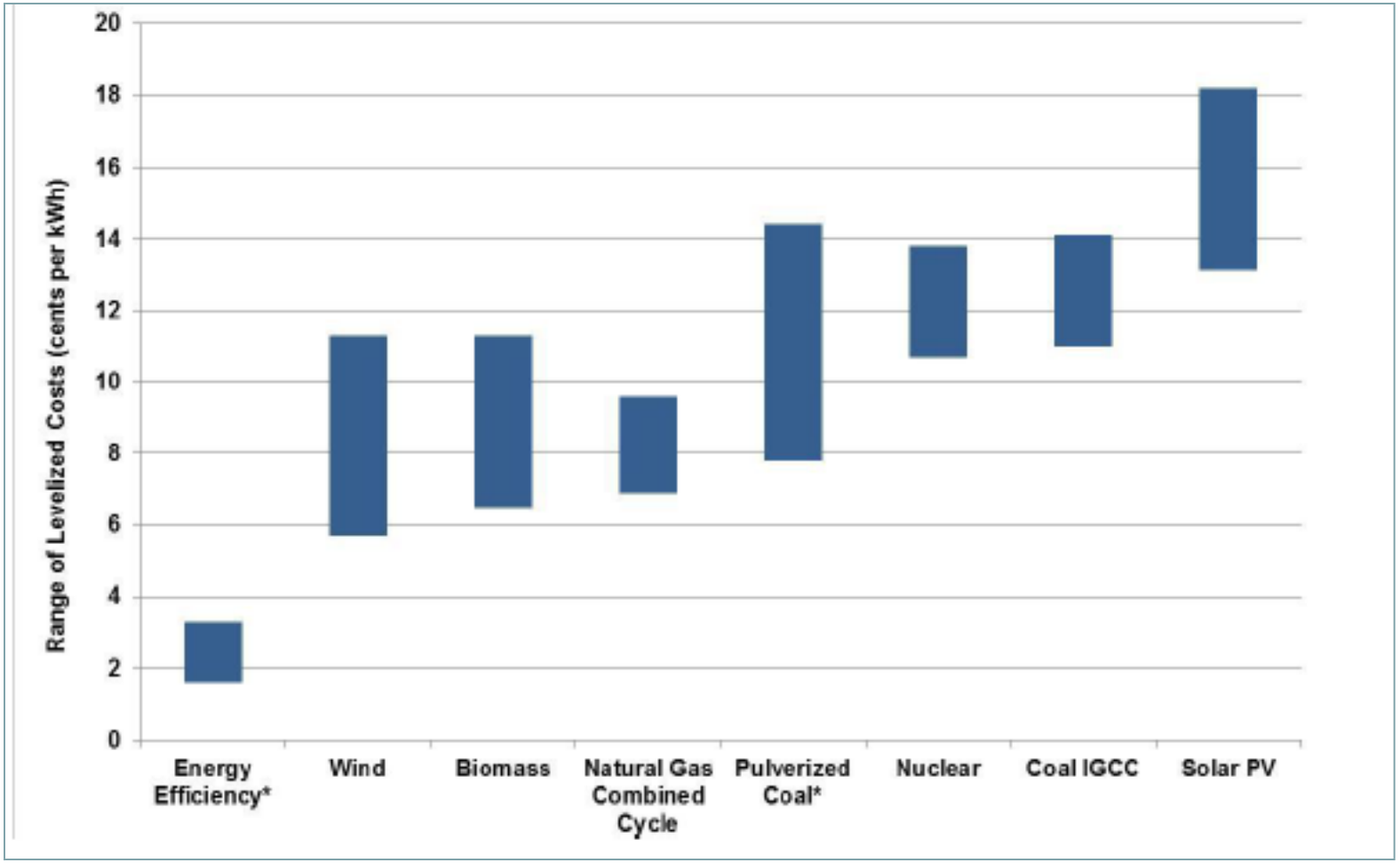
- Hedge against energy price spikes & volatility
- Increased productivity & competitiveness
- Improved product quality, reduced waste

Benefits for society

- Economic development & job retention/creation
- Environmental & health benefits
- Reduced energy bills in mid- to long-term in the context of utility programs

Cost-effectiveness of EE Resources

The cost of energy saved through customer energy efficiency is cheaper than conventional energy supply side resources: EE costs about $0.025 per kWh, compared to $0.07-0.15 per kWh for supply resources (Nowak et al. 2013).



Source: ACEEE/Chittum 2011

Cost-effectiveness of Industrial Energy Efficiency Resources

Cost of industrial EE resources relative to other EE resources

- Industrial EE is often among the lower cost EE resource
- **Bonneville Power Administration**
  - Average levelized costs estimated for BPA's 2010-2014 industrial sector plan are 2.9 cents/kWh, far below the 5.0 cents/kWh for the residential sector plan, but higher than the 1.8 cents/kWh estimated for the commercial sector
- **Wisconsin Focus on Energy**
  - The benefit-cost ratio for the non-residential program (consisting mostly of industrial projects) was almost double that of the residential program - 2.7 compared to 1.5
- **Upcoming WRI-ACEEE research will show additional insights**

Energy Trust of Oregon

- IEE electricity savings cost 20-40% less than savings in the residential sector.
- IEE gas savings cost less than half those generated from residential programs.
- The "Production Efficiency" program was one of its most cost-effective programs in terms of utility and societal benefits to cost ratios.

	Electric Savings: Levelized Cost (¢/kWh)		Gas Savings: Levelized Cost/therm (¢/kWh)	
	2011	2012	2011	2012
Industrial	2.5 ¢	2.6 ¢	19 ¢	25 ¢
Commercial	2.9 ¢	2.6 ¢	32 ¢	34 ¢
Residential	3.2 ¢	3.0 ¢	44 ¢	44 ¢

Source: Energy Trust of Oregon Annual Reports 2011 & 2012

Program	Combined Utility System Benefit/Cost Ratio	Combined Societal Benefit/Cost Ratio
New Homes and Products	1.8	2.0
Existing Homes	2.3	1.8
Existing Buildings	2.4	1.7
New Buildings	3.5	2.5
Production Efficiency	3.0	2.0
NW Energy Efficiency Alliance	3.7	1.2

Energy Trust of Oregon

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Current Landscape and Types of State IEE Programs

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Scope and Key Definitions

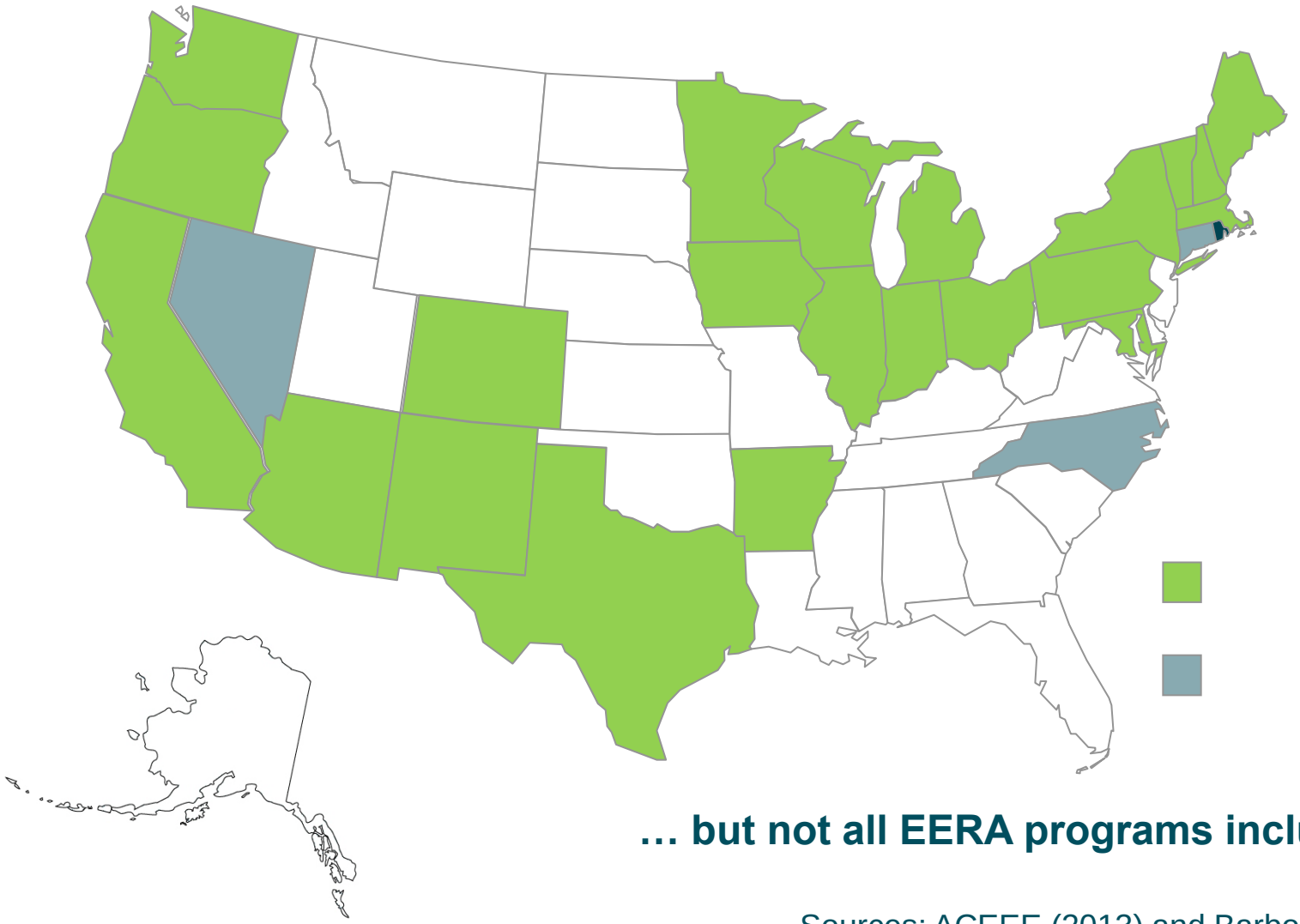
What is a state industrial energy efficiency program?

- A program that provides information, services, and/or financial support to industries in the state for energy efficiency activities

- **Utility ratepayer funded EE programs**
  - Also referred to as “customer-funded EE programs” where funds from utility bills are used for EE, as systems benefits charge, Demand Side Management or other cost recovery mechanism
  - Many states have targets to acquire EE resource (i.e. Energy Efficiency Resource Acquisition - EERA programs), either through statewide EERS or targets tailored to individual utilities/program administrators
  - Some states do not have targets but still have programs funded by ratepayers
- **Non-ratepayer funded EE programs**
  - Technical assistance, financial and knowledge sharing programs not funded by ratepayers
  - Funding can be a combination of state budgets, federal resources and other public benefactors
  - Often administered by State Energy Offices in partnership with universities, DOE and others

States with EERS and EE Targets

Around half of states have Energy Efficiency Resource Standards or energy efficiency targets …

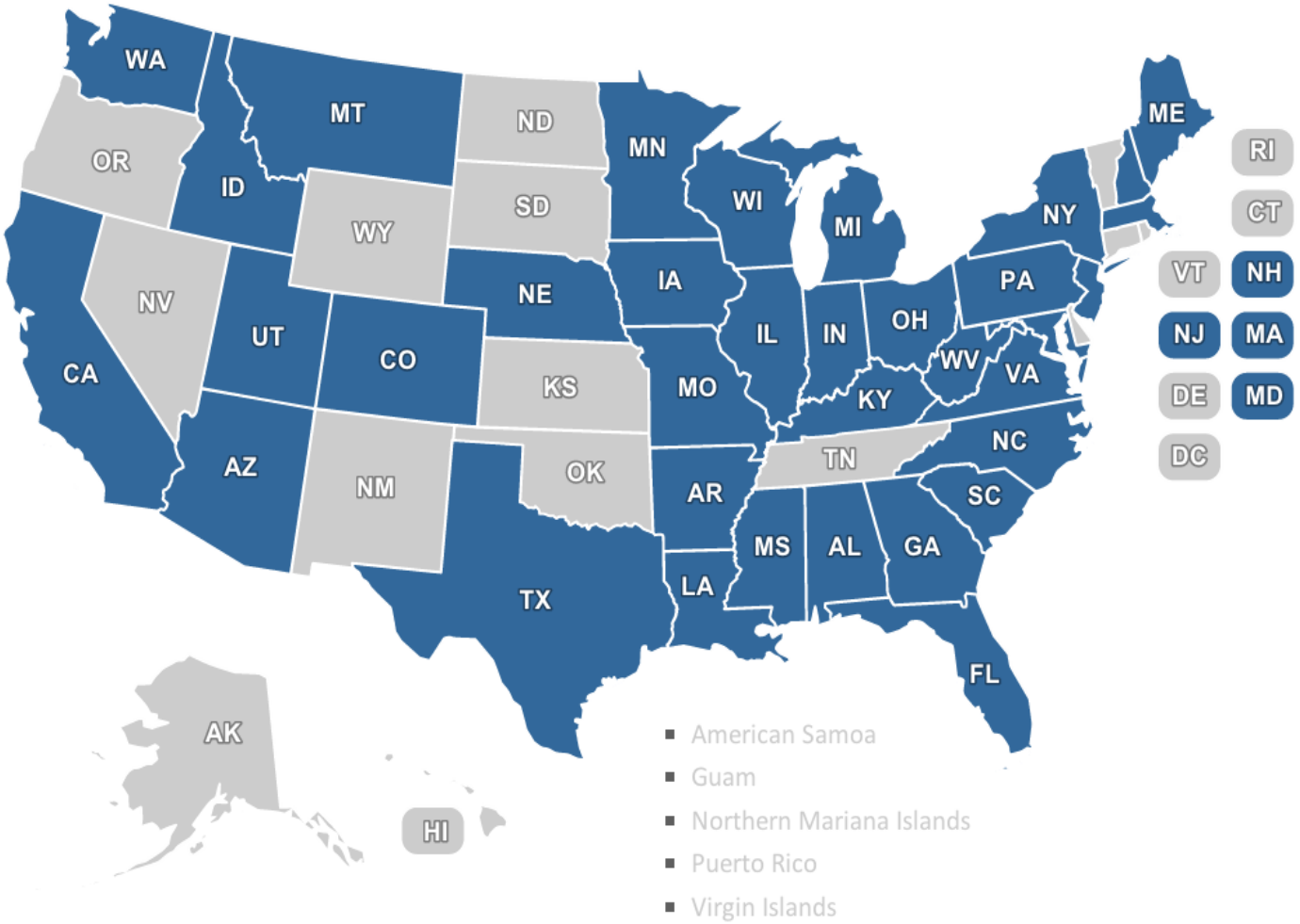


… but not all EERA programs include industry

Sources: ACEEE (2013) and Barbose et al. (2013).

IEE Programs Administered or Financed by State Energy Offices

Most states have some kind of IEE program administered or financed by SEOs



Types of Program Offerings

Continuum of State IEE Program Approaches

Knowledge Sharing
- Technical Assistance
- Workshops and other outreach
- No quantified EE resources to be "acquired"

Prescriptive Incentives
- For specific eligible energy efficient equipment and technologies

Custom/process Efficiency
- Tailored to the needs of an industrial customer
- Offers customized solutions
- Focus on industrial process rather than lighting & HVAC

Market Transformation
- Streamline the path between commercial introduction of new EE products to market
- Long-term focus and address structural barriers

Energy Management
- Strategic Energy Management
- Embedded Energy Manager
- Continuous Energy Improvement

Self-direct
- Allow customers to use funds they would have paid as a systems benefit charge
- Must demonstrate verified savings

Program Landscape: Major Trends

- Increasing focus toward EERA programs – over half the states have EERS or energy efficiency targets
- Ratepayer funded programs make up the bulk of total spending state IEE program spending (84% in 2010) (Chittum & Nowak 2012)
- However not all programs include manufacturing customers
  - Many ratepayer-funded programs allow industrial customers to “self direct” funds toward their own energy savings measures. For example: Energy Trust of Oregon, Xcel Energy, Puget Sound
  - Other states opt-out from paying EE system benefit charges entirely as a “special customer class”. Examples: Arkansas, Indiana, North Carolina
  - Recent evidence suggests a push to secure opt-out provisions for large industrial customers across a number of states
- Non-ratepayer funded programs exist in most states
  - Usually run out of State Energy Offices
  - Much smaller size in IEE spending terms
  - Examples: Texas Industries of the Future (IOF), West Virginia IOF, AlabamaSaves loan program

Selected Successful Programs

TA and Knowledge Sharing Programs

Texas Industries of the Future*

Prescriptive Offerings

Efficiency Vermont

NYSERDA

Custom Offerings

Xcel Energy

CenterPoint Energy

Market Transformation Programs

Northwest Energy Efficiency Alliance (NEEA)*

SEM and Energy Manager Programs

Bonneville Power Administration

Wisconsin Focus on Energy

Energy Trust of Oregon

Many utilities and program administrators provide a mix of offerings.

For example, Xcel Energy's Colorado offers the following programs:

- Compressed air efficiency
- Motor & drive efficiency
- Custom efficiency
- Process efficiency
- Self-direct

*Non ratepayer and non-traditional ratepayer programs

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Successful IEE Program Features that Respond to Industry Needs

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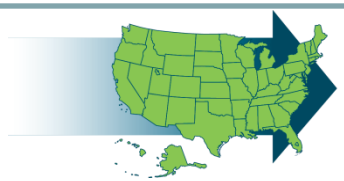
Program Features that Respond to Industry Needs

Special characteristics of manufactures as energy users

- Sector is complex & sophisticated
- Heterogeneous segments and sub-sectors
- EE often not integrated into a company's decision-making process & split across units
- EE competes with core business investments
- EE investments heavily dependent on plants' operational cycles
- Co-benefits often not included in the cost-benefit analysis for EE projects

Successful implementation approaches and features

- Demonstrate the EE project value proposition to companies
- Develop long-term relationships
- Enable flexibility to accommodate project scheduling concerns.
- Offer both prescriptive and customized project development options
- Ensure program administrators have sector credibility & offer high quality technical expertise
- Streamline & accelerate application processes
- Leverage strategic partnerships
- Conduct active program outreach
- *Others provided in report*



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Successful Implementation Approaches and Features

- **Demonstrate the EE project value proposition to companies**
- **Develop long-term relationships**
- **Enable flexibility to accommodate project scheduling concerns**
- **Offer both prescriptive and customized project development options**
- **Ensure program administrators have sector credibility & offer high quality technical expertise**

- Streamline & accelerate application processes
- Leverage strategic partnerships
- Conduct active & continuing program outreach
- Set medium and long-term EE goals as an investment signal for industry
- Ensure robust M&V of savings
- Use process and impact evaluations to support program improvement
- Acknowledge free ridership and positive spillover effects

The EE Project Value Proposition to Companies

To Inspire Additional Investment and Action

IEE programs must effectively document and promote the interrelationship between energy savings and core business goals, then communicate these to corporate decision-makers

NORPAC Paper Mill (Washington)

- Participant in BPA & Cowlitz County Public Utility District custom efficiency program
- Program funded new screening equipment estimated to save 100 million kWh of electricity per year, a ~12% power reduction
- Improved refining processes have allowed product line expansion and improved paper quality using fewer wood chips
- Results disseminated on BPA website and through workshops

Source: BPA website

Selected Features that Respond to Industry Needs

Long-term Relationships & Project Scheduling

- EE investments are heavily dependent on the plant's operational cycle. Cycles can span long timeframes (4-7 years on average) and be difficult to predict.
- Programs with flexible timelines that can accommodate individual firm's investment cycles will help to maximize EE opportunity uptake (e.g. Efficiency Vermont, NYSERDA)

Provision of Prescriptive & Custom Offerings

- Custom approaches are needed for larger, complex, or process specific projects, while prescriptive programs work well for common crosscutting technologies
- Both common technology and customized project support meet diverse customer needs and provide flexible choices to industries. (e.g. Xcel Energy, Centerpoint Energy)

Industrial Sector Credibility & High Quality Technical Expertise

- Programs need staff knowledgeable of both manufacturing operations as well as IEE program offerings to establish the trust needed for effective industrial participation
- Expertise that extends to project development support can help bring projects to implementation (e.g. Wisconsin Focus on Energy, Oregon Energy Trust, Puget Sound)

Next Steps

- Work in progress!
- The report will also cover best practices in self-direct programs
- We welcome your input
  - On the approach of the report
  - If you have cost-benefit/cost-effectiveness studies of IEE programs in your service area
  - Successful IEE program profiles that should be highlighted
- Report targeted to be finalized by late 2013/early 2014

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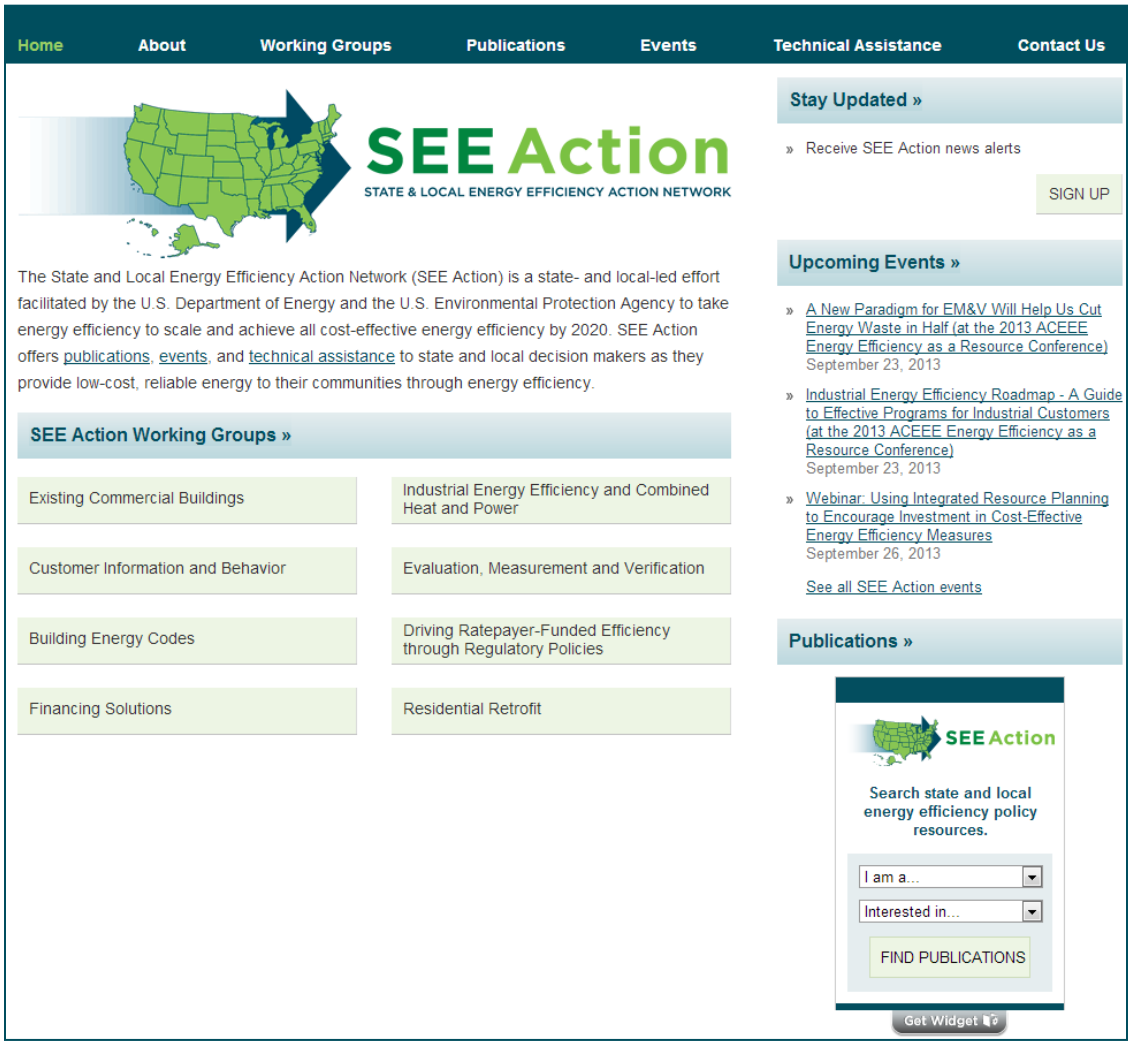

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