DOE Energy Efficiency Programs for Manufacturers
NASEO Central/Western Regional Meeting
Bozeman, MT - August 2, 2012

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Office of Energy Efficiency & Renewable Energy
Advanced Manufacturing Office
Manufacturing Matters

- 11% of U.S. GDP
- 12 million U.S. jobs
- 60% of U.S. engineering and science jobs

- 57% of U.S. Exports
- Nearly 20% of the world's manufactured value added

Jobs

31.8% of all manufacturing jobs lost from 2000-2011

Energy

31% of all 2010 U.S. total energy consumption

- Industrial 31%
- Residential 23%
- Transportation 28%
- Commercial 18%

*Includes total primary energy direct use and electricity use in end-use sectors including losses
Source: Annual Energy Review 2010, US EIA
“Of course, the easiest way to save money is to waste less energy. So here’s a proposal: Help manufacturers eliminate energy waste in their factories and give businesses incentives to upgrade their buildings. Their energy bills will be $100 billion lower over the next decade, and America will have less pollution, more manufacturing, more jobs for construction workers who need them.”

—President Obama, 2012 State of the Union Address
AMO Overview

Next Generation
Materials
Pervasive materials technologies that lead to better products

Next Generation
Manufacturing Processes
Broadly applicable processes that lead to better production

Technology Deployment
Promote better energy use practices to capture U.S. competitive advantage

Technology Projects - Innovative Manufacturing Initiative (IMI)
Competitively selected, cost-shared technology projects:
• Produce pre-competitive and generic products
• Reduce energy consumption over product life-cycles
• Increase the adaptability of manufacturers through alternate materials and process pathways
• Not directed at products to be sold competitively in existing markets
• Maintained project support through manufacturing-scale demonstration

Targeted Partnerships
• Superior Energy Performance
• Better Buildings, Better Plants
• Workforce Development
• Clean Energy Application Centers
• Supply Chain Initiative
• Utilities and States

TRL 2-6  TRL 2-8  TRL 9
DOE programs and resources drive measureable results in industrial energy efficiency.

**Results**
- CEO commitments
- Corporate energy savings goals and management plans
- Resources dedicated for facilities
- Established energy management programs
- Continual energy performance improvements
- SEP-certified facilities
- Dollar savings
- Replicated best practices
Better Buildings Challenge

Make commercial and industrial buildings 20% more efficient by 2020; save more than $40 billion annually for US organizations; create American jobs

- High level partnership with DOE
- Overcome market barriers/persistent obstacles
- Showcasing real solutions
- Recognition from DOE and Administration for success
- Partnering with industry leaders
- Portfolio wide commitment to continuous improvement

President Obama and former President Clinton take a tour of the upgrades of the Transwestern Building in Washington, Dec. 2, 2011
(Official White House Photo by Lawrence Jackson)
Better Buildings, Better Plants

• The Better Buildings, Better Plants Program & Challenge is the industrial component of the Better Buildings Challenge

• Better Buildings, Better Plants provides different opportunities for national recognition based on level of commitment

– **Better Buildings, Better Plants Program Partners:** pledge energy savings goals consistent with national targets and agree to report progress annually to DOE

– **Better Buildings, Better Plants Challenge Partners:** agree to transparently pursue innovative approaches to energy efficiency, and make a significant, near-term investment in an energy saving project or set of projects

**Challenge Partners**
- 3M
- Alcoa
- Briggs and Stratton
- Cummins Inc.
- GE
- Legrand
- Nissan North America Inc.
- Saint-Gobain Corporation
- Schneider Electric
- The J.R. Simplot Company
Better Buildings, Better Plants Challenge

Partner Agrees to:

Commit
• Assign Senior Executive
• Announce innovations/market solutions

Take Action
• Showcase project within 9 months
• Organization wide plan, schedule and milestones within 9 months

Report Results
• Share information and implementation models
• Share portfolio wide energy performance annually
• Quarterly updates on progress on showcase projects, other

DOE Agrees to:

Assist
• Technical assistance
• Help develop implementation models

Connect
• Establish marketplace of energy efficiency stakeholders

Recognize
• National and local recognition
• Showcase and highlight partners who develop and share innovative and cost effective marketplace blueprints
Examples:

• **Nissan:**
  – Making a $200 million investment in a new paint plant that will improve energy efficiency by 30% compared to the plant it is replacing.

• **Cummins:**
  – Making a $9 million, multi-year investment in a strategic, facility-wide energy system upgrade

• **Alcoa:**
  – Making a $21 million investment in a new energy efficient recycling plant
Examples:

- **3M**
  - Established a special fund devoted solely to energy efficiency projects that don’t get approved through normal budgeting process. Overcomes financial barrier – worthwhile efficiency projects often go unfunded due to competing demands on capital

- **Delaware State University**
  - Will secure construction financing via the Delaware Sustainable Energy Utility’s Energy Efficiency Construction Bonds for an energy services performance contract across 26 buildings that will result in 25 percent energy savings

- **University of California, Irvine**
  - Will share the Smart Labs program, which has successfully reduced energy consumption in lab space by more than 50 percent using advanced occupancy and air quality sensors to reduce the amount of conditioned air exhausted into the atmosphere when conditions permit
Better Buildings, Better Plants Program builds on the success of previous DOE partnership programs. Partners:

- Set a 10-year, 25% energy intensity improvement target
- Develop energy management plans
- Track and report energy data annually to DOE
- Receive national recognition for their achievements
- Receive support from technical account managers

Program currently consists of 110 companies and over 1,400 plants, consume about 1,100 trillion Btus of energy annually, or about 5% of the total U.S. manufacturing energy footprint.

Most companies are on track to meet the 10-year target.
Better Plants Locations
Industrial Assessment Centers (IACs)

- In 2011 IAC assessments saved 6,361 million Btu – a 2.5% decrease in energy consumption

- IACs:
  - Offer no-cost energy assessments for eligible small- and medium sized manufacturers
  - Are located at 24 universities across the country
  - Train the next generation of energy engineers

- Approximately 125 students successfully complete the IAC training program each year

- More than 60% of students go on to careers in the energy industry

- IACs in NASEO Northwest, Southwest and Central regions include:
  - Boise State University
  - Colorado State University
  - Idaho State University
  - Oklahoma State University
  - Oregon State University
  - San Diego State University
  - San Francisco State University
  - Texas A&M University
  - University of Idaho

- [http://www1.eere.energy.gov/manufacturing/tech_deployment/iacs.html](http://www1.eere.energy.gov/manufacturing/tech_deployment/iacs.html)
AMO Energy Resource Center (eCenter)

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- Integration of AMO’s Technology Deployment resources (tools, training etc.) within an Energy Resource Center (or eCenter) to provide continual energy management and technical solutions for manufacturing plants.
Superior Energy Performance (SEP)

- Superior Energy Performance is a market-based, ANSI/ANAB-accredited certification program
- Provides industrial facilities a roadmap for achieving continual improvement in energy efficiency
- A central element of SEP is implementation of ISO 50001
- Operational changes through compliance with SEP and ISO 50001 can achieve a 10-25% improvement in energy performance
- 7 facilities have completed SEP certification to date

To receive SEP certification, facilities must:
1. Conform to the ISO 50001 energy management system standard
2. Satisfy additional requirements defined in ANSI/MSE 50021
Regional Clean Energy Application Centers (CEACs)

Assist in transforming the market for CHP (including waste heat to power and district energy CHP) technologies and concepts throughout the United States by providing:

- **Market Assessments:** Analyses of CHP market potential in diverse sectors, such as health care, industrial sites, hotels, & new commercial and institutional buildings.

- **Education and Outreach:** Providing information on the benefits and applications of CHP to state and local policy makers, regulators, energy end-users, trade associations and others.

- **Technical Assistance:** Providing technical information to energy end-users and others to help them consider if CHP makes sense for them. Includes performing site assessments, producing project feasibility studies, and providing technical and financial analyses.

Eight Regional CEACs & International District Energy Association

http://www1.eere.energy.gov/manufacturing/distributedenergy/ceacs.html
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DOE AMO – Technology Deployment: http://www1.eere.energy.gov/manufacturing/tech_deployment
Better Buildings Challenge: www.betterbuildings.energy.gov/challenge
Superior Energy Performance: www.superiorenergyperformance.net
State and Local Energy Efficiency (SEE) Action Network

Industrial Energy Efficiency & Combined Heat and Power Working Group
Achieving the Potential

• EE remains one of the most cost-effective ways to address challenges
  – High consumer energy prices
  – Fuel price volatility
  – Transmission and distribution infrastructure expansion costs
  – Localized system reliability
  – Environmental and public health costs of GHGs
  – National energy security and independence

• Cost-effective EE can play a significant role in meeting energy requirements and save hundreds of millions of dollars* 
  – $50B/year* cost-effective investment potential; not yet achieving full potential

• Decision makers can benefit from information on current state/provider approaches to overcoming barriers to greater investment in EE

*McKinsey, Unlocking EE in the US Economy
The SEE Action Network

Goal: achieve all cost-effective energy efficiency by 2020

- State- and local-led initiative to take energy efficiency to scale through state and local policies and programs
- Information resources to support state and local decision makers
  - Decision-grade guides on time-tested best practices
  - State/local approaches to new and emerging issues
  - Technical assistance from national experts
- Successor to the National Action Plan for Energy Efficiency
What SEE Action Does

Working Groups develop decision-grade **best practice guides** based on state & local experience

Working Groups **educate and engage** with state and local decision makers through Network connections

Working Groups support decision maker action with expert technical assistance and peer exchanges

[seeaction.energy.gov](http://www.seeaction.energy.gov)
SEE Action Network Structure

Executive Group Members
A diverse group of state policy makers, business leaders, utilities, NGOs, associations, and others provide vision and strategic guidance.

Working Group Chairs
State & local leaders co-chair SEE Action’s 8 priority issue areas.

Staff Leads
DOE and EPA staff provide support and coordination.

SEE Action Goal:
ALL COST-EFFECTIVE ENERGY EFFICIENCY

- Residential Retrofit
- Existing Commercial Buildings
- Building Energy Codes
- Ratepayer-Funded Efficiency Policies
- Customer Information & Behavior
- EM&V
- Financing Solutions
- Industrial Energy Efficiency & CHP
# IEE /CHP WG Members

**Industrial Energy Efficiency (IEE) & Combined Heat and Power (CHP) Working Group:**

- Two Co-Chairs
- 19 Members
  - State Programs
  - Coordinating Organizations
  - Utilities
  - Research/Academia
  - Industry / End-Users
  - Four DOE / EPA Leads

### Co-Chairs
- Todd Currier | Washington State University Extension Energy Office
- Joshua Epel | Colorado Public Utility Commission

### State Programs
- John Ballam | Massachusetts Department of Energy Resources
- Brian Platt | New York State Energy Research and Development Authority

### Coordinating Organizations
- Jessica Bridges | USCHPA
- Ron Edelstein | Gas Technology Institute
- Rich Herweck | Texas CHP Initiative
- John Holt | National Rural Electric Cooperative Association
- Bruce Lung | Alliance to Save Energy
- Rick Marsh | Industrial Energy Efficiency Network (IEEN)
- Richard Meyer | American Gas Association
- Ethan Rogers | American Council for an Energy-Efficient Economy (ACEEE)
- Lola Schoenrich | Midwest Governors’ Association
- Lisa Schwartz | Regulatory Assistance Project
- Ed Wisniewski | Consortium for Energy Efficiency
- Jay Wrobel | Midwest Energy Efficiency Alliance (MEEA)

### Utilities
- James Earley | Southern Company
- Chris Goff | Southern California Gas Company

### Research/Academia
- John Cuttica | Energy Resources Center, University of Illinois – Chicago

### Industry/End-User
- Stephen Coppinger | CalPortland
- Brad Runda | Saint-Gobain

### DOE / EPA Leads
- Elizabeth Dutrow | EPA ENERGY STAR for Industry
- Sandy Glatt | DOE Advanced Manufacturing Office
- Neeharika Naik-Dhungel | EPA CHP Partnership
- Katrina Pielli | DOE / EERE
IEE / CHP Working Group Scope

- **IEE / CHP Working Group addresses:**
  - Industrial sector/manufacturing:
    - Large-, medium-, and small-sized industries
    - Varying levels of energy intensity
  - Energy efficiency in terms of systems and processes
    - Energy intensity (as a measure of efficiency)
    - Combined heat and power (CHP)

- **Working Group does not address:**
  - Building envelope
  - Small commercial*
  - Other issues that do not affect industrial energy efficiency or CHP uptake of state and utility programs

* EIA: Industrial sector includes “all facilities and equipment used for producing, processing, or assembling goods,” whereas the commercial sector is more encompassing and includes “service-providing facilities and equipment of businesses” (EIA Glossary).
# IEE / CHP Working Group Goals

**Achieve an average 2.5% reduction in industrial energy intensity annually through 2020; install 40 GW of new, cost-effective CHP by 2020**

## Drive Demand for IEE & CHP
1. State, Local, & Utility Programs for Industry
   - Programs that better meet the needs of industry
2. State Policy Models
   - Broader adoption of model policies
3. National Energy Efficiency Policy
   - Enhance national policy with regard to industrial energy efficiency and CHP
4. Education & Outreach
   - Build corporate culture; foster greater understanding of the economic value of industrial energy efficiency and CHP

## Build the Workforce
5. Education & Workforce Development
   - Identify industry’s needs and workforce needs; develop new programs to address needs
6. Develop Training & Academic Curricula
   - From the plant floor to the corporate level
7. Licensing & Certification Protocols
   - Certified Energy Manager (CEM); DOE Qualified Specialists; Continuous Energy Improvement, etc.

## Promote Efficient Operations & Investment
8. Financing Innovation
   - Loan guarantees, energy service companies (ESCOs), etc.
9. Financial Incentives
   - Address industry ROI and refit cycles
10. Technical Solutions
    - Improve availability of energy efficiency and CHP information and tools for industry
11. Energy Management Programs/Continuous Energy Improvement
    - Ex: ISO 50001, Superior Energy Performance (SEP), ENERGY STAR, and others

## Move the Market
12. Technology Demonstration
    - Adoption of existing technologies
13. Regulatory Recommendations to Support CHP
    - Offer comprehensive CHP policies
14. Reduce Uncertainty Related to State Interconnection
    - Harmonization across broad regions and states
15. Financing Reform
    - Depreciation rules and Sarbanes-Oxley Act
Impact of IEE / CHP WG Goals

Where We Are Today: According to the Energy Information Administration, gross domestic product (GDP) growth estimates with fixed energy intensity, the industrial sector will consume 41.6* quads of primary energy in the year 2020 (Business as Usual).

Working Group Goals: Based on the McKinsey report, 13.4 quads of potential industrial Btu savings by 2020 exist.** The working group’s goals to reduce industrial energy intensity by 2.5% annually through 2020 and install 40 GW of new, cost-effective CHP by 2020 will achieve a reduction of 10.4 quads.***

Scope: Reaching goals would capture 78% of the potential energy efficiency in the industrial sector, leaving 3.0 quads to address through other activities.

Resulting 2020 Energy Use if all potential is addressed:

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<th>Energy, quadrillion primary Btu</th>
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<tr>
<td>41.6 (Where We Are Today)</td>
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<tr>
<td>10.4 (Working Group Goals)</td>
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<td>3.0 (Scope)</td>
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<tr>
<td>28.2 (Resulting 2020 Energy Use)</td>
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* Total industrial sector energy consumption includes refining-related efforts.
** The McKinsey non-transportation industrial estimates were used to calculate the potential for the full industrial sector.
*** 2020 efficiency potential is based on an estimated 25.2% growth in GDP by 2020 (Annual Energy Outlook 2008) and a fixed industrial energy intensity (energy consumption per value of shipments) through 2020.
In support of the national goals, the IEE/CHP Working Group has established secondary goals that reflect the WG’s primary role in facilitating market transformation through promotion of best practice programs and policy adoption.

The secondary goals are tracked annually and include:

- Number of states and/or utilities that have implemented, or initiated implementation of, a program or policy identified in the Working Group’s IEE or CHP Guides*
- Changes in investment levels in IEE ratepayer-funded efficiency programs compared to previous years
- Energy savings from new IEE programs and CHP projects installed

*The programs and policies addressed in the Guides recognize multiple best practices that note the use of different approaches for different local market and operating conditions.
Year One WG Resources

- **Regional Workshops** bring together regulators, state officials, utilities, and industrial end-users to address key barriers to IEE & CHP programs and policies through actionable solutions
  - First was held in September 2011 in Denver, CO
  - Midwest Workshop held in June 2012 in Columbus, OH
  - Southeast, West, Northeast / Mid-Atlantic Workshops in Fall 2012 – Winter 2013

- **IEE/CHP Webinar Series** features expert speakers discussing ways to advance IEE & CHP policies & programs, remove barriers, and grow state & local investment in IEE & CHP
  - Information on upcoming webinars and past presentations are available at: http://www1.eere.energy.gov/seeaction/iee_chp_webinars.html

- The **Guide to the Successful Implementation of State IEE Policies** and the **Guide to the Successful Implementation of State CHP Policies** identify the economic, regulatory, and other circumstances contributing to the effectiveness of IEE & CHP programs and policies across the U.S.
States / Regions/ Localities

How States Can Engage:

1. Use the Working Group’s Best Practices Guides to disseminate, promote, and adopt SEE Action recommendations within your state or region

2. Inform SEE Action Working Groups of working programs / policies your state has in place or is working toward

3. Highlight innovative industrial financing or incentives that are available in your state via participation in the webinar series

4. Work with us to enhance state energy efficiency data collection and reporting for the industrial sector to improve capabilities for measuring program / policy impacts

Other Stakeholder Engagement

How Stakeholders Can Engage:

1. Provide essential feedback on key issues and barriers facing industry that hinder IEE and CHP implementation

2. Attend dialogues and workshops to interact with utilities, states and local entities and manufacturers to provide input on best practice financial and technical incentive programs


4. Identify and support opportunities to promote IEE and CHP within your stakeholder community
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