SEE Action

STATE ENERGY EFFICIENCY ACTION NETWORK

Industrial Energy Efficiency/CHP Working Group Executive Summary

Todd Currier and Greg White

Executive Group Meeting

March 25, 2011

SEE Action

STATE ENERGY EFFICIENCY ACTION NETWORK

The Industrial Efficiency and CHP Working Group of the State Energy Efficiency Action Network is committed to taking action to increase investment in cost-effective energy efficiency. This Blueprint was developed under the guidance of and with input from the Working Group. The document does not necessarily represent an endorsement by the organizations of Industrial Efficiency and CHP Working Group members.

The Industrial Efficiency and CHP Working Group Blueprint is a product of the State Energy Efficiency Action Network and does not reflect the views, policies, or otherwise of the federal government.

If this document is referenced, it should be cited as: State Energy Efficiency Action Network (2011). Industrial Efficiency and CHP Working Group Blueprint. www.seeaction.energy.gov

Industrial EE & CHP Goals

- IEE/CHP WG 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.

5-Yr Goals for progress	2011	2012	2013	2014	2015
Industrial Energy Efficiency, quads saved	0.5	0.7	0.9	1.3	1.6
New Installed CHP, GW	2	2	3	4	4

- Background:
  - Achieving a 2.5% average annual reduction in energy intensity and adopting a 40 GW of CHP would save 10.4 quadrillion Btu by 2020.**
  - Meeting these goals to save 10.4 quadrillion Btu would capture 78% of the total 13.4 quadrillion Btu in estimated potential energy savings in the industrial sector by 2020.

* The 2.5% goal includes waste heat recovery (as defined by the WG). The WG also recognizes that the reduction may not be a year-over-year 2.5% achievement, but a cumulative effort over time that equates to a 2.5% annual reduction, on average, over the next 10 years.

* * 2020 efficiency potential is based on an estimated 25.2% growth in GDP by 2020 (AEO 2008) and a fixed industrial energy intensity (energy consumption per value of shipments) through 2020.

Scope

- IEE/CHP Working Group (WG) will address:
  - Industrial 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)
- IEE/CHP WG will not address:
  - Building envelope
  - Small commercial*
  - Other issues that do not affect uptake of industrial energy efficiency (EE)/CHP state and utility programs

* According to the EIA, the 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).

State of IEE & CHP

Industrial Energy Efficiency (IEE)

- 2008 key industrial sector statistics:
  - primary energy consumption: 33.2 quads[1]
  - energy intensity (Btu/GDP*): 5,849[2]
  - 12,748,361 employees
  - GDP of $5.68 trillion[3]
- ~25%[8] of utilities offer at least one technical or financial incentive to industrial customers (>3,000 utilities in U.S.)
- States and several regional organizations are actively involved in IEE, others less so
- DOE and EPA have resources that can be leveraged to meet the goal:
  - Industrial Assessment Centers
  - *Save Energy Now* LEADER
  - EPA ENERGY STAR for Industry

What achievement of the WG goal would mean:

- A 25% reduction in industrial energy intensity by 2020 would mean the industrial sector consumes 31.2 quads in 2020; 6.4% less than was consumed in 2008

Combined Heat and Power (CHP)

- Current CHP installed capacity: 85 GW[4]
  - States w/most installed capacity:
    - Texas (17,240 MW) and California (9,220 MW)[5]
- CHP untapped potential** capacity: 50.4 GW[6]
  - States with more than 8,000 MW CHP Potential: [7]
    - California
    - New York
    - Ohio
    - Pennsylvania
    - Texas
- DOE and EPA have resources that can be leveraged to meet the goal:
  - Regional Clean Energy Application Centers
  - EPA CHP Partnership
  - ITP CHP Program
  - ITP CHP Project Profiles Database

What achievement of the WG goal would mean:

- CHP goal reflects a 47% increase over what is currently in place

*GDP here refers to industrial value of shipments.
** CHP Potential includes both industrial and commercial potential.

Key Solutions & Actions to Achieve the Goal

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 Industrial Energy Efficiency & 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
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

SEE Action
STATE ENERGY EFFICIENCY ACTION NETWORK

Green = Industrial Energy Efficiency and CHP solution
Purple = CHP only solution

Work Plan Part 1: Create Resources

Industrial EE/CHP Key Work	Role for Stakeholder Groups							First Year Schedule				At End of 1 Year
	Federal	State	Research Academia	Industrial Users	National Organizations	Utilities	PUCs	Q1	Q2	Q3	Q4	
To assist in the roll out of SEE Action, the Working Group will develop outreach / communications materials for all Working Group and stakeholder participants to utilize to convey priorities, goals, and activities	X							X				Complete outreach / communications materials
(1,2) To promote the adoption of model state, local, and utility industrial EE and CHP programs, the Working Group will develop two white papers that capture the key elements of successful, existing programs	X	X	X	X	X	X					X	Complete 2 White Papers
(2) To promote implementation of IEE and CHP, the Working Group will create a Guide to implementing model state programs and policies	X	X	X	X	X	X	X			X		Complete research on state policy models; Develop Guide
(3) To evaluate effective national IEE / CHP programs and policies, as well as policy needs, national organizations could develop, analyze, and deliver effective and new policy proposals	X	X		X					X			Identify working national/federal programs and needs in regulatory and tax structures
(6) To expand IEE / CHP education and standardize materials development, universities/community colleges should consider developing new curricula and training programs	X	X		X	X	X					X	2 new university, 2 new community college training programs and associated curricula

Green = IEE and CHP solution
Purple = CHP only solution

SEE Action
STATE ENERGY EFFICIENCY ACTION NETWORK

Work Plan Part 1: Create Resources (cont'd)

Industrial EE/CHP Key Work	Role for Stakeholder Groups							First Year Schedule				At End of 1 Year
	Federal	State	Research Academia	Industrial Users	National Organizations	Utilities	PUCs	Q1	Q2	Q3	Q4	
(8,9) To better understand the current state of IEE investments, the Working Group will pursue data analysis activities particularly to fill areas where existing data collection is not sufficient	X	X	X		X	X					X	Complete a data collection needs analysis
(10) To develop low-cost avenues for sharing information and overcoming barriers to industrial EE and CHP, the Working Group could enhance its cataloging of technical resources and develop and expand informational and technical solutions			X	X		X				X		Begin cataloging technical resources and complete CHP efficiency calculations and clearinghouse
(13) To facilitate CHP accessibility and implementation, regional organizations should consider continuing to identify model CHP policies	X			X	X					X		Identify model CHP policies
(14) To reduce CHP implementation barriers, states should consider developing standardized grid connection approval processes that do not delay CHP projects	X	X		X		X	X				X	States engage utilities and PUCs on interconnection policies

Green = IEE and CHP solution
Purple = CHP only solution

SEE Action
STATE ENERGY EFFICIENCY ACTION NETWORK

Work Plan Part 2: Communicate Concepts

Industrial EE/CHP Key Work	Role for Stakeholder Groups							First Year Schedule				At End of 1 Year
	Federal	State	Research/ Academia	Industrial Users	National Organizations	Utilities	PUCs	Q1	Q2	Q3	Q4	
(1,4,13) To enhance key stakeholders' understanding of implementing IEE and CHP, the Working Group could hold a utility-industry workshop on overcoming barriers and model programs and policies	X	X		X	X	X	X		X			Hold a Utility-Industry Workshop
(1,2) To improve available data and resources, the Working Group and academia could pursue pathways for supporting states and utilities in enhancing data collection and reporting on program and policy metrics	X		X		X		X				X	Engage states and utilities on enhanced data collection and reporting
(3) To ensure broad delivery of IEE and CHP incentives, financing, and workforce development, national organizations should consider promoting valuable national energy policies and programs	X	X		X	X						X	Begin promotion of identified valuable policies
(5) To bolster education, training, and workforce programs, states, regional organizations, and utilities should consider developing appropriate trainings on IEE and CHP for industry	X	X	X		X			X				At least 5 utilities agree to host new industrial EE/CHP trainings
(7) To increase adoption of standardized licensing and certification for energy efficiency service professionals, national and regional organizations, states, and utilities should consider promoting accepted protocols	X	X			X	X				X		Begin the promotion of identified valuable licenses and certifications

Green = Industrial Energy Efficiency and CHP solution
Purple = CHP only solution

SEE Action
STATE ENERGY EFFICIENCY ACTION NETWORK

Work Plan Part 2: Communicate Concepts (cont'd)

Industrial EE/CHP Key Work	Role for Stakeholder Groups							First Year Schedule				At End of 1 Year
	Federal	State	Research/ Academia	Industrial Users	National Organizations	Utilities	PUCs	Q1	Q2	Q3	Q4	
(8) To advance IEE / CHP investment by industry, states and national and regional organizations should consider promoting CHP financing	X	X			X					X		Engage 5 to 7 states to begin promotion
(9) To advance IEE / CHP project implementation, states and utilities should consider promoting awareness of relevant incentives	X	X		X	X	X					X	Conduct outreach to industry on available incentives
(10) To support policy development for IEE and CHP, the Working Group could provide technical expertise to policy makers	X		X		X							
(13) To advance regulatory reform for CHP systems, the Working Group and states could conduct outreach to USCHPA about formulating a new State Policy Subcommittee		X	X	X	X	X					X	USCHPA formulation of new State Policy Subcommittee
(14) To support harmonious state interconnections, the Working Group could conduct outreach to PUCs/states on interconnection standards on implementing model approaches	X	X			X		X				X	Contact 5 to 7 states with recommendations on how to harmonize their interconnection standards

Green = Industrial Energy Efficiency and CHP solution
Purple = CHP only solution

SEE Action
STATE ENERGY EFFICIENCY ACTION NETWORK

Working Group Priorities

Priorities for the First Year: April 2011 – April 2012

Priority Work	Purpose / Considerations
Identify and fill needs in available key information and information resources	Good and sufficient data is critical in making key program and policy recommendations. The Working Group (WG) has identified some critical data collection needs which inhibit best practice decision-making. The WG recommends cataloging available key information resources, identifying and filling those needs.
Collect and compile information on model programs and policies	The WG recommends researching and compiling information on model industrial energy efficiency programs and policies; including analyzing what is working or not and why.
Promote and pilot the identified model programs and policies	The WG recommends raising awareness of these models and demonstrating their effectiveness to states, utilities, and industry.
Understand Others Needs. Engage states, utilities, and industry on improvement of financing and incentives for industrial EE and CHP	The WG recommends working with states, utilities, and industry to properly understand industry expectations and needs, so that financing and incentives offered help overcome industry's hurdle rates and other obstacles leading to in increased uptake.
Complete development of new tools as technical solutions • ***Case studies / White papers*** • ***Trainings/Workshops*** • ***Information Clearinghouse***	The WG recommends providing the general resources and tools industry, states, and utilities need to make informed decisions about IEE and CHP. Developing tools such as an information clearinghouse or a CHP efficiency calculator would prevent duplicative efforts across the nation and ensure consistency in building and implementing model IEE and CHP approaches.

Expectations / Deliverables: First Year

Expected Activity
Identify model IEE and CHP programs and policies
Develop communication tools for all Working Group and stakeholder participants to utilize to convey priorities, goals, and activities
Create a Guide to implementing model state programs and policies
Convene utilities and industrial stakeholders in a regional workshop to discuss the disconnects between model programs and industrial needs and solutions
In support of model policies, identify best practice approaches to calculate CHP efficiency and promote standardization across state policies
Engage key stakeholder groups, such as NASEO / ASERTTI, Nat'l Governors' Associations, regional energy efficiency alliances, and others to promote the recommendations and outcomes of the Working Group and SEE Action activities
Provide training curricula
Characterize and capture the magnitude of investment from IEE / CHP financing mechanisms to further inform policy and program decisions
Create an information clearinghouse to make resources more accessible

Key Hurdles

- Awareness and information/resources available on value of industrial EE and CHP implementation
- Industry engagement
  - Lack of awareness that needs to be addressed
  - Industry concerns regarding inappropriate costs and cost shifting
  - Lack of staff, capital
- Return on investment (ROI) hurdle
- Access to internal capital for energy projects
- Access to external capital
- Utility programs are often perceived as not offering the right solution
- Lack of broad utility support for CHP and interconnection
- Stakeholder funding limitations

Process

- Recognize the substantial time and contribution of our Working Group members and our Federal Team
  - Seven calls, one in-person meeting, several sub-group meetings and multiple document reviews over many months
- Blueprint Finalization
- Continued coordination with Utility Motivation WG and Commercial WG, as needed
- WG Activity "Roll-out" (near term examples)
  - National Governor's Association mtgs.
  - U.S. Clean Heat and Power Association: Spring CHP Forum
  - Midwest industrial workshops by the Energy Resources Center (Univ. of Ill. at Chicago)
- WG Meetings post roll-out
  - In-person Kick-Off Meeting (May 2011)
  - Quarterly Meetings via conf call (starting Sept 2011)
    - Identify action items, Report progress amongst WG members
    - Report progress to SEE Exec Group
- Ongoing support of Federal team (DOE and EPA)
  - Materials development

References

[1] U.S. Energy Information Administration, Annual Energy Outlook 2008, http://www.eia.gov/oiaf/aeo/pdf/0383%282008%29.pdf.

[2] U.S. Energy Information Administration, Annual Energy Outlook 2008, http://www.eia.gov/oiaf/aeo/pdf/0383%282008%29.pdf.

[3] U.S. Census Bureau, 2009 Annual Survey of Manufactures, Sector 31: Annual Survey of Manufactures: General Statistics: Statistics for Industry Groups and Industries: 2009 and 2008, http://factfinder.census.gov/servlet/IBQTable?_bm=y&-ds_name=AM0931GS101.

[4] Oak Ridge National Laboratory, "Combined Heat and Power: Effective Energy Solutions for a Sustainable Future," December 2008, page 4, http://apps.ornl.gov/~pts/prod/pubs/ldoc13655_chp_report____final_web_optimized_11_25_08.pdf.

[5] McKinsey Global Energy and Materials, "Unlocking Energy Efficiency in the U.S. Economy," July 2009, http://www.mckinsey.com/clientservice/electricpowernaturalgas/downloads/us_energy_efficiency_full_report.pdf.

[6] McKinsey Global Energy and Materials, "Unlocking Energy Efficiency in the U.S. Economy," July 2009, http://www.mckinsey.com/clientservice/electricpowernaturalgas/downloads/us_energy_efficiency_full_report.pdf.

[7] Oak Ridge National Laboratory, "Combined Heat and Power: Effective Energy Solutions for a Sustainable Future," December 2008, page 17, http://apps.ornl.gov/~pts/prod/pubs/ldoc13655_chp_report____final_web_optimized_11_25_08.pdf.

[8] Based on data in the State Incentives and Resource Database as of March 2011.