

NASEO National
Association

of State Energy Officials



Combined Heat and Power: Ohio's Statewide Effort to Move CHP Policy and Legislation Forward

July 24, 2012



Panelists

Moderator:

- Jennifer Kefer, Project Manager, Industrial Efficiency, David Gardiner & Associates

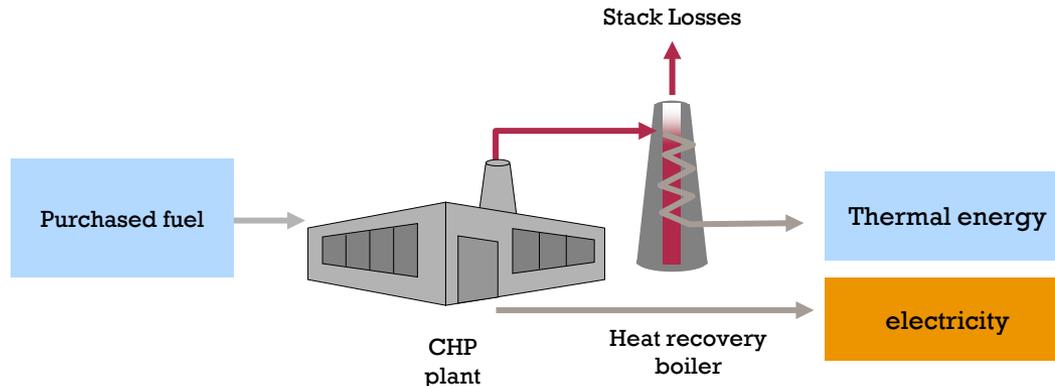
Presenters:

- Trish Demeter, Director of Clean Energy Campaigns & Legislative Affairs Associate, Ohio Environmental Council
- Melissa Mullarkey, Director of Corporate Affairs, Recycled Energy Development
- Katrina Pielli, Senior Policy Advisor & Acting CHP Deployment Lead, U.S. Department of Energy and Cliff Haefke, Midwest Clean Energy Application Center, U.S. Department of Energy



Combined Heat and Power (CHP)

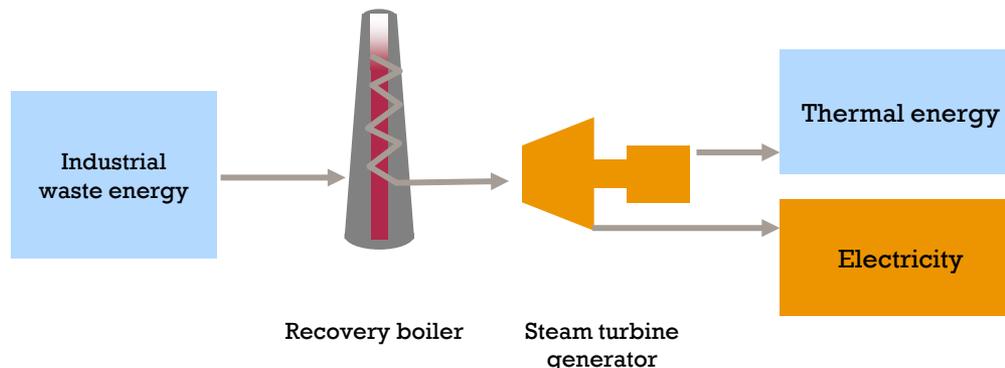
- CHP recycles and reuses otherwise wasted heat from power generation to serve local thermal loads
- Typically fueled by natural gas and/or locally available opportunity fuels
- Uses conventional technologies, optimized to site-specific thermal needs
- More than doubles the efficiency of today's power plants





Waste Energy Recovery (WER)

- WER captures otherwise wasted energy from industrial operations and converts it into useful heat and/or power
- Use-it-or-lose-it fuel source like traditional renewables
- Typically fueled by zero-cost wastes (waste heat, off gases and pressure drops)
- Uses conventional technologies, optimized to site-specific energy flows and processes





Coalition Efforts

- **Common interest among diverse stakeholders**
 - Large industrial users
 - Developers
 - Technical experts
 - Environmental advocates
- **Governor's 21st Century Energy and Economic Summit**
 - Shale gas opportunity emerging
 - Cogeneration named a policy "pillar"
- **Recommendations to Reduce Barriers**
 - Policy options submitted for consideration in Governor's Energy Legislation



SB 315 As Introduced

■ As Introduced Provisions

- Waste Energy Recovery Systems (exhaust heat and gas line pressure drop technologies) qualify as renewable resource OR as an energy-efficiency measure
- Cogeneration to be evaluated if state facilities spend more than \$50 million on capital improvements

■ Legislative Negotiations

- Confusion about what technologies were included in definitions
- Reaction to Governor's intent was mixed among coalition members



SB 315 As Enacted

Legislative Compromise

- WER qualifies as a renewable resource
- CHP will qualify as an energy efficiency measure
 - WER and CHP must meet thermal efficiency threshold of at least 60%, and 20% of a system's useful energy must be thermal
 - Efficiency savings capped at the % of a utility's industrial customer load relative to their total load



Next Steps

Coalition Focus on Public Utilities Commission

- White Paper Recommendations for SB 315 implementation
- Collective Comments on Interconnection Rule Package



Governor Kasich's Energy Policy Support's WER and CHP

- Ohio's new industrial energy policy was championed by Governor Kasich and his team.
- Two critical senior members of the administration actively promoted the policy and ensured successful passage.
 - Chairman Todd Snitchler, Public Utility Commission
 - Craig Butler, Executive Assistant to Governor Kasich for Energy



RPS Creates a Market for WER

- WER inclusion as a renewable resource gives projects access to the clean energy market so they can compete for renewable power purchase agreements.
- Typical WER projects capture waste – heat or gas – to generate electricity that is often in excess of the site electric load.
 - Law provides a market for WER power
 - WER has no federal subsidy
 - Environmental benefits of WER
 - WER increases industrial productivity and cuts costs

+ Efficiency Standard Incentive for WER and CHP to Offset Site Electric Load

- WER projects are not one size fits all, so some of these projects fit best within utility efficiency programs because the electric output stays behind the meter.
- Some fuel-fired CHP projects can be designed to meet an industrial or commercial site's electric and thermal loads and offset retail electric prices.
 - Law helps utilities meet the state's aggressive efficiency standard
 - Electricity can be sold and take advantage of the efficiency
 - CHP reduces industrial costs and pollution



Thank You

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U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy



Combined Heat and Power: Ohio's Statewide Effort to Move CHP Policy and Legislation Forward

NASEO Webinar

July 24, 2012

Katrina Pielli
U.S. Department of Energy

Cliff Haefke
Midwest Clean Energy
Application Center

- DOE's CHP activity in Ohio Overview
 - Role of Clean Energy Application Centers
 - DOE Boiler MACT Technical Assistance pilot
- Role of Public Utility Commission of Ohio
- DOE connection to Ohio SB 315

Why Combined Heat & Power (CHP) is Important

- Combined Heat & Power (CHP) is an important energy resource that provides
 - Benefits for U.S. Industry
 - Reduces energy costs for the user
 - Reduces risk of electric grid disruptions
 - Provides stability in the face of uncertain electricity prices
 - Benefits for the Nation
 - Provides immediate path to increased energy efficiency and reduced GHG emissions
 - Offers a low-cost approach to new electricity generation capacity and lessens need for new T&D infrastructure
 - Enhances grid security
 - Enhances U.S. manufacturing competitiveness
 - Uses abundant, domestic energy sources
 - Uses highly skilled local labor and American technology

DOE CEAC Overview

- **DOE Clean Energy Application Centers (CEAC) Mission:** Develop technology application knowledge and the educational infrastructure necessary to promote “clean energy” technologies as viable energy options and reduce any perceived risks associated with their implementation.

CEAC Focus: Assist in transforming the market for CHP, WHtP, and DE technologies and concepts throughout the United States by providing:

Market Analysis
& Evaluation

Education &
Outreach

Technical
Assistance

Midwest CEAC Activity Overview in Ohio

- Ohio has significant CHP potential: 9,800 MW (521 MW installed now)
- Current circumstances have highlighted the role additional CHP can play in the energy resource mix & achieve above benefits
 - Coal power plant retirement announcements, energy mix changing
 - Boiler MACT opportunity for new CHP
 - Focus on maintaining and increasing manufacturing in the US
- DOE will be providing site-specific technical and cost information on clean energy compliance strategies to those major source facilities affected by the EPA Boiler MACT rule currently burning coal or oil.
 - Opportunities to develop compliance strategies, such as CHP, that are cleaner, more efficient, and have a positive economic return for the plant
- DOE Boiler MACT Technical Assistance program is being piloted in Ohio now, and will be rolled out nationally when the EPA rule reconsideration process is complete.
- CEACs can/have provide(d) non-bias educational information to inform state policy decisions, such as Ohio SB 315

Impacts of the EPA Boiler MACT (reconsidered proposal)

- Compliance straight forward for natural gas fired units (tune-ups in lieu of more rigorous control options)
- Rule significantly impacts oil, coal and biomass boilers and process gas boilers
 - Controls potentially required for Hg, PM, HCl and CO
 - Emissions limits must be met at all times except for start-up and shutdown periods
 - Also includes monitoring and reporting requirements
- Limits difficult, technically and economically, for oil and coal units - some may consider switching to natural gas
 - Potential opportunity for natural gas CHP:
 - Trade off of benefits and additional costs
 - Economics now based on incremental investment over compliance costs

Affected Facilities by Technical Assistance DOE CEAC Region

CEAC Region for Technical Assistance	Number of Facilities	Number of Coal Units	Number of Heavy Oil Units	Number of Light Oil Units
Mid-Atlantic	109	150	67	43
Midwest	232	377	100	82
Northeast	58	22	88	26
Southeast	168	202	112	90
Total	567	751	367	241

The data in this chart is still being refined

- Facilities are categorized by the CEAC region conducting their technical assistance, not their actual location
- This table includes only industrial/commercial/institutional boilers

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CHP as a Compliance Strategy

- Compliance with limits will be expensive for many coal and oil users
- May consider converting to natural gas
 - Conversion for most oil units?
 - New boilers for some coal units?
- May consider moving to natural gas CHP
 - Represents a productive investment
 - Potential for lower steam costs due to generating own power
 - Higher overall efficiency and reduced emissions
 - Higher capital costs, but partially offset by required compliance costs or new gas boiler costs
 - State / local / utility incentives can help

Potential CHP Capacity

Fuel Type	Number of Facilities	Number of Affected Units	Boiler Capacity (MMBtu/hr)	CHP Potential (MW)	CO ₂ Emissions Savings (MMT)
Coal	332	751	180,525	18,055	114.2
Heavy Liquid	170	367	48,296	4,830	22.9
Light Liquid	109	241	22,133	2,214	10.5
Total	611*	1,359	250,954	25,099	147.6

The data on this chart is still being refined

*Some facilities are listed in multiple categories due to multiple fuel types; there are 567 ICI affected facilities

- CHP potential based on average efficiency of affected boilers of 75%; Average annual load factor of 65%, and simple cycle gas turbine CHP performance (power to heat ratio = 0.7)
- GHG emissions savings based on 8000 operating hours for coal and 6000 hours for oil, with a CHP electric efficiency of 32%, and displacing average fossil fuel central station generation

For More Information on DOE Boiler MACT Technical Assistance

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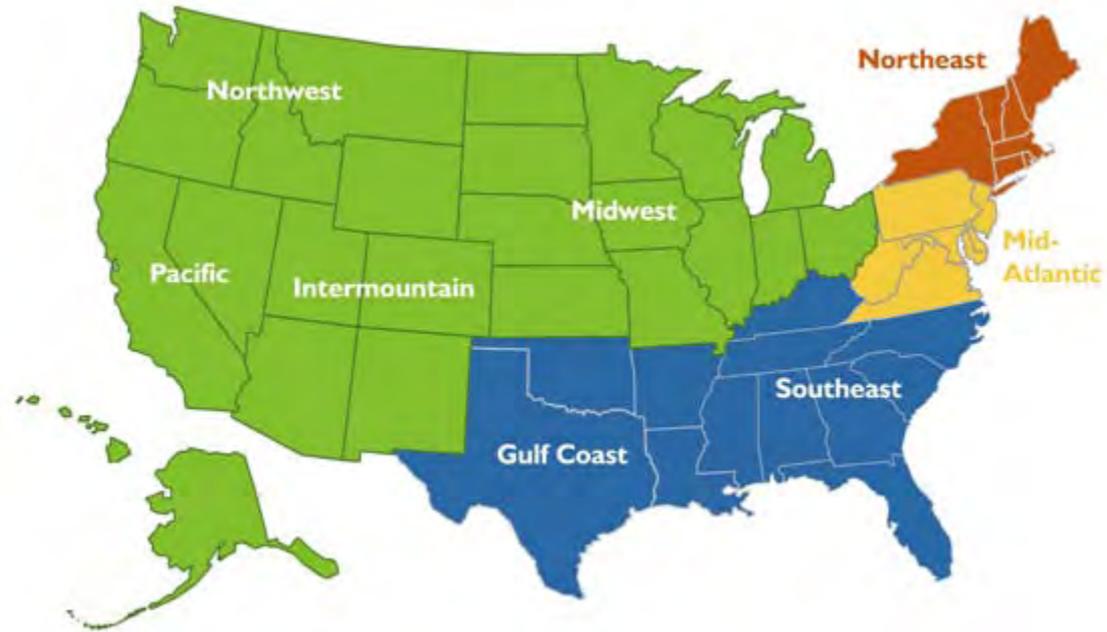
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DOE Boiler MACT Technical Assistance:

<http://www1.eere.energy.gov/manufacturing/distributedenergy/boilermact.html>

DOE Boiler MACT Technical Assistance Fact Sheet:

http://www1.eere.energy.gov/manufacturing/distributedenergy/pdfs/boilermact_tech_asst_factsheet.pdf



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Role of Utility Commission

“Because of coal plant retirements, educating consumers on combined heat power is of particular interest to the PUCO. A facility’s decision to invest in CHP may constitute a rational market response that not only benefits the facility but which will also supports grid reliability in Ohio.”

- Public Utilities Commission of Ohio (PUCO) Chairman Todd Snitchler. February 23, 2012

PUCO Resolution passed February 22, 2012 supporting the DOE Boiler MACT technical assistance effort being piloted in Ohio

<http://www.puco.ohio.gov/puco/index.cfm/industry-information/industry-topics/combined-heat-and-power-in-ohio/www.puco.ohio.gov/puco/?LinkServID=EE08638F-C000-C2CA-E4D77686612C5744>

Role of Utility Commission (2)

- PUCO is conducting a series of CHP workshops as part of the DOE pilot to help industrial boiler owners and operators learn about options to meet changing environmental standards.
- The initiative is intended to remove educational and regulatory barriers to CHP development in Ohio and across the nation.
- Upcoming Workshops:
 - **Financial Tools for CHP Development - Thursday, August 2, 2012**
 - Focus on the various financing options available to organizations interested in CHP development opportunities. Topics include: private financing, utility programs, government incentives, power purchase agreements and CHP project estimation.
 - **CHP & Stand-by Power - Thursday, September 13, 2012**
 - Explore barriers to entry for CHP facilities posed by stand-by power rates and provide a forum for potential regulatory and market solutions.

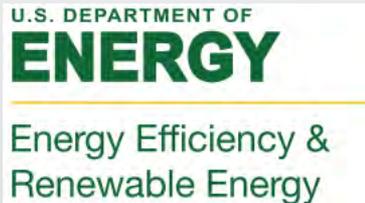
For more information on the PUCO CHP initiative and to register for upcoming workshops, visit:
<http://www.puco.ohio.gov/puco/index.cfm/industry-information/industry-topics/combined-heat-and-power-in-ohio/>

DOE Connection to Ohio Senate Bill 315

- Diverse stakeholder group came together in support of CHP
- Midwest CEAC met with several stakeholders including Governor's staff, PUCO, CHP developers, industry (potential end users), environmental, etc.
- Role of DOE was primarily education through the Midwest CEAC sharing:
 - CHP benefits and potential
 - How other states have addressed CHP in portfolio standards (EERS, RPS, AEPS, etc)
 - Best practices/successful examples of portfolio standard implementation that includes CHP

DOE & Midwest CEAC Contacts

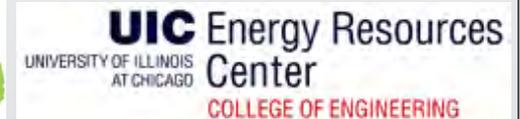
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States Covered: Illinois, Indiana, Iowa,
Kansas, Michigan, Minnesota, Missouri,
Nebraska, North Dakota, Ohio, South
Dakota, Wisconsin



Questions?

