

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy



Northeast Energy Efficiency Partnerships

Northeast / Mid-Atlantic Industrial Energy Efficiency and Combined Heat & Power Regional Dialogue

Held

March 13, 2013

Radisson Plaza Lord Baltimore Hotel, 20 West Baltimore Street, Baltimore, Maryland

SUMMARY REPORT

May 23, 2013

Prepared by NEEP and VEIC

EXECUTIVE SUMMARY

In response to President Obama's 2012 Executive Order *Accelerating Investment in Industrial Energy Efficiency* which calls for 40 GW of new Combined Heat and Power (CHP) capacity over the next decade, the U.S. Department of Energy (DOE) is holding a series of regional meetings to discuss Industrial Energy Efficiency (IEE) and CHP opportunities. The Northeast and Mid-Atlantic Regional Dialogue Meeting, co-sponsored by Northeast Energy Efficiency Partnerships (NEEP) and the State and Local Energy Efficiency Action Network (SEE Action), was held in Baltimore, Maryland and brought together policymakers, utilities, industrial customers, vendors and other stakeholders. The Dialogue meeting focused on fostering a regional discussion of state best practice policies and investment models to overcome the numerous barriers to industrial energy efficiency and CHP investments. The meeting focused on industrial energy efficiency and CHP successes, opportunities, and new approaches—all with an eye toward state and regional policy, including the role of ratepayer-funded energy efficiency programs. This report captures the key points of the dialogue.

The Northeast / Mid-Atlantic Region Has Significant CHP Potential: The Northeast and Mid-Atlantic states already have 16 gigawatts (GW) of installed CHP capacity, which is about 20 percent of the total U.S. installed capacity (See Appendix E). This figure includes 11 states and Washington, D.C. New York has the highest installed capacity of the group at 5.6 GW. Pennsylvania, New Jersey, and Massachusetts each have more than 1.5 GW of CHP installed. Recent state-level studies identified significant additional potential for CHP systems. However, because the methods used by states to quantify the technical and economic potential for CHP systems vary, the state data is generally not comparable across states. Despite this uncertainty, the studies agree that a large potential for additional CHP in the Northeast and Mid-Atlantic remains, and that this region could play a leading role in realizing the 40 GW goal.

Installed CHP Systems Reduce Energy Costs and Offer Reliable Back-up Power during Grid Outages: The dialogue highlighted a number of successful CHP installations across the region, demonstrating both reliability and energy savings. Sikorsky Aircraft in Connecticut, for example, was able to keep 9,000 people working through Superstorm Sandy which knocked out power across the state and much of the region for four days. Their CHP system not only kept people employed, but also provided employees who lost power in their own homes with a place for showers, hot meals, medical care and cell phone recharging. This experience, along with the financial return the system provided, led Sikorsky to commit to install CHP in all their facilities worldwide. Co-op City in New York, the world's largest cooperative housing development, also maintained service for its 60,000 residents during the storm. Similarly, Princeton University's CHP system enabled it to run its own "micro grid" to power the whole campus until the local utility power system was restored four days later. The University of Massachusetts Medical School campus (UMASS) is also served by a CHP system. In addition to protection against blackouts, a particular concern for a hospital, the CHP system allows the UMASS to take more control over their energy usage and costs. See Appendix B for links to videos about Sikorsky and UMASS that were played during the dialogue meeting. The DOE Mid-Atlantic Clean Energy Application Center reported that the availability of low-cost and stable natural gas, especially if it is available on-site such as in most of the region, is having a positive impact on CHP system economics.

Site-Specific Factors Drive the Economic Potential for Industrial CHP, Requiring a Flexible, Systems Approach to Project Development: The dialogue highlighted that the opportunity for CHP is very specific to each project and is especially dependent on thermal loads and fuel types. For any industrial customer to gain the full benefits from CHP, such systems should be evaluated as part of an overall system of process improvements that minimize energy and thermal loads and optimize system performance and productivity. Reductions in energy use through efficiency measures should be performed first to avoid oversizing the CHP system. Participants

noted that efficiency program participation, including the installation of CHP, should remain voluntary. The value of resilience, providing uninterrupted power during times of grid power outages, can be a strong driver for CHP. However, quantifying the value of resilience poses challenges for state utility regulators needing to determine ratepayer-funded program cost-effectiveness, as well as for businesses that base investment decisions upon return on investment.

Cooperation and Public-Private Partnerships Can Unlock the Region’s Industrial Energy Efficiency and CHP

Potential: Participants noted that for the Executive Order CHP goals to be achieved, industrial customers, government and utilities should cooperate and work together to create conditions conducive to more industrial process efficiency projects and the installation of CHP systems. The discussion addressed a number of public policy, financial and technical barriers that each may inhibit progress. The dialogue suggested that all types of participants potentially have a role to play in overcoming those barriers. Much of the dialogue was devoted to identifying the barriers, from the various perspectives of the participants, and proposing solutions.

State and Federal Policy Support Are Critical to Advancing CHP: The federal government is actively working to encourage CHP growth by funding regional Clean Energy Application Centers that provide technical assistance to customers considering CHP and un-biased information to state policy makers on successful policies. In addition, in response to the Executive Order, federal agencies are working to align their policies and programs to encourage economic CHP investments.

Participants suggested that state policies encouraging the installation of CHP systems also play an important role. For example, some participants suggested that a Renewable Portfolio Standard type approach, also called a Clean Energy Standard, can encourage CHP and may or may not have to be accompanied by incentives. They noted that uncertainty with respect to regulations, the availability of funds, and the economy can all present barriers to moving forward with a CHP project. If states and the federal government can stabilize regulations, policies and incentives for CHP for substantial periods of time, the more likely it is that CHP projects will have the time it takes to be proposed, permitted and installed. Participants noted that states also have a role in defining the way in which CHP systems are treated. If CHP systems are defined as an energy efficiency measure, and all of the non-energy benefits are included in the cost benefit analysis, then a CHP system is more financially attractive to both utilities and industrial customers. This approach has been successful in a number of states including Rhode Island, New York and Connecticut.

Participants also noted that state policies are important to overcome two major obstacles to CHP: utility interconnection standards and standby rates, and determination of cost-effectiveness as a driver of available incentives. Rhode Island instituted public policies to address these issues including revenue and sales decoupling that enable the utility to sever their cost recovery from energy sales, and the establishment of standby rates attractive to customers seeking to install CHP as an element of comprehensive, systemic energy efficiency treatments. In addition, inclusion of a greater number of benefits, such as economic development benefits, energy supply costs, greenhouse gas emissions standards and air quality benefits, and system reliability benefits in the mandated cost-effectiveness testing allowed the utility to offer higher customer incentives.

Utilities Can Play a Key Role in Enabling CHP Installations. Potential barriers to CHP include: standby rates, demand ratchets, interconnection requirements, and other utility approval processes. Participants suggested that if utilities view industrial CHP as an opportunity to avoid new generation capacity and/or meet efficiency goals, then they may have an incentive to remove barriers and promote CHP. Utilities already have established relationships with their customers, so they are in a good position to promote solutions, such as CHP, that could meet their customer’s needs. However, as regulated entities, utilities are limited in their flexibility to recover fixed cost recovery lost to the installation of a CHP system. Thus, state policymakers should seek ways to make CHP attractive to all parties, including utilities.

Appendices

Appendix A: Dialogue Summary Points

Appendix B: Dialogue Agenda

Appendix C: Moderator and Speaker Biographies

Appendix D: Participant List

Appendix E: CHP Summary Status

Appendix A

DIALOGUE SUMMARY POINTS

INDUSTRIAL ENERGY EFFICIENCY AND CHP BENEFITS/DRIVERS

From the Utility Perspective:

- Industrial customers can be large energy consumers and represent significant potential for energy efficiency.
- Industrial efficiency can serve as a utility customer retention and economic development strategy to stabilize loads.
- In some states CHP systems are categorized as an efficiency measure allowing CHP to be promoted with incentives through efficiency programs. Sometimes this enables utilities to be rewarded for meeting efficiency goals with CHP. In that context, large CHP projects can have a significant impact on achieving efficiency goals – making CHP an attractive business opportunity for utilities.
- CHP can be a cost-effective solution to meet generation capacity needs particularly in distribution constrained areas.

From the Customer Perspective:

- Energy efficiency projects can provide excellent returns on investment – boosting profitability.
- CHP preceded by comprehensive industrial energy efficiency supports properly sizing CHP systems – helping to meet customer payback requirements.
- The availability of low-cost and stable natural gas, particularly if it is already available on the site or close to the site, can make CHP very cost-effective.
- Manufacturers/customers that use both the thermal and electricity continuously (versus seasonal use) reap the most benefits from CHP.
- A CHP system can help a facility better manage and control energy use and costs. A multi-fuel CHP system can provide unique operational options and minimize costs.
- A CHP system can provide resilience when the grid fails by providing electricity and thermal (heat, chilled water and/or cooling) during a grid outage. This is especially important for facilities where continuous power is required such as manufacturing plants, hospitals, and retirement communities.
- New environmental regulations, such as the EPA's Boiler MACT rules, may drive customers to consider natural gas CHP as a compliance strategy.

From the Policymaker Perspective:

- Industrial energy efficiency – including CHP - can help meet energy and environmental policy goals.
- Industrial efficiency and CHP can be a driver of economic development: making industrial businesses more competitive globally while creating and maintaining local manufacturing jobs.
- Industrial CHP provides resiliency during power outages offering benefits in public safety, health and welfare. Such benefits should be considered in screening ratepayer-funded incentives or other measures to promote industrial CHP.

INDUSTRIAL ENERGY EFFICIENCY AND CHP BARRIERS

From the Utility Perspective:

- Industrial customers are reluctant to change their process systems or equipment core to their business – particularly those that run continuously.
- Industrial customers are concerned that utilities do not have the expertise to fully evaluate the efficiency opportunities in their systems and processes.
- Mechanisms (e.g., revenue decoupling) are needed to allow a utility to recover costs from lost revenue as the result of the installation of industrial efficiency and customer located CHP.
- Some utilities are interested in re-entering the generation business to offer CHP to their industrial customers, but deregulation bars them from owning generation - including customer-sited generation. A possible precedent is utility-owned, customer-sited solar PV systems.

From the Customer Perspective:

- Customers typically want a short payback investment, and CHP tends to have longer paybacks.
- The lack of a comprehensive industrial energy management plan can lead to a company making short-term, short-payback investments that can provide barriers to CHP systems. For example, a company that has made recent upgrades to an existing boiler may be reluctant to move forward with CHP.
- The cost of a district energy system with CHP, which is commonly used at a university or medical center campus, can be prohibitive, and may require either disruptive civil works or expensive horizontal boring.
- Regulations that prevent an industrial CHP owner from selling thermal energy outside the host CHP facility limits options to partner with another company or create a district energy system.
- Multiple industrial efficiency programs offered by different providers in the same service territory, such as in New York, are confusing to the customer and can impact the adoption of both industrial efficiency and CHP.
- National economic uncertainty and pending regulations can cause businesses to refrain from making industrial efficiency and/or CHP investments.
- The value of the resilience varies significantly by customer under different circumstances (e.g., during a natural disaster versus during normal times). Regardless, resilience is a significant value and regulators need to be able to quantify that value in determining program cost-effectiveness.
- Instability and uncertainty about program incentives and financing can discourage internal champions and obstruct CHP projects.

For Both Utilities and Customers:

- Cost-effective electric and gas efficiency measures should be implemented first to help ensure a good match between the sizing of the CHP system and the facility's energy usage. This is particularly important in matching thermal energy production from the CHP system with specific facility uses.
- Utility's goals and the customer's goals are not always aligned for industrial CHP installation.
- Bundling potential neighbors into a district energy co-op or partnership with a CHP system to aggregate thermal loads can be challenging in that businesses probably do not know their neighbors' energy consumption or thermal loads. To address this, utilities could help evaluate and aggregate energy and thermal loads of neighboring utility customers to support CHP systems.

INDUSTRIAL ENERGY EFFICIENCY AND CHP ENABLING POLICIES AND PRACTICES

From the Utility Perspective:

- It is important that the various groups within a utility, such as efficiency, planning, strategy, and distribution, communicate effectively in order to align policies and programs that affect industrial customer investments in industrial efficiency and CHP.
- A mechanism that allows a utility to recover lost revenue from electricity sales and to cover costs for maintenance of the electrical distribution system addresses a significant barrier to utility support for industrial efficiency and CHP.
- Including environmental and economic benefits in the cost-effectiveness and incentive calculations could help capture the full benefits of industrial efficiency and CHP, allowing more projects to pass the cost effectiveness test, and make them eligible for larger incentives.
- Special tariffs for natural gas delivery that encourage CHP could improve project economics for a customer considering installing a CHP system, thus resulting in more gas sales for the utility.
- Including industrial CHP as an eligible resource in meeting a utility's energy efficiency targets could shift their perspective toward new customer-sited CHP.

From the Customer Perspective:

- Cultivation of a business relationship between an industrial customer and the utility is important to establish the trust necessary to uncover and implement process efficiency opportunities. Traditional utility lighting and HVAC programs do not address the major energy uses at an industrial plant. NYSERDA, for example, has a dedicated program for addressing industrial process energy efficiency opportunities.
- Straight-forward, integrated and fast-track state and federal permitting for industrial efficiency projects and CHP can remove a key barrier to industrial efficiency and CHP investments.
- Standardized interconnection requirements make it easier to move forward CHP projects.
- Accurate CHP project assessments, such as those provided at no cost by the DOE regional Clean Energy Application Centers, can help identify promising projects.
- References, case studies and peer referrals can be persuasive and help customers move forward.
- CHP can be integrated with a number of energy and business management practices such as ISO 50001/Superior Energy Performance, Six Sigma, and Kaizen. A comprehensive energy management system can be strengthened with CHP. The LEED rating program provides points for buildings with CHP systems.
- Incentives for CHP systems improve the return on investment in a CHP system. New Jersey funds up to 30 or 40 percent of qualifying CHP costs, depending on the fuel and the size of the system. Fuel cell systems are eligible for incentives of up to 60% of the project cost.
- Financing options for a CHP project such as public-private partnerships or third-party surety "QBE" bonds can be helpful. Power Purchase Agreements (PPA) could be another method.

For Both Utilities and Customers:

- Utility participation in the development of industrial CHP should include a balance between incentives for the utility and benefits for the customer while not providing the utility with an unfair business advantage. This balance may be achievable through custom tariff rates.

Appendix B

SESSION DESCRIPTIONS

9:00-10:00 **Registration and Networking**

10:00-10:30 **Welcome and Introduction**

Jason Miller, Special Assistant to the President for Manufacturing Policy

Mike Carr, DOE Principal Deputy Assistant Secretary, Energy Efficiency and Renewable Energy

10:30-11:45 **Session 1: Industrial Energy Efficiency and Combined Heat & Power: Opportunities and Successes**

Marion Gold, Rhode Island Commissioner of Energy Resources

Robert Araujo, Sustainable Director, Manager Sustainability and EHS Programs at Sikorsky Aircraft

Tim Roughan, Director of Distributed Resources, National Grid

Jim Freihaut, Director, Mid-Atlantic Clean Energy Application Center

Moderator: Sue Coakley, Executive Director, Northeast Energy Efficiency Partnerships

- Moderator began with panel introductions followed by brief overview of the status of industrial efficiency and CHP across the region and case study video about [Sikorsky Aircraft](#) -

See: <http://www.neep.org/neep-supporters/business-leadership/case-studies/sikorsky>

11:45-1:00 **Session 2: Current Barriers and Drivers for More Investment in Industrial EE and CHP**

Brian Platt, Program Manager, NYSERDA

John T. Baker, PE, Associate Vice Chancellor for Facilities Management

Steven Goldenberg, Chief Council to New Jersey Large Energy User Coalition, Fox Rothschild LLP

Mike Winka, Director Office of Clean Energy, New Jersey Board of Public Utilities

Moderator: Tom Bourgeois, Co-Director, Northeast Clean Energy Application Center

- Moderator began with panel introductions followed by brief case study video about [UMass Medical School](#)

See: <http://www.neep.org/neep-supporters/business-leadership/case-studies/umms>

1:00-1:45 **Lunch Speaker: Barbara Kates-Garnick**, Massachusetts Undersecretary of Energy

1:45-3:00 **Session 3: Charting the Path to Greater Industrial EE and CHP**

Calvin Timmerman, Assistant Executive Director, Maryland Public Service Commission

Bob Pistor, Vice President, UGI Utilities

Ken Cooper, Senior Business Development Professional, United Illuminating Holdings

Ronald Araujo, Manager, Conservation and load management, Northeast Utilities

Moderator: Jonathan Schrag, Executive Board Member, Northeast Clean Heat and Power Initiative

- Moderator began with panel introductions

3:00-4:00 **Moderated Audience Discussion and Next Steps**

Moderator: Tim Woolf, Vice President, Synapse Energy Economics

Session moderators and keynote speaker participated in the audience discussion. Discussion questions included:

- What should be the top priority policy options for state utility regulatory commissions to adopt to promote industrial EE and CHP to help achieve the state’s goals (energy, environmental, economic development)?
 - Address utility cost recovery and financial incentives?
 - Address standby rates and interconnection barriers?
 - Require EE program administrators to offer CHP as an energy efficiency program?
 - Promote utility partnerships with host customers? Is there a specific opportunity in grid-congested areas?
 - Others?
- What should be the top priority options for state legislatures to adopt to promote industrial EE and CHP?
- How can regional organizations (e.g., NEEP, Clean Energy Application Centers) do more to support CHP and industrial EE?
- Given the clear support for industrial EE and CHP from the federal government, what are the most important actions that Federal agencies can undertake to promote them?

4:00 **Adjourn**

Appendix C

MODERATOR/SPEAKER BIOGRAPHIES

Robert Araujo, Sustainable Director, Manager Sustainability and EHS Programs at Sikorsky Aircraft

Robert J. Araujo is the Manager of Sustainable Development and EHS Programs for Sikorsky Aircraft Corporation and responsible for developing a sustainable approach to manufacturing systems and programs, prior to which served as Manager of Environmental Engineering for Sikorsky. Prior to coming to Sikorsky, Bob managed chemical engineering and EHS programs for Risdon Corporation, Emhart Corporation, and Uniroyal. He has more than 30 years' experience in environmental, chemical engineering, hazardous materials management and Emergency Response. Bob has a B.S. degree in chemistry, an Executive Masters in Business Administration from the University of New Haven; he has also performed graduate studies in both chemistry and engineering at the University of Bridgeport and Boston University. He has a Masters from Rensselaer Polytechnic Institute in Environmental Policy and Management and is also an adjunct professor at Rensselaer in environmental sustainability, industrial ecology and design for the environment.

John T. Baker, Associate Vice Chancellor for Facilities Management, University of Massachusetts Medical School

John Baker is currently the Associate Vice Chancellor of Facilities Management at the University of Massachusetts Medical School, Worcester, MA. UMass Medical School is nationally ranked for Primary Care medical education and continues to be nationally recognized as a leader in Biomedical Research. In addition to managing facilities for this academic medical institution, John also provides facility operational and maintenance support for the 400-bed Level 1 Trauma hospital. Prior to joining UMass Medical School, John retired as a Commander from the US Navy Civil Engineer Corps, where he served twenty years of active duty. John holds a BS in Civil Engineering from the University of New Hampshire and a MSCE in Construction Engineering and Management from Purdue University. He is a registered professional engineer in both Massachusetts and New Hampshire and an active member of ASHE, ASCE, NFPA, and NSPE. In addition, he is a Certified Facility Manager (CFM) and a Certified Healthcare Facility Manager (CHFM).

Tom Bourgeois, Co-Director, Northeast Clean Energy Application Center

Tom Bourgeois is Deputy Director of the Pace Energy and Climate Center, as well as Co-Director of the U.S. Department of Energy's Northeast Clean Energy Application Center, a position he has held since 2004. In October 2008, he was recipient of the CHP Champion Award, presented by the U.S. Combined Heat and Power Association (www.uschpa.org). Tom has served as the principal investigator or major contributor on more than a dozen research contracts sponsored by New York State Energy Research and Development Authority (NYSERDA), U.S. Department of Energy, Oak Ridge National Labs, Argonne National Labs, ASERTTI/NASEO, and other research foundations and government agencies. Tom has 18 years of work experience in utility markets in the Northeast United States. He is the Past President and Current Treasurer and Executive Board Member of the Northeast CHP Initiative (www.nechpi.org). He studied for a Ph.D. in Managerial Economics from Rensselaer Polytechnic Institute (RPI) and holds a Master's Degree from the University of North Carolina – Chapel Hill with a concentration in Regional Economic Development.

Mike Carr, U.S. Department of Energy, Principal Deputy Assistant Secretary - Energy Efficiency and Renewable Energy

In his role as Principal Deputy Assistant Secretary for the Office of EERE, Mike provides leadership direction on cross-cutting activities in EERE's portfolio. In particular, he is using his experience in policy development to help ensure that EERE does its best to inform federal policy-making and legislative activities related to renewable energy and energy efficiency technologies. Since 1996, Mike has advised on law and policy both inside and outside of government, with a particular specialization in environment and natural resources law. Prior to taking on the Principal Deputy position, from 2004 to June 2012 Mike served as Senior Counsel to the Senate Committee on Energy and Natural Resources. In private practice, Carr specialized in litigation involving NEPA, the Clean Air Act, and the Clean Water Act. He managed environmental and appropriations issues for Rep. David Skaggs (D-CO) until 1998, then worked in the Solicitor's Office of the Department of the Interior through 2002. Mike holds a law degree from Lewis and Clark College and a Bachelor's from the University of Colorado – Boulder.

Sue Coakley, Executive Director, Northeast Energy Efficiency Partnerships

Since founding Northeast Energy Efficiency Partnerships (NEEP) in 1996, Sue Coakley has served as Executive Director and a member of the Board of Directors. She provides strategic direction for NEEP's development, management, and operations; manages relationships with NEEP's broad base of sponsors and funders; and contributes to national and regional strategies to accelerate energy efficiency as a clean, powerful and dependable energy resource. She has been advocating and collaborating for clean energy for over thirty years, including five years at the Massachusetts Department of Public Utilities and several years as an energy efficiency consultant/advocate before founding NEEP. She is also the Board Chair for TopTen USA and as Board Vice Chair for Vermont Energy Investment Corp. She holds a master's degree in natural resource management and administration from Antioch/New England University and a bachelor's degree in environmental science from Windham College.

Ken Cooper, Senior Business Development Professional, United Illuminating Holdings

Ken is a Strategic Business Development and New Products professional with solid experience in identifying, planning, and implementing new products and business ventures including energy-related products and services. Ken currently works for UIL as Senior Business Development Professional where he actively facilitates and promotes CHP development and other distributed generation projects. Prior to UIL, Ken held various positions in international Strategic Business Development, New Product Development and Marketing for myFC, a start-up fuel cell company based in Stockholm, Sweden, BIC Corporation and Avery Dennison.

Jim Freihaut, Director, Mid-Atlantic Clean Energy Application Center

James D. Freihaut is an Associate Professor in the Department of Architectural Engineering at Pennsylvania State University. He serves as Director of DOE's Mid-Atlantic Clean Energy Application Center, the Ben Franklin Center for High Performance Building Systems Research and Technical Director of the DOE Energy Innovation Regional Center for Energy Efficient Buildings at the Philadelphia Navy Yard. Prior to joining Penn State University, Jim worked for 22 Years at United Technologies Research Center (UTRC) of United Technologies Corporation. Jim received his bachelor's degree in Philosophy/Chemistry from Christian Brothers College (1966). He earned his master's degree at Rensselaer Polytechnic Institute (1972) in Natural Science/Physical Chemistry. Jim achieved his Ph.D. in Fuel Science from the Pennsylvania State University (1980).

Marion Gold, Rhode Island Commissioner of Energy Resources

Marion Gold has served as Administrator of the Rhode Island Office of Energy Resources (OER) since August 2012 and was confirmed as Commissioner on March 5, 2013. As leader of the OER, Dr. Gold is dedicated to working with public and private sector partners to provide sustainable, secure, and cost-effective energy services to all sectors of the community. Prior to joining the OER, she was the Director of the Outreach Center at the University of Rhode Island where she established the URI Partnership for Energy and directed extension programs for communities and the public in energy, environmental horticulture, and urban agriculture. She served on the URI President's Council for Sustainability and on the RI Energy Efficiency and Resource Management Council and continues to serve as an adjunct professor of Environmental and Resource Economics at URI. Dr. Gold holds a B.S. in Natural Resource Science and Policy from the University of Michigan, a M.S. in Environmental Economics from Michigan State University, and a Ph.D. in Environmental Sciences from the University of Rhode Island.

Steven Goldenberg, Fox Rothschild LLP, Chief Council to New Jersey Large Energy User Coalition

Steven Goldenberg is a Partner at Fox Rothschild, LLP, and he concentrates his practice in public utility law, with a particular emphasis on energy regulatory matters. He serves as co-chair of the firm's Energy and Public Utilities Practice Group. Steve founded the New Jersey Large Energy Users Coalition, which is comprised of pharmaceutical companies, major manufacturers and large commercial customers. He now serves as the group's counsel before the New Jersey Board of Public Utilities and New Jersey Legislature in connection with energy-related matters. His government affairs practice focuses primarily on energy and government procurement issues. Steve holds a law degree from Yeshiva University, Benjamin N. Cardozo School of Law, an M.P.A. from New York University, and a B.A. from The State University of New York.

Barbara Kates-Garnick, Massachusetts Undersecretary of Energy

Barbara Kates-Garnick was appointed by Governor Deval Patrick as the Energy Undersecretary after serving for several years as an independent consultant in academia and private business. Most recently, she advised the Polytechnic Institute of New York University on issues related to urban systems, clean technology, energy policy and entrepreneurship. At NYU, she created a successful proposal for the \$1.5 million New York City Accelerator for Clean and Renewable Energy, a showcase for clean energy technology. Some of her previous energy positions include serving as a former Department of Public Utilities (DPU) commissioner and member of the Energy Facilities Siting Board, and as a DPU director responsible for developing Massachusetts' first natural gas deregulation policy. She is also a former assistant secretary in the Massachusetts Office of Consumer Affairs, where she managed various aspects and budgets of the Public Utilities Division and the Department of Energy Resources. Kates-Garnick earned her PhD at Tufts University's Fletcher School of Law and Diplomacy, and an undergraduate degree in political science at Bryn Mawr College.

Jason Miller, Special Assistant to the President for Manufacturing Policy

Jason Miller is the Special Assistant to the President for Manufacturing Policy at the National Economic Council in the White House. Mr. Miller serves as the Director of the White House Office of Manufacturing Policy at the NEC, and in that role he serves as the White House point person on the President's manufacturing agenda, leading policy development efforts and coordinating implementation efforts across Federal agencies. Mr. Miller has played a key role in designing and launching key initiatives like the National Network for Manufacturing Innovation, the President's Advanced Manufacturing Partnership, and the completion of the light-duty fuel efficiency standards through 2025. Prior to joining the Administration, Mr. Miller advised global companies as a management consultant with The Boston Consulting Group in San Francisco. His focus included energy and technology manufacturing firms facing strategic and operational issues. Mr. Miller received a B.A. from the University of Pennsylvania, a M.B.A. from the Kellogg School of Management at Northwestern University, and a M.P.A. from Harvard's Kennedy School of Government.

Bob Pistor, Vice President, UGI Utilities

Bob Pistor is the Senior Operating Officer of UGI HVAC Enterprises, Inc., a 450-employee mechanical, electrical, and plumbing contracting company that operates in the Mid-Atlantic. Bob has been with UGI and its various subsidiary companies for 38 years, where he has held numerous executive positions. In his current role, his business unit is focused on energy utilization. His team completes design build HVAC, refrigeration and plumbing projects, combined heat and power applications, PV and thermal solar applications and all other end use applications with-in the customers' fence related to mechanical, electrical, HVAC, and plumbing applications around the energy space.

Brian Platt, Program Manager, NYSERDA

Brian Platt is the NYSERDA Program Manager for Process, Power, and FlexTech. He has worked for 20 years in the energy field for New York State. Previously, Brian worked for Shell Oil Company as a project manager for offshore process facilities and cogeneration plants. Brian is a New York State licensed professional engineer. He has a B.S. in Chemical Engineering from Cornell University.

Tim Roughan, Director of Distributed Resources, National Grid

Tim Roughan is the Director of Energy and Environmental Policy for the National Grid companies, which serve 6.8 million electric and gas customers in NE and NY. His prior positions include Director of Product Management, Business Services Vice President, and the Director of Distributed Resources. He has been with the company or its predecessors for 30 years. In his role, Tim works in the regulatory arena to promote balanced approaches to distributed generation issues, such as net metering, integration of renewables with the transmission and distribution (T&D) system, and interconnection. In addition, his work includes reviewing the applicability of the use of non-wires alternatives to standard T&D investments using various customer-side resources. He is a 1982 graduate of WPI.

Jonathan Schrag, Executive Board Member, Northeast Clean Heat and Power Initiative

Jonathan Schrag is a principal in the Resilient Energy Coalition, a consortium of clean energy companies organized to increase deployment of on-site distributed generation. In 2011 and 2012 Jonathan served as the Deputy Commissioner for Energy in the Connecticut Department of Energy and Environmental Protection where he assisted Commissioner Daniel C. Esty to develop a long-term strategy for energy resilience and to implement the new Clean Energy Finance Investment Authority. From 2008 to 2011, Jonathan administered the first cap-and-trade program in the U.S. as the Executive Director of Regional Greenhouse Gas Initiative. And from 2004 to 2007 he was an Assistant Director of the Earth Institute at Columbia University and the Executive Director of the Lenfest Center for Sustainable Energy. Jonathan received an AB degree with honors from Harvard University and was a Fulbright Scholar in Mexico.

Calvin Timmerman, Assistant Executive Director, Maryland Public Service Commission

Calvin Timmerman is an Assistant Executive Director on the Staff of the Maryland Public Service Commission (PSC). He joined the Maryland PSC in 1989, and he has managed the Staff's energy efficiency, peak demand reduction, and energy supply resource activities since 2001. He currently chairs the Smart Grid Implementation Working Group and the EmPower Maryland Working Groups. Mr. Timmerman has B.A. and M.A. degrees in History and a Specialist in Education degree from the University of Florida. He was a Graduate Exchange Fellow at Eberhard Karls University in Tuebingen, Germany, and he also received a M.A. degree in Economics from the University of Maryland, College Park.

Mike Winka, Director, Office of Clean Energy, New Jersey Board of Public Utilities

In 2003, Mike Winka was named the Director of the newly organized Office of Clean Energy in the New Jersey Board of Public Utilities. He managed the New Jersey Clean Energy Program and the State Energy Plan for Energy Efficiency and Renewable Energy through 2012. The Office is responsible for promoting energy efficiency, clean energy generation and renewable energy generation through the various regulatory and non-regulatory tools available to NJBPU. Mike is currently the Senior Policy Advisor to President Hanna on technical issues, including clean energy and smart grid. Before joining NJBPU, Mike worked for the New Jersey Department of Environmental Protection for 22 years

Tim Woolf, Vice President, Synapse Energy Economics

Tim Woolf is a vice president at Synapse Energy Economics. He has thirty years of experience working on a variety of electricity industry regulation and planning issues. The primary focus of his work includes energy efficiency program design and policy analysis; technical and economic analyses of electricity systems; renewable resource technologies and policies; clean air regulations and policies; and many aspects of consumer and environmental protection. Prior to working at Synapse, Mr. Woolf was a commissioner at the Massachusetts Department of Public Utilities and also served as the President of the New England Conference of Public Utility Commissioners from 2009-2010. Mr. Woolf holds an MBA from Boston University and a Diploma in Economics from the London School of Economics, as well as a B.S. in mechanical engineering and a B.A. in English from Tufts University.

Appendix D

PARTICIPANT LIST

NORTHEAST/MID-ATLANTIC DOE INDUSTRIAL ENERGY EFFICIENCY & COMBINED HEAT & POWER DIALOGUE MEETING			
First Name	Last Name	Title	Organization
Eric	Ackerman	Director, Alternative Regulation	Edison Electric Institute
Mariusz	Adamski	Ph D	Technical University of Bialystok
Todd	Allen	Project Officer	Dept of Energy
Chas	Anders Hall	CEO	Trifecta Industries
Lee	Anderson	Senior Policy & Legislative Advocate	BlueGreen Alliance
Ronald	Araujo	Manager, Conservation & Load Management	Northeast Utilities
John	Baker	Associate Vice Chancellor for Facilities Management	University of Massachusetts Medical School
Felicia	Bellows	Managing Partner	New Alchemy Energy Partners
Jeff	Bentley	CEO	CellTech Power LLC
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Appendix E

Summary of the status of installed CHP and potential in the Northeast and Mid-Atlantic states



Northeast Energy Efficiency Partnerships

Northeast and Mid-Atlantic States: Combined Heat and Power Capacity and Potential

NEEP, with assistance from VEIC, has put together an overview of the CHP capacity and technical potential for states in our region. The data presented in the following table is from internal ICF estimates technical potential for CHP installations across all customer sectors. There are a variety of additional studies available that may reflect more or less technical potential. Identifying and achieving the economic potential for installations is highly dependent on spark spread, state regulatory and business environment, and other key factors that can vary across the sectors.

STATE	CHP CAPACITY & POTENTIAL
<i>Connecticut</i>	<ul style="list-style-type: none">Existing: 713 MWTechnical Potential (2012): 1400 MW
<i>Delaware</i>	<ul style="list-style-type: none">Existing: 52.5 MWTechnical Potential (2012): 400 MW
<i>Maine</i>	<ul style="list-style-type: none">Existing: 900 MWTechnical Potential (2012): 900 MW
<i>Maryland</i>	<ul style="list-style-type: none">Existing: 714 MWTechnical Potential (2012): 1,800 MW
<i>Massachusetts</i>	<ul style="list-style-type: none">Existing: 1,571 MWTechnical Potential (2012): 2,800 MW
<i>New Hampshire</i>	<ul style="list-style-type: none">Existing: 58.5 MWTechnical Potential (2012): 600 MW
<i>New Jersey</i>	<ul style="list-style-type: none">Existing: 3,055 MWTechnical Potential (2012): 3,800 MW
<i>New York</i>	<ul style="list-style-type: none">Existing: 5,585 MWTechnical Potential (2012): 9,500 MW
<i>Pennsylvania</i>	<ul style="list-style-type: none">Existing: 3,307 MWTechnical Potential (2012): 6,200 MW

STATE	CHP CAPACITY & POTENTIAL
<i>Rhode Island</i>	<ul style="list-style-type: none">Existing: 114 MWTechnical Potential (2012): 500 MW
<i>Vermont</i>	<ul style="list-style-type: none">Existing: 22 MWTechnical Potential (2012): 300 MW
<i>Washington, D.C.</i>	<ul style="list-style-type: none">Existing: 14.5 MWTechnical Potential (2012): 300 MW