Meeting with EPA and AEE Member Businesses

March 25, 2014
Suggested Agenda

I. Who We Are - Brief introductions (15 minutes)

II. AEE Industry Perspective on Opportunity Provided by 111d (30 minutes)
   - Share core AEE 111d principles
   - Highlight key recommendations from AEE comments
   - Discuss timing of state implementation
   - Approaches to address energy efficiency EMV

III. How Can We Help? (15 minutes)
   - Share plan for carbon reduction technology premier
   - Discuss AEE state outreach - and priority states
   - Other key issues where AEE can help?

4. Share economic analysis
   - Job creation
   - Revenue
   - Jobs

AEE chapters in 20 states

Final compliance

Send early 3rd quarter
- Allow 1
- NN

Help states start on EMV

California states will hang back
- 1,100 homes - 5 years
- New mission
- DOE

Johnson Controls - build jobs
- New projects, ECO

AEE - existing jobs
- 7 projects

www.aee.net 503.326.0300
Washington DC  San Francisco  Boston
plan is in new term
- Primer on testing rule that 4-12 -audience - states
- State-by-state discussions in 22 states
- Primary states & go deeper
- Regional market
- Common elements - educate big players
- - build related up.- players
- - Comm - make can to public
- maybe? Pub. discussions about cost
- - emphasize options
- - go & big up
- - will dialogs - like NY

Where - Medical ET Groups
- WEB Paper

=> TALK TO Malcolm, Connect 10 mins

BCT IST Population
- Study unregistered homes across US
  1. Contact - bring to code
  2. Health, mortality & morbidity

What can BE do to help air
- has to demonstrate aggregated value
- measure mark proposals to give confidence to states
- VPR to see proposal, then distributed
- firm - Signal that BE works so states can
- states change legislation
- SO mindful of signal need, many need
ADVANCED ENERGY NOW 2014 MARKET REPORT – HIGHLIGHTS

The Advanced Energy Now 2014 Market Report is the first annual report of market size, by revenue, of the advanced energy industry, worldwide and in the United States. As defined by Advanced Energy Economy (AEE), a national association of business leaders with the goal of making the global energy system more secure, clean, and affordable, advanced energy is a broad range of technologies, products, and services that constitute the best available technologies for meeting energy needs today and tomorrow.

Prepared for AEE by Navigant Research, Advanced Energy Now 2014 draws on more than 60 previously published Navigant Research studies on specific industry categories. The results presented in Advanced Energy Now 2014 must be viewed, however, as a conservative assessment of advanced energy market size. Navigant Research has used strict definitions within product categories in order to distinguish advanced energy from conventional energy products. Also, U.S. market revenue counts only domestic sales of products and services and does not include revenue from exports, understating the economic scope of the U.S. advanced energy industry.

Summary Findings – Global Market

- For 2013, advanced energy reached $1.13 trillion in estimated global revenue, a 7% increase year-over-year.
- Electricity Generation was a mix of ups and downs over the last two years.
  - From 2011 to 2012 the industry experienced a decline in large-scale hydropower (due to a reduction in orders from China and elsewhere).
  - The Electricity Generation segment rebounded globally in 2013 with 5% growth (driven by hydro, solar, and biomass).
- Transportation grew 6% in 2013 driven by strong growth in hybrid and plug-in hybrid vehicles.
- There has been a steady growth in advanced Fuel Production (up 34% from 2011 to 2013), led by ethanol, compressed and liquefied natural gas for transportation (CNG and LNG), and bio-oils associated with development of cellulosic biofuels.
- The Buildings segment showed similar two-year growth globally (up 27%), led by advanced lighting and industrial applications of Combined Heat and Power (CHP).

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Summary Findings – U.S. Market

- In the United States, the advanced energy market was an estimated $168.9 billion in 2013 – 15% of the global market, up from 11% in 2011.
- Excluding wind, U.S. advanced energy revenue grew 18% from 2011 to 2012 and 14% from 2012 to 2013.
- Wind energy suffered a severe, $23 billion revenue downward swing between 2012 and 2013, due to policy uncertainty around the federal Production Tax Credit (PTC).
- Solar PV revenue grew steadily over this two-year period, up 27% from 2011 to 2012, and 54% from 2012 to 2013. Two-year growth, from $8.2 billion to $16.2 billion, was 97%. This revenue growth is even more impressive given the continued declines in total installed prices for PV over that period. In 2013, the United States accounted for an estimated 18% of global revenue for solar PV, a doubling of its global market share from 2011 – making the United States the third largest market for solar PV in the world.
- The United States remains a world leader (34% of global revenue) in the production of advanced fuels – principally in biofuels and synthetic diesel and gasoline – as revenue in Fuel Production grew steadily, up 17% from 2011 to 2013.
- Similarly, revenue from advanced Building products and technologies increased 11% from 2011 to 2012 and 12% from 2012 to 2013, for two-year growth of 24%.
- The most dramatic growth came in Transportation, where revenue from advanced vehicles more than doubled over the two-year period.
  - Hybrid vehicles led the way in revenue, rising from $7.2 billion in 2011 to $11 billion in 2012 and an estimated $14 billion in 2013.
  - Plug-in electric vehicles showed the most dramatic growth, from $707 million in 2011 to an estimated $3.6 billion in 2013.
  - Natural gas trucks and buses grew five-fold in two years, from $102 million to $530 million.

the full Advanced Energy Now 2014 Market Report is available for download at www.eee.net
Recommendations on EPA's Forthcoming Proposal To Reduce Carbon Emissions from Existing Power Plants

Executive Summary

As a national organization of businesses making the energy system more secure, clean, and affordable, Advanced Energy Economy (AEE) is pleased to deliver these recommendations on EPA's upcoming proposal to reduce carbon emissions from existing power plants under Section 111(d) of the Clean Air Act (CAA).1,2

AEE believes properly implemented 111(d) standards can help the United States move toward a higher performing energy system for the 21st Century. Thanks to technological advances and innovation, we have more options for meeting our energy needs than ever before in history. These technologies and services, such as wind and solar power, energy efficiency, and demand response, provide us the opportunity to upgrade the electric system while reducing carbon emissions.

AEE believes that a few overarching principles can guide the development of smart, cost-effective plans for reducing emissions from the power sector. We believe that EPA and the states should:

➢ Recognize the Value of Advanced Energy - Advanced energy technologies and services provide a portfolio of emission reduction tools for the electric power sector, including numerous options that are found “beyond the fence line” of emitting electric generating units. As these technologies and services provide a range of other benefits to the electric system and the economy, they ought to be utilized in state plans for emission reduction.

➢ Provide Business Certainty - The business community needs certainty that EPA guidelines and corresponding state plans will be actionable and enforceable, so that businesses can plan effectively to meet market needs. States should have a range of options for compliance, but all options need to result in specific and demonstrated reductions.

➢ Encourage Technology-Neutral Solutions - EPA and the states should favor market-based solutions to emission reduction that allow competition between solutions on a technology-neutral basis. In recognition of the dynamism and innovation of the energy industry, these solutions should also provide future technologies pathways to compete on an equal footing.

As an organization representing a wide array of technologies providing cost-effective emissions reductions, AEE makes the following specific recommendations to EPA:

1. Use a System-Based Approach in Establishing the BSER – In establishing the best system of emission reductions (BSER) and the guideline for state performance standards, EPA should use a system-based approach that incorporates beyond the fence line options, including such advanced energy technologies as renewable energy, energy efficiency, demand response, etc.
As part of the $169 billion annual U.S. market for advanced energy, these technologies are well established in the marketplace, and states and utilities have many years of experience with policies related to them. Ultimately, the electric power system is not simply a series of generating units, but rather an interconnected system of generation, use, and management, with emissions dependent on the performance of the entire system. As a result, system-level regulations that can leverage all options for emissions reduction are more effective, including on the basis of cost, than those simply governing individual plants.

2. **Allow States To Take a System-Based Approach To Compliance** – Just as EPA should use a system-based approach in establishing the BSER, the Agency should allow states to develop compliance plans based on a system-based approach. Such an approach would permit states to incorporate beyond the fence line technologies and services, expanding their access to cost-effective emission reduction options while simultaneously allowing them to upgrade energy system performance and expand economic opportunity. States should be allowed to leverage years of experience by using known policy instruments, including the Renewable Portfolio Standard (RPS) and Energy Efficiency Resource Standard (EERS), as compliance measures.

3. **Provide States with Model Approaches and Equivalency Criteria** – Given the varied nature of states, EPA should allow for flexibility in state emission reduction strategies. At the same time, the business community, which will have to carry out the actions necessary to achieve reductions, needs certainty to effectively plan operations, so EPA needs to ensure that emission reductions are real. To achieve both goals and facilitate state plan development, EPA should lay out model approaches as well as equivalency criteria that states can use to demonstrate the equivalency of their own approaches.

4. **Support Regional Coordination for State Plan Development** – Neither greenhouse gas emissions nor energy markets respect political boundaries, so EPA should allow and facilitate the development of coordinated 111(d) implementation plans across states. Regional approaches help deal with technical challenges such as cross-state power flow and crediting, but more importantly analysis shows that regional approaches lower implementation costs. Simultaneously, they facilitate the work of the business community responsible for carrying out emission reductions by reducing the number of markets and variability between them.

5. **Provide Specific Guidance To States Regarding EM&V and Greenhouse Gas Crediting** – Regardless of the form of the emission standard, whether rate-based or mass-based, beyond the fence line technologies can and must be allowed as options for emission reduction in state plans. To facilitate the incorporation of these resources into plans and ensure consistency across the plans, EPA should provide states with specific guidance regarding accepted methods for evaluation, measurement, and verification (EM&V) and greenhouse gas crediting. Such guidance should balance the needs for accuracy and administrative ease.

AEE thanks EPA for the opportunity to provide recommendations on this regulatory development. AEE and its state partner organizations represent roughly 1,000 organizations from across the advanced energy industry. We offer EPA the individual and collective expertise of this wide network of advanced energy firms to answer any related questions.
About Advanced Energy Economy (AEE)

AEE is a national organization representing the advanced energy industry. Active in 22 states across the country, AEE and its state partner organizations represent roughly 1,000 organizations. AEE’s mission is to transform public policy to enable rapid growth of advanced energy companies.

Founded in 2011, AEE has a national network of business members across states and across industries to help the advanced energy industry succeed. Specifically, AEE has partner organizations working in Alaska, Arizona, Arkansas, Colorado, Connecticut, Illinois, Maine, Maryland, Massachusetts, Michigan, Nevada, New Hampshire, New Mexico, North Carolina, Ohio, Rhode Island, South Carolina, Utah, Vermont, and Wyoming, with more to come. AEE also has active engagements in California and New York.

In representing the advanced energy industry, AEE works on behalf of businesses making the energy system more secure, clean, and affordable. Thanks to technological advances and innovation, we now have more options for meeting energy needs than ever before in history. We call those new options “advanced energy.” Advanced energy represents an opportunity to create value and prosperity across the economy as we modernize our methods of producing, managing, and using energy. At the same time, advanced energy provides regulators a portfolio of technologies and services, many of which are “beyond the fence line” of generating units, that can reduce greenhouse gas emissions.

AEE’s member companies span the advanced energy industry and its value chains. The scope and scale of the industry was recently documented in AEE’s Advanced Energy Now 2014 Market Report, which found an annual advanced energy market of $169 billion in the United States and $1.1 trillion globally in 2013. Since 2011, the U.S. share of the global market has risen from 11% to 15%. Technologies represented include wind, solar, energy efficiency, demand response, nuclear power, natural gas, grid modernization, and advanced transportation technologies.

These technologies are the tools necessary to create a higher-performing energy system, one that is reliable and resilient, diverse, cost-effective, and clean, while providing customers with more services of greater quality than was possible in the past. In an upcoming report, which we will deliver to EPA and distribute to the states, AEE will lay out the portfolio of technology options that advanced energy provides states for greenhouse gas reduction, while improving these other aspects of grid performance.

Detailed Recommendations

Use a System-Based Approach in Establishing the BSER

EPA is required under Section 111(d) to establish a carbon pollution emission guideline for the states that sets the minimum requirements in terms of emission reductions and timing for compliance. The guideline is based on the emissions reductions EPA deems achievable through the best system of emission reduction (BSER) that is adequately demonstrated. In establishing the BSER, EPA should use a system-based approach that incorporates beyond the fence line
technologies and services such as wind power, solar power, energy efficiency, demand response, etc. These technologies provide cost-effective emission reductions, substantial value to states and the power system, are well established in the marketplace, and have been incorporated for many years into state, regional, and utility policies and programs.

The electric power system is not simply a series of generating units, but rather an interconnected system of generation, use, and management, with emissions dependent on the performance of the entire system. As a result, efforts to regulate the emissions from the power system are more effective, including on the basis of cost, if they address the system comprehensively rather than simply dealing with individual units.

Fortunately, the language of Section 111(d) of the CAA provides EPA the authority to select a system-based approach in establishing the BSER. In fact, Section 111(d) requires EPA, in determining the BSER, to consider cost, energy, environmental and health considerations, all factors that suggest a system-based approach. Environmental and public health impacts decline as emissions drop. Also, analysis indicates that including reduction options beyond the fence lines of the electric generating units (EGUs) results in the lowest cost of implementation for any particular level of emission reduction. At the same time, these technologies and services provide benefits to the larger energy system beyond emission reduction. With power purchase agreement prices averaging 4 cents/kWh in 2012, wind power is competitive with or less expensive than traditional generation options. Solar power helps the grid meet peak demand because its output is greatest during the hottest hours of sunny days. Energy efficiency measures reduce energy consumption, resulting in lower energy bills for consumers as well as lower emissions. Demand response helps grid operators prevent blackouts and reduces the need for underutilized generation specifically used short periods of high demand.

Beyond the fence line options can help EPA balance cost, energy, environmental and public health considerations. They are also well established in the U.S. and global marketplaces, as illustrated by AEE’s recent Advanced Energy Now 2014 Market Report. The assessment, which was produced by Navigant Research, found that the 2013 market for advanced energy technologies was $1.1 trillion globally and $169 billion in the United States. The industry generates as much revenue on an annual basis as the U.S. airline industry and plastic & rubber manufacturing, so these technologies are well established in the marketplace, and therefore more than adequately demonstrated.

States and utilities have many years of experience implementing a variety of policies and programs that result in emission reduction using these types of technologies and services. These policies include market-based emission reduction programs, renewable portfolio standards (RPS), energy efficiency resource standards (EERS), and a variety of other programs implemented by states, utilities, and regional organizations.

Market-based emission reduction programs are well established, with the Regional Greenhouse Gas Initiative serving as a prime example. The nine participating states have reduced carbon pollution in the region by over 40 percent from 2005 to 2012. At the same time, over the program’s first three years, the program generated a $1.6 billion net benefit for the nine states along with a net increase of 16,000 jobs.
Renewable portfolio standards (RPS) exist in 30 states and have been used for upwards of two decades to spur renewable energy installation while delivering emission reductions. As an example, analysis by the Minnesota Department of Commerce through 2012 shows all Minnesota utilities on track with their targets under the state's Renewable Energy Standard while most ratepayers were experiencing lower costs.\textsuperscript{15} In Kansas, wind projects developed under the RPS have resulted in more than 12,000 jobs and $13.7 million annually in lease payments for landowners and developers.\textsuperscript{16}

Energy efficiency resource standards (EERS) or mandatory energy efficiency investment programs exist in 25 states. Efficiency Vermont, which produced 1.8 percent reduction in annual electricity consumption in 2012, is expected to yield lifetime savings for customers of $136.1 million from an investment of $57.1 million. On the other side of the country, California has reduced ratepayer bills by $78 billion over the life of its energy efficiency program, which has existed in some form since the 1970s.\textsuperscript{17,18} Arizona has implemented an aggressive energy efficiency program, with 1-2% reductions expected each year. Since 2005, the program has saved Arizona Public Service Co. customers over $700 million.\textsuperscript{19}

Beyond EERS, RPS, and market-based emission reduction programs, states, utilities, and grid operators (RTOs/ISOs) have gained experience with a range of advanced energy policies that capitalize on beyond the fence line technologies. Demand response rules in the PJM wholesale market reduce PJM's need to build additional generating units and result in savings of over $275 million annually.\textsuperscript{20} Another effective program type that results in reduced emissions provides incentives for combined heat and power (CHP), such as the one run by Maryland utility Pepco. Pepco's CHP incentive program offers generous credits for electric production or capacity.\textsuperscript{21,22,23} Legislatures also play an active role in establishing advanced energy policies. For example, Colorado recently enacted the Clean Air–Clean Jobs Act, under which Xcel Energy, Colorado's largest utility, anticipates it will decrease its carbon emissions 28% through 2020.\textsuperscript{24} These examples only scratch the surface of the experience states and utilities have in working with beyond the fence line technologies.

A system-based approach also allows for ready incorporation of emerging and future technologies that reduce emissions into 111(d) compliance plans over time. As the electricity system evolves to include newer technologies such as electric vehicles, a system-based approach will enable the recognition of their emission reduction benefits. EPA and the states should be prepared to adapt to changes in the electric power system and avoid discouraging future enhancements to the system.

Given that these policies and programs are well established, the technologies they incentivize have large markets, and implementation of those technologies results in lower compliance costs and other benefits to the power system, AEE sees little reason for EPA not to use a system-based approach to the BSER. It should be noted that EPA could implement a system-based approach in the form of either a mass-based (tons of emissions per year) guideline or a rate-based (pounds of emission per MWh) guideline or a combination of the two. AEE believes that either approach to the federal guideline would work, although we do see some potential efficiencies in the mass-
based approach when it comes to incorporating solutions beyond the fence line, including crediting and verification.

**Allow States To Take a System-Based Approach To Compliance**

Just as EPA should use a system-based approach in establishing the BSER, EPA should allow states to use a system-based approach to compliance. Such an approach would allow states to incorporate beyond the fence line options such as renewable energy, energy efficiency, demand response, etc. States’ ability to take advantage of these technologies throughout the power system will both increase cost-effective emission reduction options and enable states to develop higher performing energy systems.

President Obama has explicitly asked EPA, in carrying out its charge to guide states in plan development, “to build on state leadership, provide flexibility, and take advantage of a wide range of energy sources and technologies.”25 As noted above, states have many years of experience successfully implementing policies and programs that result in emission reduction using a variety of energy technologies and services.

A consistent theme in these policy efforts is extensive use of technology options beyond the fence line of electric generating units, such as renewable energy, energy efficiency, demand response, line loss improvements, etc. So as EPA looks to build on state experience in a way that allows states flexibility in strategy and technology, it is critical that EPA allow states to use a system-based approach to carbon reduction incorporating beyond the fence line technologies. Such an approach will allow states to leverage the full suite of cost-effective options and choose the technology mix best suited to their own energy circumstances.

As detailed above, states have deep experience with policy mechanisms for beyond the fence line technologies that can help to achieve their emission reduction standards. States should be given the opportunity to implement or enhance existing RPS or EERS policies as part of their 111(d) implementation plans, as these policies have been effective in reducing emissions in the past.26

In allowing for a system-based approach to emissions reduction, EPA should also provide states the option to utilize a mass-based standard. EPA has experience setting both rate-based and mass-based standards under the Clean Air Act.27 Regardless of the form of target EPA establishes in the federal guideline, EPA should accept either mass-based or rate-based standards in the state implementation plans. In allowing the states to have the flexibility to choose between the two types of standards, EPA must provide guidance on equivalency between the mass-based and rate-based standards in order to translate the guideline across states.

**Provide States with Model Approaches and Equivalency Criteria**

The timeline that President Obama laid out for Section 111(d) implementation calls for EPA to finalize its guidelines by June 1, 2015 and for states to submit their plans for implementation by June 30, 2016.28 That means states will have thirteen months to establish a plan for implementing greenhouse gas reduction standards once they are set. That time period, while sufficient, places a
premium on efficient work given that planning will require coordination across a state’s environmental agency, energy agency, and public utility regulatory body.

At the same time, states have a legitimate need for flexibility in terms of the approaches they are able to deploy to reduce emissions. Each state has different energy circumstances, including its generation mix, available transmission, electricity demand, and resources for new generation. Therefore, states need to be able to leverage their unique combination of assets to develop the plan that results in the best outcomes for their local circumstances. Some states may choose to transition to advanced energy generation sources, such as wind and solar, while other states may rely more heavily on reducing demand through energy efficiency. Regardless of the pathway chosen, EPA should allow for any mix of technologies or strategies for reducing greenhouse gases, as long as the reductions are real. As a result, EPA needs to create different pathways for meeting the guideline that are flexible enough to accommodate variation in state circumstances.

While flexibility for states is important, there is a simultaneous need for confidence that the actions taken in each state are real. The business community needs to know that, despite variation in the approaches taken to emissions reduction across the states, each state’s approach will verifiably lead to compliance with the guidelines created by EPA. Businesses need certainty to effectively plan operations, so uncertainty about the credibility of approaches in states would be counterproductive.

AEE believes that EPA can help achieve the needs for ease of implementation, flexibility in approach, and veracity of results by providing states with model plans as well as equivalency criteria that states could use to demonstrate the equivalency of their own alternative approach. Under this approach, states would still have many options for implementing a performance standard, and would even have the option of developing their own alternative plans, without facing overwhelming uncertainty around the demonstration of equivalency. Critically, it would help avoid the highly undesirable situation in which a state develops a plan that EPA has to reject during review. While this approach provides flexibility to states, its transparency would simultaneously bolster the confidence of all stakeholders that states will all achieve real, verifiable emission reduction. This model approach could serve as a backup state plan that could be implemented for states that have customized plans rejected by EPA. It provides a ready, known alternative should a state’s plan fail short of the established criteria.

Support Regional Coordination for State Plan Development

Neither greenhouse gas emissions nor energy markets respect political boundaries, so EPA should allow and facilitate the development of coordinated 111(d) implementation plans across states. Regional approaches help deal with technical challenges such as cross-state power flow and crediting, but most importantly, analysis consistently shows that regional approaches lower implementation costs. Simultaneously, they facilitate the work of the business community responsible for carrying out emission reductions by reducing the number of markets and variability between markets. As long as each individual state meets the federal guideline, there is little downside and great benefit to regional coordination.
The chemical and physical nature of greenhouse gas emissions dictate that they do not remain within a political jurisdiction but rather travel from the point source to the atmosphere where they are transmitted vast distances. Electrons likewise do not stop at the state line but instead travel wherever our interconnected transmission networks take them. Given that both the output (electrons) and regulated side effect (carbon emissions) of our energy system travel beyond state boundaries, there are benefits to regional coordination in state plan development.

Since electricity crosses state boundaries, such that states are generally either net importers or exporters of electricity, crediting for compliance action taken under Section 111(d) could be challenging. For example, if an emitting power plant in one state that exports power to another state is closed, it raises the question as to which state should get credit for the emission reduction. Regional coordination can help address these types of issues by effectively expanding the compliance area to include both states.

At the same time, regional coordination can help to reduce compliance costs by opening up a greater pool of cost effective compliance options across the states. By expanding the geographic areas available to states, a regional approach provides states with greater flexibility to find the most efficient mix of approaches. In the process, regional coordination will simplify the work of the business community that will be responsible for implementing emission reduction. By effectively decreasing the number of market structures or at least the degree of variability across those market structures, regional approaches would decrease time lost to navigating the rules of each market, increase market transparency, and increase competition, ultimately leading to lower implementation costs.

Fortunately, the U.S. power system is already well suited for these kinds of regional agreements, as more than half of the states (and two-thirds of electricity consumers) are already located in competitive power markets that are governed by members of the ISO/RTO Council. These regional ISO/RTOs group together power markets across a set of states, such as New England or the Mid-Atlantic region. With these states working together in existing regional organizations, much of the infrastructure for regional coordination is already in place. With some guidance from EPA, states could employ this infrastructure to take advantage of the many benefits of regionally coordinated plans.

**Provide Specific Guidance to States Regarding EM&V and Greenhouse Gas Crediting**

Regardless of the form of the emissions standard, whether rate-based or mass-based, beyond the fence line technologies can and must be allowed as options for emission reduction in state plans. Beyond the fence line technologies, including low or zero emitting generators (e.g., wind or solar energy) and demand side management (e.g., building and behavioral energy efficiency) are critical tools for efficient emission reductions from the power sector. Incorporation of these technologies will lower the cost of any performance standard for carbon emission reduction, while allowing states to maximize economic, energy system performance, and environmental outcomes.

To facilitate the incorporation of these resources into plans and ensure consistency across the plans, EPA should provide states with specific guidance regarding two technical issues: evaluation, measurement, and verification (EM&V) and greenhouse gas crediting. The need for such guidance
is substantial. As an example, a number of states have indicated to our member companies that, without a strong signal in the upcoming EPA proposal with respect to how energy efficiency savings will be counted, states will have a difficult time incorporating efficiency into their implementation plans. In developing its guidance for states on both issues, EPA needs to balance the needs for accuracy and administrative ease.

In terms of EM&V, EPA should avoid trying to reinvent the wheel and instead recognize the well-established EM&V protocols that have been used for many years by utilities and states for energy efficiency programs and the private sector for privately contracted energy efficiency projects. In the proposal or accompanying technical support documents, EPA should, for example, pre-approve current and future EM&V approaches developed by other experienced entities. Such approaches include but are not limited to the U.S. Department of Energy’s (DOE’s) Uniform Methods Project’s protocols, International Performance Measurement and Verification Protocol (IPMVP), protocol recommendations made by the State and Local Energy Efficiency Action (SEE Action), and the savings databases used by many states and public utility commissions.34,35,36

When it comes to greenhouse gas crediting methodologies for low/zero emitting generators and demand reduction technologies and services, EPA needs to provide states with specific guidance as to approved methodologies. There are a number of potential methodologies depending on whether a mass- or rate-based system of accounting is deployed (e.g., crediting relative to benchmark emission rates, crediting based on marginal emission calculations, and crediting using power system modeling).37 Tools conceptually similar to EPA’s recently released AVOIDed Emissions and geneRation Tool” (AVERT) but incorporating more beyond the fence line technologies and solutions could help reduce the learning curve.38

**Conclusion**

AEE believes that properly implemented 111(d) standards can help the United States move toward a higher performing energy system for the 21st Century. We thank EPA for its consideration of the principles offered by AEE to guide the Agency and the states in implementation and the specific recommendations for EPA’s upcoming proposed guideline. We look forward to working with the Agency to provide any additional information or clarification. AEE and its state partner organizations represent roughly 1,000 organizations from across the advanced energy industry. We offer EPA the individual and collective expertise of this wide network of advanced energy firms to answer any questions about this regulatory development. For questions or additional information, please contact Matt Stanberry, AEE’s Director of Industry Analysis, at mstanberry@ae.net or 919-423-8897.
1 Advanced Energy Economy, http://www.aee.net
2 EPA has asked for input from stakeholders through a number of avenues in addition to numerous meetings around the country. The Agency asked its state partners explicit questions, which are available at http://www2.epa.gov/carbon-pollution-standards/questions-state-partners. EPA also held 11 listening sessions around the country (http://www2.epa.gov/carbon-pollution-standards/public-listening-sessions). The Agency also has an open call for comment submission to carbonpollutioninput@epa.gov, through which these comments are submitted.
4 42 U.S.C. § 7411(a)(1)
5 http://nicholasinstitute.duke.edu/sites/default/files/publications/ni_r_13-01.pdf
6 http://emp.lbl.gov/sites/all/files/lbnl-6356e.pdf
7 http://www.seia.org/research-resources/solar-industry-data
8 http://www.aee.org/resources/top-5-reasons-be-energy-efficient
11 http://www.reuters.com/article/2012/01/31/idUS2088824+31-Jan-2012+BW20120131
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Creating a 21st Century Electricity System for New York State

An Energy Industry Working Group Position Paper

February 26, 2014

Process facilitated by Advanced Energy Economy
About this Document and the Working Group

This document summarizes the work, conducted over a three-month period, by an informal Working Group formed following an Advanced Energy Economy (AEE) and MIT-Industrial Performance Center (IPC) led CEO Forum on the 21st Century Electricity System in November 2013.1 Representatives from the following companies and organizations participated in the Working Group:

- Advanced Energy Economy*
- BRIDGE Energy Group
- Central Hudson Gas & Electric
- Conservation Services Group
- Consolidated Edison Company of NY Inc. and Orange & Rockland Utilities, Inc.
- EnerNOC
- Environmental Defense Fund
- General Electric
- Gridco Systems
- Iberdrola USA
- Johnson Controls, Inc.
- Landis+Gyr
- National Grid USA
- New England Clean Energy Council
- New York Independent System Operator
- New York Power Authority
- New York Smart Grid Consortium
- Opower
- PSEG Long Island
- Verizon

* AEE served as the facilitator of the Working Group.

The purpose of this document is to provide leadership and input to regulators, policymakers and other stakeholders on the goals, objectives and considerations that will facilitate the implementation of a vision for the future electricity industry in New York State. This document is a preliminary step prior to what is expected to be a detailed regulatory process. It is not meant to be a substitute for or preempt any aspects of that process. The information contained herein is not based on detailed analysis conducted specifically by the Working Group during the development of this document. Such analysis will need to be done to validate the viability of the vision, as well as the roles of the different stakeholders and the regulatory models to be considered and developed in the future.

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1 For more about the CEO Forums, go to https://www.aee.net/initiatives/21st-century-electricity-system.html.
Executive Summary

The electricity industry is in the midst of dynamic change, with many of the underlying assumptions that have shaped it for decades in transition. This document summarizes the collective thinking of an informal Working Group (WG) that was formed to provide input to New York State policymakers, regulators and other stakeholders on potential changes to the electric utility industry that:

- Better align the state’s utility regulatory framework with the state’s energy, environmental, and economic policy objectives
- Successfully address the underlying technology and market forces shaping the “Utility of the Future”

The forces affecting the electric power industry are creating both challenges and opportunities. Technology developments include increasing deployment of distributed generation (DG), energy efficiency (EE), demand response technologies (DR), and smart grid technologies, products and services. At the same time, customer needs and expectations are changing, including the desire for more self-generation, better control over energy use and costs, and expectations for a more resilient system. New York State also has energy, environmental and economic policy objectives that can only be met with a modernized, efficient electricity system.

These technology, market and policy-driven trends will continue to put pressure on the existing utility business model, yet there is also an opportunity to build upon them to meet the policy objectives of New York State in the most cost-effective and equitable way possible. Achieving this future begins with exploring changes to electricity markets and existing utility business models.

The WG envisions a future electric industry model in New York in which a modernized grid serves as a platform for enabling new capabilities, customer-driven products and services, and creates value for utilities, non-utility companies and customers. This vision is one that:

- Aligns the electricity sector with state policy objectives
- Improves the customer experience and gives customers tools and options for managing electricity costs
- Creates sustainable utility business models that recognize the value of the grid
- Improves market design, operation and coordination
- Encourages innovation
- Moderates future customer bill increases relative to what would otherwise be experienced

To implement this vision, the WG identified three “pillars” that will serve as the foundation for this new model. These are:
Customer Products and Services
The 21st Century Electricity System will drive improvements in core functions such as operations and reliability, additional customer services and greater levels of customer engagement and choice. Grid modernization infrastructure, increased customer participation, and services provided by and to utilities will enhance the core operational capability of the electricity system. As explained below, compared to today, basic services will provide incremental capabilities and services to customers and will be included as part of traditional utility rates. Additional value-added products and services will be provided by utilities and/or non-utility companies. Value-added products and services will allow customers to actively engage more in managing their energy usage or hand off this management to utility or non-utility service providers. Value-added services will typically be market-priced for services such as enhanced reliability or resiliency.

The WG outlined an initial set of basic and value-added services, but there are numerous unresolved policy issues that will need to be addressed, including the roles of utilities and non-utility providers, what is included in competitive markets, and how these markets will function. Issues surrounding rate design for regulated services, metering services and the associated data will also be important considerations for the future industry model.

Network Infrastructure and Operational Model
As New York’s distribution utilities plan and invest for the future, their network infrastructure requirements will be shaped by a number of industry dynamics and emerging technologies. The ability of the grid to accommodate a high volume of distributed energy resources (DER), smart grid technologies, demand response, and additional loads from electric vehicles require an evaluation of necessary network infrastructure and operational requirements. Moreover, certain customers and customer classes will seek increased access to more information and empowerment regarding their energy usage. Reliability and grid resiliency also need to be addressed as a result of changing customer and community expectations as well as an ever-growing reliance on electricity, in light of an anticipated increase in severe weather events. All of these requirements must be delivered while maintaining data security in the face of a rising threat of cyber events. To effectively manage these dynamics, the Utility of the Future must build out an infrastructure that provides the network operator with a fundamentally new set of functions and capabilities. Managing this complex system will require development or expansion of two-way, low-latency communication infrastructure and control schemes to integrate distributed resources and controllable loads.

Deploying the infrastructure required to enable the future industry model will entail significant investment over a sustained period of time. This raises numerous questions and considerations with respect to cost recovery, prioritization of which capabilities to deploy first, and to which customers and which parts of the network. Valuing DER is a key consideration, as DER is
expected to play an important role in providing grid services to the utility. It will be important to assess the costs as well as the direct and indirect broad benefits of this new model, and to move forward in a way that provides net benefits to customers.

**Regulatory Framework**

Many jurisdictions, including New York, have made adjustments to traditional ratemaking to adapt to the changing industry dynamic with mechanisms such as capital trackers, revenue decoupling and flexible alternative regulation schemes. To foster increasing investment in grid modernization, these methodologies can be broadened and enhanced. The WG envisions advancing to an increasingly flexible and performance-oriented regulatory system that is designed to accomplish the following core objectives:

- Facilitate the attraction of capital and investment in advanced grid infrastructure
- Support continued resource diversity, e.g., demand response, energy efficiency, renewable supply, distributed generation
- Empower consumers with the information and tools to better manage their energy consumption, especially peak demand, and enable value-added products and services
- Enhance the reliability and resiliency of the grid
- Ensure the long-run financial viability of the distribution utility franchise
- Moderate future customer bill impacts through efficient utility investment and operations

The WG recommends that any changes to the regulatory approach in New York should be based on the following guiding principles:

1. Maintain effective aspects of the current regulatory approach that will serve as the foundation for the future
2. Modify the regulatory approach to realize the future model, in particular:
   - Supplement traditional cost of service regulation with symmetric performance incentives
   - Align utility investments to the achievement of state policy objectives
   - Create greater clarity for long-term investments and cost recovery
3. Adjust ratemaking, including rate design, to allocate costs equitably, reflect the true value of the grid, and address structural changes in utility load profiles
4. Improve rate design to allow customers to make informed choices to enhance their value of service, aligned with policy objectives

In the future, utilities may be expected to meet a broader range of performance outcomes in order to successfully transition to the evolving utility model. As the industry transforms, today’s existing measures can be the building blocks for future measures. Currently, utilities’ base level of service is primarily measured on safety, reliability and adequate service. As the definition of base level of service expands, measures will evolve and perhaps even new ones could be
introduced. Where today the focus is on maintaining a certain level of service, tomorrow the focus may shift to enhancing that level of service. The WG identified five broad categories of outcomes that may be established. The categories should focus not only on the outcome – whether we achieved what we set out to achieve – but should also focus on how we get there. The broad “outcome” categories and some possible measures of success that may be considered include:

<table>
<thead>
<tr>
<th>Outcome Category</th>
<th>Description of Possible Measures of Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Engagement</td>
<td>Social media channels, managing energy use/conservation &amp; access to new energy services. Additionally, customer awareness, ability to propagate information &amp; anticipate customer needs.</td>
</tr>
<tr>
<td>Advancement of Clean Energy Goals</td>
<td>Clean energy policies, providing support to accommodate significant DER &amp; further reductions in GHG emissions.</td>
</tr>
<tr>
<td>Operating Safe, Reliable, &amp; Resilient Systems</td>
<td>Network resiliency, self-healing capabilities, adaptability, customer-initiated resiliency solutions.</td>
</tr>
<tr>
<td>Operational Efficiency</td>
<td>Utilization of the network, e.g., efficient asset utilization &amp; load factor management.</td>
</tr>
<tr>
<td>Innovation</td>
<td>Utilities measured on portfolio of projects, ability to be forward looking &amp; processes for looking at new ideas.</td>
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**A New Benefit-Cost Analytical Framework**

The current regulatory framework establishes specific guidance on the rationale for making capital investments. That is, investments are justified on the basis of reliability, risk reduction, safety, and economic and environmental benefits to customers. A broader business-case, considering value to customers and societal benefits that meet State policy goals, would more fully account for the effects of new technologies and justify support for the investments that may be needed to support overall state policy objectives. Many of the benefits of the investments necessary to realize the vision described in this document will accrue to others – energy service and technology providers and local economies – and not directly to utilities or the customers they serve. As a result, traditional benefit-cost analysis that compares estimated consumer savings to estimated consumer costs may not capture all of the claimed benefits, thus limiting a utilities’ ability to justify the investments necessary to make this vision a reality. Consideration should also be given to risk and uncertainty within the broader framework.
The Path Forward
The utility industry model is at a crossroads: it will have to adapt to (1) meet future customer expectations and needs, (2) promote and integrate clean energy, (3) adopt new technologies, and (4) drive economic growth. A long-term view is essential to maintain the proper alignment and reinforce these elements. It should also set the customer at the center of the new paradigm. The new industry model will need to provide sufficient clarity and certainty such that both utilities and non-utility companies can develop and implement business plans that serve the customer and achieve the desired outcomes. The WG invites a dialogue with other stakeholders to further refine its vision.
Advanced Energy in Arkansas

Arkansas has emerged to take a leading role in the burgeoning advanced energy industry, which encompasses all the technologies, products, and services that make energy in the U.S. more secure, clean, and affordable.

Advanced energy is characterized by the benefits it provides in the field and in the marketplace. Electric and plug-in hybrid cars, lightweight composites for airplane bodies, natural gas fueled trucks, high-performance buildings, more efficient industrial processes, and the latest wind, solar, and nuclear technologies – these are all advanced energy, as they use energy more productively, diversify energy sources, and reduce health and environmental costs.

Advanced Energy Companies in Arkansas

At a time when company growth and job creation are at a premium, advanced energy in Arkansas has been a source for both:

- Arkansas Advanced Energy Association has 21 member companies with over 1,000 workers.
- Advanced energy companies can be found all across the state.
- Arkansas has more than 100 companies with operations in the state tied to advanced energy, employing an estimated 10,000 to 15,000 Arkansans.

Why Advanced Energy Companies are Good for Arkansas

The wind energy manufacturing industry is particularly strong in Arkansas, with turbine manufacturer Nordex investing over $100 million in its Jonesboro plant and LM WindPower creating over 300 jobs at its Little Rock facility. As a result, German steel component manufacturer Beckmann Volmer and others have developed facilities nearby.

The state is home to a diverse array of companies involved in everything from energy efficiency to geothermal power. One example is NexGen Illumination, which manufactures LEDs and leads the niche LED poultry house lighting market. Biofuel companies are also flourishing in Arkansas, with FutureFuel Chemical Co. employing over 500 people to support its biodiesel production facility.

In an entirely different realm, Clean Line Energy Partners, a developer of high voltage transmission lines, plans to invest $600 million in Arkansas to transmit wind energy across the state from Oklahoma to TVA.
Why Arkansas is Good for Advanced Energy Businesses

Business Climate:
Arkansas presents companies with an attractive business environment and low cost of living. In a recent CNBC study, the state was ranked number one in the country for cost of doing business, as a right-to-work state with a relatively low corporate tax rate.

Policy:
Arkansas' energy consumption per capita (365 million Btu) ranked it 17th highest in the United States in 2009. As a result, Arkansas spends a significant portion of its gross state product on energy (see chart below). Most of this energy must be imported. For example, over 47% of Arkansas's electricity is generated by coal, which is extremely limited in state. The situation has prompted policymakers to encourage advanced energy development as a mechanism for reducing energy costs and keeping energy spending in state. In late 2010, Arkansas became the first southeastern state to enact an Energy Efficiency Resource Standard (EERS). To support efficiency measures at utilities, Arkansas has "decoupled" its natural gas industry, although there are no decoupling laws for electricity. These efficiency policies complement the state's wind manufacturing incentive, which has drawn new manufacturers to Arkansas. For advanced transportation, the Arkansas Alternative Fuels Development Fund provides incentives for capital projects, operations, production, and distribution of alternative fuel in state.

Location and Infrastructure:
Arkansas has rail and trucking freight industries that leverage the state's central location to move goods across the country. Arkansas has ready access to the shipping lanes of the Arkansas and Mississippi Rivers, which provide critical connections to the Gulf of Mexico. Companies ranging from wind manufacturing to biodiesel industries rely on this linkage to the Gulf for both component sourcing and product distribution.


Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years. Consolidated Data File (11.1 million records), May 2010.
In a recent CNBC study, Arkansas was ranked number one in the country for cost of doing business.

Supportive Programs and Institutions:
Research in the advanced energy industry is being performed at top universities and research centers in Arkansas, including the University of Central Arkansas, Arkansas Research and Technology Park, National Center for Appropriate Technology, University of Arkansas, Arkansas State University, and Philander Smith University. Pulaski Technical College and NorthWest Arkansas Community College have established a Building Training Center of Excellence to train energy auditors, energy raters, weatherization workers, and workers in the heating and cooling industries.

Resources:
Arkansas also has natural resources, including biomass and geothermal, for the advanced energy industry to leverage. The map depicts the state's strong biomass resources.
This material developed and published by Arkansas Advanced Energy Association; Advanced Energy Economy, a national industry association of which AAEA is Arkansas' state chapter; and their respective charitable affiliates, the Arkansas Advanced Energy Foundation and the AEE Institute.