
# Smart Grid Outreach and Communication Strategy: The Next Steps

# Recommendations for the U.S. Department of Energy

**A Report by**
**The Electricity Advisory Committee**
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# EAC Smart Grid Outreach White Paper

# 1 Glossary of Terms and Abbreviations

AARP – American Association of Retired Persons
AHAM - Association of Home Appliance Manufacturers
AMI – Advanced Metering Infrastructure
APPA – American Public Power Association
ARPA-E – Advanced Research Projects Agency-Energy
ARRA – American Recovery and Reinvestment Act of 2009
CFA – Consumer Federation of America
DOE – U.S. Department of Energy
DRSG – Demand Response and Smart Grid Coalition
EAC – Electricity Advisory Committee
EEI – Edison Electric Institute
EISA – Energy Independence and Security Act of 2007
EPRI – Electric Power Research Institute
FISR – Fault Isolation and Service Restoration
GPON – Gigabit Passive Optic Network
IEC – International Electrotechnical Commission
IEEE – Institute of Electrical and Electronics Engineers
ISO – Independent System Operator
MOU – Memorandum of Understanding
NAESB – North American Energy Standards Board
NARUC – National Association of Regulatory Utility Commissioners
NASEO – National Association of State Energy Officials
NASPI – North American Synchrophasor Initiative
NASUCA – National Association of State Utility Consumer Advocates
NCLC – National Consumer Law Center
NCSL – National Conference of State Legislatures
NEMA - National Electrical Manufacturers Association
NGA – National Governors Association
NIST – National Institute of Standards and Technology
NRECA – National Rural Electric Cooperative Association
NRRI - Natural Resources Research Institute
OE – DOE's Office of Electricity Delivery and Energy Reliability
O&M – Operations and Maintenance
R&D – Research and Development
SAIDI – System Average Interruption Duration Index
SCADA –Supervisory Control and Data Acquisition System
SGDP – Smart Grid Energy Demonstration Projects
SGIG – Smart Grid Investment Grant program

## 2 Executive Summary: EAC Smart Grid Recommendations to DOE

As part of its support for the US Department of Energy (DOE), the Electricity Advisory Committee (EAC) is pleased to provide this paper with recommendations for DOE in the area of smart grid outreach. There are many smart grid programs, both ones sponsored by DOE and ones without DOE sponsorship, and substantial amounts of data and feedback that is beginning to flow into the information banks. At this opportune time, DOE is poised to play a pivotal role in sharing lessons learned and supporting those seeking to expand their smart grid efforts in the most cost-effective manner. By building upon its existing outreach and materially expanding its communications with a number of stakeholders, DOE can fully meet the intent of the 2007 EISA legislation that established its primary role in smart grid development.

- DOE should focus on developing a process to systematically understand and communicate benefits and lessons learned by supplementing and shifting from its current one-way effort to a two-way smart grid outreach and communications program. DOE should solicit feedback from key stakeholders, existing Focus Groups and Partners to improve its outreach and, where aligned with meeting its statutory objectives, refine its research, funding, work force efforts, and policies.

- Create a matrix of information on smartgrid.gov that enables users of smart grid techniques and technologies to quickly find the results and benefits of smart grid case studies that are comparable to their situation. Data needs to be classified and categorized to make it easy for users to find, sort, and use.

- To maximize its outreach, DOE should identify Partners that have established smart grid outreach infrastructure and collaborate with them to disseminate information through existing communication channels that they have developed with their constituents.

- DOE should develop a series of policy papers focused on the following issues, describing the potential for smart grid deployment to contribute to their positive resolution:
  - Aging infrastructure and required investment
  - Enhancing grid reliability and resilience
  - Renewables integration and environmental improvement
  - Cyber-security
  - Aging workforce and the need to achieve operational efficiencies

- DOE should develop a comprehensive information dissemination strategy covering costs, benefits, risks, and the communication methods that DOE intends to use. DOE should continue to post findings on smartgrid.gov and expand on it. The website will become one component of a much broader public outreach plan to meet constituents' smart grid information needs. Near-term outreach efforts should be focused on the states and state commissions (e.g., NARUC, regulators and commission staff) by providing information that will promote their understanding of existing and future smart grid technologies and the associated costs and benefits to facilitate acceptance[1], certainty, and adaptation.

[1] There will be a future paper released by the EAC that focuses on Customer Acceptance of Smart Grid technologies.

- DOE's resources should reflect this new outreach focus, with designated staff that has the responsibility for public outreach and message management disseminated through a wide range of mechanisms. It should include sufficient resources to implement a multi-year program.

## 3 What are the objectives of this paper? How can DOE enhance its smart grid outreach efforts?

The objective of this paper is to recommend ways for DOE to enhance its outreach efforts to states and other key stakeholders. These stakeholders include utility regulators; other state energy officials; consumer groups; utilities, municipal utilities, cooperatives and utility trade associations; technical organizations; equipment manufacturers; and others in a position to directly influence customers and their members with regard to smart grid efforts. These efforts are critical now to build on the lessons and early findings from both DOE and non-DOE smart grid projects to enable continued development. The Recovery Act projects provide a particularly invaluable resource of benefit realization and lessons learned that provide the information needed to articulate the value proposition of smart grid technologies. Without such outreach, the EAC believes that DOE can potentially lose or delay the opportunity to achieve more widespread smart grid benefits from deploying key technologies on a broader scale. Thus, time is of the essence to capture case study material, measure system impacts, and quantify and communicate the costs and benefits achieved.

There are tangible benefits that DOE can already identify emerging from DOE and non-DOE smart grid projects. DOE can undertake many efforts, as described below, to disseminate key messages from these projects and from targeted case studies. These dissemination efforts can:

1) Demonstrate benefits in a number of areas;
2) Reduce possible policy, cost, technology, market design, and decision making barriers; and
3) Identify workforce constraints that will help drive DOE's research, development, and other programs.

In doing this, however, it will be important for DOE to accurately portray the information it has gathered, and to acknowledge potential downsides and technology limitations. To do otherwise would risk making DOE appear to be a "cheerleader" rather than an unbiased source of smart grid information and research.

As both the DOE and non-DOE projects gather more information on their experiences in operating the smart grid technologies and systems, the outreach emphasis should shift to effectively communicating results, lessons learned, impacts, costs, and benefits realized from these projects. To support the sustained development of the smart grid across the United States, power systems, utilities, consumers, and industry need to be shown the actual costs and benefits realized by existing projects, and be made aware of potential pitfalls. Therefore, the EAC believes it is necessary for DOE, in support of the national policy, to advance grid modernization, and to widely disseminate customized assessments of smart grid costs and benefits, backed by strong evidence from ongoing smart grid activities.

One thesis of this paper is that effective outreach involves two-way communication. By this, the EAC means that DOE should both share its smart grid findings with stakeholders, and also receive ongoing feedback from industry organizations, regulators, customers, and others. The substance of this communication could focus on what information will be most effective in assessing smart grid opportunities; on the incremental lessons and benefits from projects; on the substance of DOE's outreach materials and messages; on the research and development (R&D) efforts that would be most effective; on workforce needs; and on how DOE's outreach should be best targeted.

The rest of this paper is organized as follows:

- Section II describes the larger strategic purposes of DOE's involvement in the smart grid;
- Section III identifies what the EAC believes should be the focus of DOE's outreach process;
- Section IV delineates the benefits emerging from the demonstration of smart grid projects nationwide;
- Section V describes the need to match the benefits with the appropriate stakeholders in DOE's outreach efforts; and
- Section VI provides a number of EAC smart grid outreach recommendations to the DOE going forward.

## 4 What are the larger purposes of DOE's smart grid effort, and what does this imply for DOE's outreach activities?

Based on the provisions of both the Energy Independence and Security Act of 2007 (EISA) and the American Recovery and Reinvestment Act of 2009 (ARRA), it is clear that DOE has significant responsibilities to conduct smart grid research and to promote the awareness, integration, and standardization of smart grid technologies into the power industry. Further, it is clear from these mandates that DOE needs to coordinate and conduct proactive outreach with other agencies and stakeholders in the energy industry to effectively carry out the legislations' objectives.

For example, the Energy Independence and Security Act of 2007 (EISA) made it "the policy of the United States to support the modernization of the Nation's electricity transmission and distribution system to maintain a reliable and secure electricity infrastructure that can meet future demand growth and to achieve [specified objectives], which together characterize a Smart Grid." EISA, Section 1301.

In EISA Section 1304(a), Congress then assigned a number of specific smart grid responsibilities to the DOE, including:

- Developing advanced techniques to measure peak load and energy efficiency savings;
- Researching wide area measurement and control networks;
- Testing new reliability technologies in a control room environment;
- Identifying needed communication network capacity to accommodate advance technologies;
- Developing algorithms to use in electric transmission applications; and
- Investigating the feasibility of a transition to alternative tariffs (which smart meters could convey).

EISA also authorized the Smart Grid Investment Grant (Section 1306) and Demonstration (Section 1304 (b)) Programs, for which funding was subsequently appropriated in the American Recovery and Reinvestment Act of 2009. As described elsewhere in this paper, DOE has a highly proactive effort in place to gather data, identify lessons learned, determine benefits and costs, and communicate such findings in the public domain, which the recommendations of this paper are designed to supplement.

EISA further mandated the creation of a Smart Grid Task Force under the direction of the Assistant Secretary for the Office of Electricity Delivery and Energy Reliability (OE) to "embody the Federal role in the national transition toward development and use of smart grid technologies." Its mission is "to ensure awareness, coordination and integration of … activities … in the Federal Government related to smart-grid technologies and practices…". Task force members include Department employees "who have responsibilities related to the transition to smart-grid technologies and practices." EISA, Section 1303 (b).

The requirement in this section for the Task Force to raise awareness and to coordinate Federal smart grid activities justifies a strong outreach role for DOE.

Moreover, EISA directs DOE to report to Congress every two years on "the status of smart grid deployments nationwide and any regulatory or government barriers to continued deployment," including, "information on technology penetration, communications network capabilities, costs, and obstacles," and any "recommendations for State and Federal policies or actions helpful to facilitate the transition to a smart grid." EISA, Section 1302.

These statutory requirements continue to provide policy direction for DOE's Smart Grid Research and Development program. EISA directs that this research be undertaken in consultation with FERC, other agencies, electric utilities, the States, and other stakeholders. EISA, Section 1304 (a). Such consultation should be on-going and incorporate a sharing of lessons learned as smart grid technologies and practices are implemented. Moreover, the program's purpose is to advance national policy to support the modernization of the transmission and distribution system. This modernization will be undertaken by electric utilities, under the supervision of Federal and State regulatory authorities or local governments, and with input and involvement by a broad range of stakeholders. Given the number of utilities, agencies, and stakeholders involved, effective outreach by DOE will be needed to realize the policy objectives set forth in EISA.[2]

## 5 What should be the focus of DOE's outreach process?

As authorized in the EISA (2007) and ARRA (2009) legislation, the DOE's smart grid programs (the Smart Grid Investment Grant Program and the Smart Grid Demonstration Program) are $9.0 billion public-private partnership to accelerate investments in grid modernization. The Federal government's contribution to this initiative was $4.0 billion from ARRA funds, with industry providing the rest. DOE selected 99 grant projects covering almost all states through a merit-based competitive selection process in the grant program. The smart grid demonstration program, consisting of another 32 projects, added an additional $770 million in storage projects and $876 million in regional projects to DOE's smart grid efforts. Many utilities and other organizations have spent billions in funds to match DOE grants, and on smart grid programs initiated without DOE support.

DOE has considerable outreach efforts underway to communicate lessons and best practices as they emerge from the ARRA smart grid projects that are in progress. DOE is well aware of the need to effectively communicate the results of the SGIG and SGDP programs (as well as non-DOE smart grid efforts) to help serve as a catalyst for smart grid deployment.

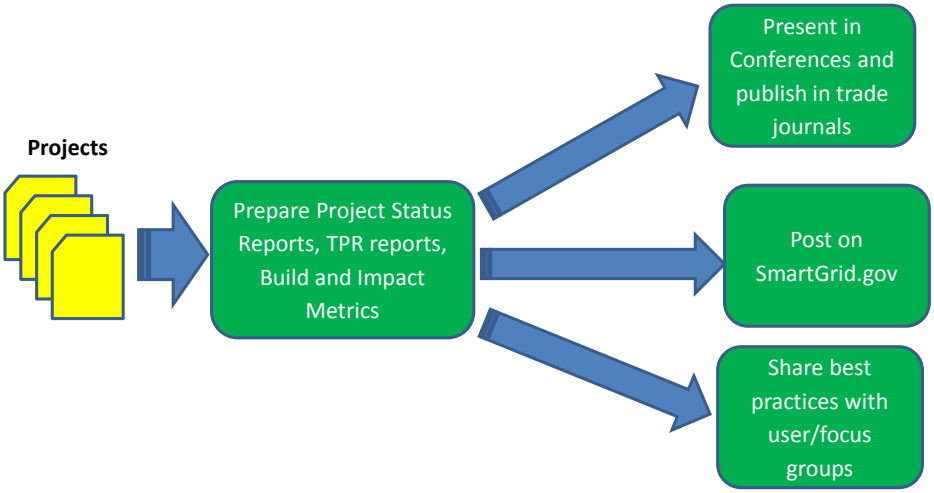
DOE's current outreach approach for disseminating the progress and results of its smart grid projects will encompass various forms of communication, including:

[2] EISA directs the Secretary of Energy to appoint a Federal Smart Grid Advisory Committee, either as an independent entity or as a designated sub-part of a larger advisory committee on electricity matters, to advise the Secretary, Assistant Secretary, and other Federal officials, "concerning the development of smart grid technologies, the progress of a national transition to the use of smart-grid technologies and services, the evolution of widely-accepted technical and practical standards and protocols to allow interoperability and inter-communication among smart-grid capable devices, and the optimum means of using Federal incentive authority to encourage such progress." EISA Section 1303 (a) (2). The EAC's Smart Grid Subcommittee has been so designated by the Secretary. This report is an instance of such advice.

1) Presenting at conferences such as those organized by NARUC, IEEE, EEI, APPA, NRECA, NASUCA, Distributech, and other industry associations and organizations;
2) Publishing in trade journals;
3) Posting information in the www.Smartgrid.gov website;
4) Issuing project status and results reports;
5) Creating and facilitating focus groups consisting of current project teams targeted toward sharing best practices; and
6) Funding topical studies.[3]

The figure below summarizes the current DOE outreach process.

Figure 1
**CURRENT DOE OUTREACH SMART GRID PROCESS**




These efforts, while laudable, are principally a one-way effort to "push" information to the market, using a single website as the primary venue for communicating results.

To enhance the value of DOE's outreach efforts, the EAC recommends that DOE adopt a more strategic, two-way communications approach that identifies and responds to the information needs of the stakeholders[4]. This requires identifying stakeholder information needs and the most appropriate means for exchanging the information. A process needs to be established that systematically captures and disseminates smart grid findings, lessons, costs and benefits, and barriers. For a two-way process to be effective, an exchange of perspectives is required, rather than a one-way presentation of information.

The key is to talk *with* stakeholders rather than *at* stakeholders, and thus create an atmosphere for honest dialogue and exchange of ideas. This will lead to improved decision making in two ways:

a) By providing stakeholders with access to experiential lessons and

[3] DOE is funding a number of technology-based studies, which Sandia National Laboratories is developing into a series of papers. These papers will emphasize the value streams from these technologies, which include: Advance Metering Infrastructure (AMI); Operations and Maintenance Improvements; Distribution Automation (e.g., system reliability, reconfiguration, feeder switching, sensors); Automated Volt-Var Control; and Sychrophasor Application.

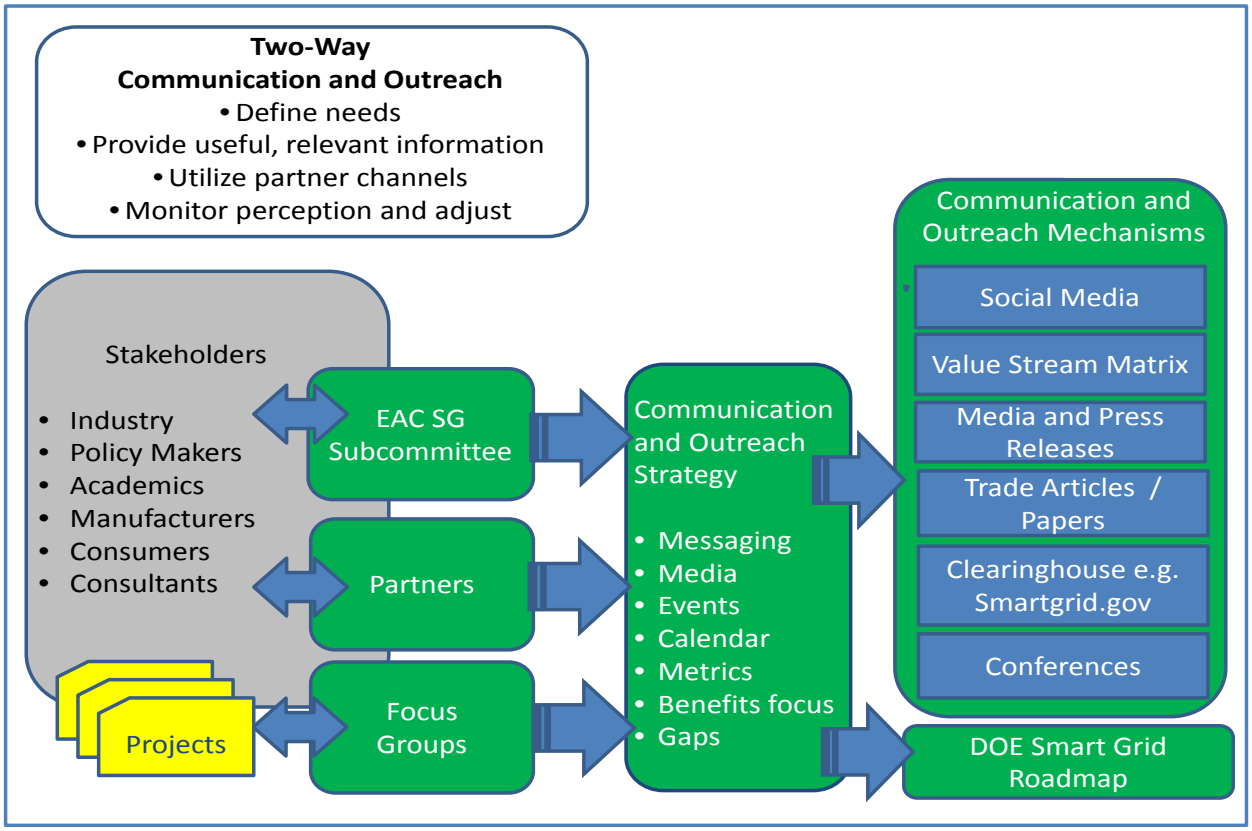
[4] See discussion of "stakeholders" on page 7

b) By providing DOE with effective communication channels where DOE can collect and access incremental input for its findings, and identify changes in perceptions.

Two-way information flow effectively builds outreach messaging; communicates value streams / benefits; and drives incremental R&D, policy, and workforce development efforts. This continuous two-way communication can become a primary input to a roadmap that frames and prioritizes the activities (by DOE and others) needed to overcome existing barriers that restrict smart grid advancement and scalability.

Key components to this recommended Smart Grid Outreach and Feedback Process include Partners, Key Stakeholders, and Focus Groups. This process is established to better engage with stakeholders that will result in a Communication and Outreach Strategy for Smart Grid Constituents that is effectively implemented by a stand-alone group in DOE; having responsibility for public outreach that will coordinate messaging through a wide range of mechanisms, including but not limited to the existing DOE website, smartgrid.gov. Because of the broad stakeholder base, DOE will receive structured feedback through Focus Groups, Partners, and Key Stakeholders, which will be further validated through social media. The process is illustrated below, followed by a description of each key component.

Figure 2
**EAC-RECOMMENDED SMART GRID OUTREACH AND FEEDBACK PROCESS**



## Key Smart Grid Stakeholders

Stakeholders are utilities, policy makers, academics, manufacturers and others who are directly involved in smart grid innovation, development, policy-making, implementation, and technologies. It is important to define their needs and capture the lessons, benefits, costs, and challenges of smart grid deployment in a factual manner, in both positive and not-so-positive situations. It is important to capture all facets to create balanced messaging. In addition, the gaps are useful insights to guide future research, policy, and workforce developments. DOE should adjust the information and approach to these stakeholders over time, as perceptions and needs change.

## Partners

The EAC recommends that DOE forge partnerships with others that have established infrastructure with a mission to implement smart grid outreach activities. Partners will likely represent stakeholder groups that can be used to effectively conduct communications; gather information and perspectives from stakeholders; customize and coordinate messages focused on costs and key benefits for the respective stakeholder groups; and relay over-arching findings through their existing communication channels.

DOE currently works closely or "Partners" with other Federal agencies and departments in communicating its smart grid efforts. The EAC recommends that DOE expand its "Partners" to include state entities, professional organizations, trade associations, and consumer groups to effectively leverage their existing constituencies and communications channels. Where these organizations are objectively capturing and disseminating lessons learned from smart grid implementations, DOE should explore opportunities to collaborate with them[5] and thus multiply DOE's communication and outreach efforts many-fold. For example, these partner entities could include:

- State officials (e.g., NARUC, NRRI, NASEO, NCSL, NGA). DOE has a strong relationship with entities such as NARUC; increased state-specific outreach is a cornerstone of the EAC's recommended approach.[6,7]
- Utility trade associations (e.g., EEI, NRECA, APPA)
- Professional and Standards organizations (e.g., IEEE, IEC, NAESB)
- Consumer and environmental groups (e.g., NASUCA, NCLC, AARP, CFA, NRDC, Sierra Club)
- Smart grid equipment manufacturers (e.g., NEMA, AHAM)
- Research organizations (EPRI, SGIP)

The table in Appendix 2 identifies a number of possible key Partners and their smart grid activities, the relationship to DOE vis-à-vis the smart grid, and potential collaborative DOE outreach opportunities. By working with such Partners, DOE will facilitate the outreach process, providing targeted information to the right organizations in a position to communicate effectively with their members and constituencies, through their channels. Smart Grid Stakeholders will in turn have more formal and established channels for sharing information and perspectives with DOE and each other. The EAC believes that this approach will not only leverage DOE's resources, but will have a much greater impact on grid modernization and in meeting DOE's objectives as established in the EISA legislation.

[5] SGIP both maintains an authoritative catalog of smart grid standards and through its Implementation Methods Committee is gathering information on lessons learned that will be included in the catalog.

[6] The EAC is not recommending that DOE make filings regarding the facts and circumstances of specific state regulatory proceedings, but rather that DOE provide overall information on smart grid best practices, other stakeholder experiences, and the type of benefits and costs that state commissions may wish to consider as part of their decision process.

[7] The EAC recognizes that NARUC has a number of regional entities, as well as a research organization (NRRI), which may be part of DOE's outreach.

**Focus Groups**
DOE has anticipated that Focus Groups would be held as forums for smart grid recipients with like projects to compare findings and share experiences. A Focus Group has been created on consumer behavior focused on the deployment of Automated Meter Reading Infrastructure (AMI) and pricing. NASPI serves as a Focus Group to advance the adoption of synchrophasor technology. DOE is planning to launch additional groups focused on reliability (feeder switching), Volt-VAR control, O&M improvements, and a joint focus group with NASPI on synchrophasors. The EAC recommends expanding Focus Groups' intended role to participate in the outreach process by empowering each of them to systematically collect smart results (including non-DOE smart grid projects), document project lessons and gaps, confirm messaging to be used in the Communication and Outreach Strategy, and recommend the best vehicles to share results and capture input from their respective communities. They should include both recipients and non-recipients of Recovery Act funding. DOE should establish a set of guidelines or criteria for the information and insights they would like to gather from the Focus Group participants, and set a regular timeline for tapping into these groups. This will keep DOE in touch with the "grass roots" of firms as they implement their smart grid programs. Furthermore, since the groups are not firmly established, the EAC recommends that they are organized to align with the benefit structure as proposed in Section IV where there would be a group focused on:

- Reliability and resiliency
- Asset utilization and improved efficiency
- Cyber security
- Accommodating future technologies
- Cost savings and operational benefits
- Economic development
- Retail customer choice and technology acceptance

**EAC Smart Grid Subcommittee**
The EAC Smart Grid Subcommittee has been designated by the Secretary under EISA Section 1303 (a) (2) to the overall direction of DOE's role and means to encourage progress on the national objective of grid modernization. With appropriate consultation, the EAC Smart Grid Subcommittee can periodically provide DOE broader and further feedback on its smart grid communication and outreach efforts. As part of this ongoing relationship, it is recommended that DOE consult with the EAC Smart Grid Subcommittee and develop policy papers focused on the following issues that would describe the potential for smart grid deployment to contribute to their positive resolution:

- Aging infrastructure and required grid investment. Much of the infrastructure in the power system is nearing or has exceeded its expected useful life. Hundreds of billions of dollars of new investment may be required before the end of the decade to refurbish infrastructure to support needs driven by an emerging digital economy. Smart policies and technologies that could reduce investment requirements include: demand optimization to reduce investment requirements and improve asset utilization, volt-VAR optimization, and sensors and condition-based maintenance of equipment.

- Enhancing grid reliability and resilience. As both consumers and critical infrastructure increasingly rely on digital technology, reliability and the ability to restore service to critical end uses become increasingly important. Smart grid technologies can significantly reduce outage frequency and duration for consumers through pre-failure identification of problems and maintenance, self-healing that isolates and reduces the scope of outages, rapid identification of

outage locations and efficient deployment of repair resources, and enhanced resilience facilitated by the response demand and resources to changing prices or grid conditions.

- Renewables integration. With the expansion in renewable generation, the grid must increasingly accommodate variable generator output. Smart technologies and approaches including advanced power electronics, energy storage, and demand optimization may play a key role in cost-effectively accommodating the deployment of variable renewable technologies at scale.

- Cyber-security concerns. While increased reliance on information and communications technology could create new entry points into utility systems, the development of smart grid standards and deployment of smart grid technologies has been an important catalyst for leading utilities to implement comprehensive cyber-security architecture and systems that will protect both new and previously vulnerable legacy systems.

- Aging workforce and the need to maintain and enhance operational efficiency. As a significant portion of the utility workforce approaches retirement, utilities will need to achieve operational efficiencies. Smart systems can both reduce costs and take advantage of skills present in a younger workforce. See the EAC Workforce White Paper submitted for approval by the EAC in October 2012.

Focusing on these topics/policy papers is consistent with the recommendation elsewhere in this paper that DOE focus more on the real-world benefits and costs of smart grid deployment. The recommendations in Section VI expand upon the potential roles and composition of this group.

**Communication and Outreach Strategy**

The EAC recommends that DOE develop a comprehensive Communication and Outreach Strategy utilizing input from the Focus Groups, Key Stakeholders, Partners, and smart grid projects to identify and disseminate information that meets stakeholder needs including, but not limited to costs, benefits, challenges, and barriers. The Communication and Outreach Strategy would identify the key messages and the appropriate communication mechanisms that will be used to effectively connect with the target audiences. Frequent, consistent, factual, and interactive messages are required. Opinion leaders who carry particular weight with early adopters may be utilized to help reinforce findings. The more frequent, consistent, and collegial an outreach message is, the better it will be received by the stakeholder groups of interest.

The following are key elements for DOE to develop as part of such an outreach strategy:

- A comprehensive identification of all stakeholder groups for the smart grid
- A clear understanding of the information needs of various stakeholders and their constituents
- A description of the outcome impact or results desired in each stakeholder group from the outreach activities over time
- The development of metrics to measure the progress of outreach and assess its impact
- The determination of the type and content of messages that will best meet the needs of each stakeholder group, and the recommended timing, frequency, forums, and venues to deliver these messages
- Potential DOE Partners, Focus Groups, and EAC contributors and their respective roles in collecting input, feedback, and disseminating information
- Communication and outreach mechanisms such as the smartgrid.gov Web site development and management, case studies, events, and public outreach that will be used

- A multi-year schedule highlighting key milestones, events, papers, presentations, and meetings
- Mechanisms and measurements to understand effectiveness and adjust based upon changing perceptions and needs

**Public Outreach**

DOE's resources should reflect this new outreach focus, including a full-time outreach coordinator who is responsible for coordinating public outreach associated with implementing the Communication and Outreach Strategy. This group should include staff with sufficient resources to implement a multi-year program. As expectations change over time, successes emerge, and objections surface or gaps are identified, the public outreach group needs to be adept at reacting dynamically with facts, experts, and applicable findings in congruence with the Communication and Outreach Strategy.

A pertinent example is the scenario in which a small group of customers are aggressively objecting to a utility installation of smart meters based on perceived impingement of privacy, health concerns, cyber security vulnerabilities, and/or general intrusiveness. Public utility commissions and state Legislatures/Governors have reacted differently to these concerns. Some states have accepted the right of customers to object to the installations of such meters and made the entire program voluntary. Other states have provided an "opt out" opportunity with fees that reflect the cost of non-standard service. A few states have rejected these concerns and made the program mandatory based on the opportunity for utilities to better manage the electric distribution system. In most states the Commissions and Legislatures have not definitively acted, instead permitting electric utilities to develop pilot projects and dealing with these concerns on a case-by-case basis.

DOE has limited options to address such customer concerns, but it does have information that could provide a scientific and practical context in which to better consider and evaluate them. Compilation and effective distribution of electric company best practices in terms of customer interactions and education is an obvious opportunity. Condensing scientific studies about the health impacts of smart meters, data security studies and best practices designed to ensure the safety and privacy of personal data, and studies demonstrating economic benefits of a smarter grid to utilities and customers are a few topics that the DOE could communicate to Americans. DOE could also work with their Partners, other government agencies and departments (e.g., the National Science Foundation) to fund and disseminate credible, unbiased research on issues such as health impacts. DOE should not interfere with an individual electric company's relations with its customers, but can legitimately engage in regional and national education campaigns – particularly through the use of social media. The new Public outreach group could assemble simple summaries of data reports in plain language that demonstrate how the information impacts customers' daily lives, with links to the full studies to promote transparency. The related Focus Group could validate the messaging if needed. This would give customers access to secure information from a trusted third party. This provides an example of a day-in-the-life of the Public outreach group. More discussion and related recommendations will be provided in an upcoming EAC report on smart grid customer acceptance that is currently under development.

It must also be recognized that there is still limited information available on the results of the DOE funded and non-DOE smart grid pilot programs, and it is likely that there will be a very limited DOE role in funding the implementation of the smart grid once the ARRA funding comes to a close. Rather, most smart grid efforts take place at the local/state level, and smart grid funding - post ARRA - will be primarily through programs and rate adjustments approved by state regulatory commissions.
Thus, DOE's outreach effort should recognize that there are funding and rate impacts issues for future smart grid deployment, as DOE's role changes from a primary funder to one that is secondary.

It is important to recognize that there are differences between states and constituencies within those states. Furthermore, states are the forums where customers with concerns about smart grid installations (e.g., health and safety issues, consumer privacy issues, cost and ratemaking issues) will bring those concerns; therefore, state decision making bodies must have the tools and information to properly assess and address those concerns. The information and priorities will need to be tailored to each state. DOE may wish to develop its analysis and benefits in a modular fashion through a matrix approach so that results are tailored to each state. DOE can also play a valuable role by facilitating the exchange of best practices and related knowledge transfer on technical, policy, and ratemaking developments among states. Selected other countries can provide example of how to enhance the acceptance of smart grid, and summarize those examples (both costs and benefits) for US-based stakeholders.

Therefore, DOE will gain knowledge that can assist states as they consider policy approaches and implications that connect the long term value of smart grid technology investments to the importance of supporting strategic movement towards grid modernization including items like the digital economy, carbon management, electric transportation, micro-grids, and consumer choice. While all stakeholders are important, state regulatory commissions (both commissioners and staff) are at the nexus between customers, the cost of smart grid deployment, the capabilities of the smart grid, and the introduction of new technology, and are thus a particularly important stakeholder with which DOE should engage and focus near-term efforts. DOE needs to focus on the needs of state policy makers and regulatory commissions. DOE input and meaningful participation with the states could have a significant impact on cost-benefit assessments that are occurring at the state level, associated rate-making policies, and ultimately the long-term investment that is derived from other sources.

## 6 What are the key smart grid costs and benefits (value propositions)?

As described above, stakeholders have voiced concerns about the organization of smart grid material around technologies rather than benefits. The EAC encourages DOE to focus the capture of information according to the benefits that may result from smart grid deployment, because they translate into useful messages for all audiences. In doing so, it is important to acknowledge costs and capture lessons learned (both positive and critical). A proposed benefit structure to organize material and engagement efforts is proposed below with supporting examples:

| **Benefit** | **Result** | **Technology** |
|---|---|---|
| Reliability and resiliency | • Fewer outages<br>• Shorter outage durations | • Automation Switches<br>• AMI<br>• Equipment health monitors |
| Asset utilization and improved efficiency | • Peak management (demand optimization)<br>• Load factor improvement<br>• Energy efficiency<br>• Loss minimization<br>• Enhanced utility system inter-operability<br>• Reduced investment requirements | • Volt-VAR<br>• Synchrophasors<br>• Solid state electronics<br>• AMI |

| | | |
|---|---|---|
| Cyber | • Hardening<br>• Cyber security protections | • Software and hardware |
| Promoting future technologies | • Nimbleness<br>• Flexibility<br>• Lower emissions<br>• Enhanced system integration and interoperability<br>• Ability to integrate higher penetrations of variable energy resources, electricity storage systems, and electric vehicles. | • Micro-grid<br>• Electric Vehicles<br>• Renewables<br>• Storage<br>• Other clean technologies |
| Cost savings and operational benefits | • Extended utility equipment life<br>• Better information on system conditions<br>• Reduced utility outage damage costs<br>• Better utilization of utility personnel and resources | • Data management<br>• Visualization<br>• Equipment monitors<br>• AMI |
| Economic development | • Economic benefits from more reliable and lower cost power<br>• Facilitating the green economy<br>• Enhanced community services | • Data management<br>• Visualization<br>• Communication backbone |
| Retail customer choice and technology acceptance | • Improved customer satisfaction and loyalty<br>• Better information for end-users to manage energy use | • AMI<br>• Pricing policies<br>• Customer systems |

An addition to the matrix would include measurable benefits and costs from the deployment of the technology or program. This would serve as a guide to stakeholders as they evaluate smart grid investment decisions.

To maximize its impact, DOE may need to target education and information dissemination about different benefits to specific stakeholders using tailored communications. DOE should work to balance information on near-term benefits that customers can "see" immediately (e.g., shorter outages, lower bills) with longer-term benefits (e.g., ability to integrate more renewable resources, electric vehicles, etc.) in such dissemination efforts.

Other ways for DOE to focus on these benefits would be to emphasize them in the policy papers described above, and to orient DOE's primary smart grid Web site (www.smart grid.gov) around these characteristics of the effective use of smart grid technology.

Some benefits can occur through utility deployment of new technologies at the transmission and distribution level (e.g., synchrophasors, volt-var techniques), while other benefits will be derived at the customer level from connecting with end-users (e.g., advanced meters, intelligent appliances, rate designs, behavior changes).

While such benefits are not guaranteed, and the costs can be considerable, several examples of utilities achieving multiple benefits from their smart grid installation are starting to emerge. For example, the

Chattanooga EPB is experiencing fewer outages during storms, faster restoration times, and lower costs as a result of its smart grid investment. Appendix 1 provides more detail on the Chattanooga example.

Ideally, the benefits would be defined as the foundation to organize all efforts. They would establish the structure to map the Focus Group scope, the policy papers, the organization for the materials on smartgrid.gov, and even align with overarching DOE strategic goals for grid performance. A template could be created to facilitate the collection of project performance according the benefit groups, making it easier to develop messaging and roll-up accomplishments and ultimate performance contributions for various levels of penetration so there is an easy way to align activity. OE could start the activity with the goal of expanding throughout DOE so project results can be tied to achieving strategic macro-targets and to provide helpful input for incremental DOE portfolio investment decisions.

## 7 How can DOE best provide information on smart grid costs and benefits achieved to date to constituents?

As described in this section, there are a number of actions that DOE could take and which the EAC recommends for DOE to implement in order to capture the experiences of those actually deploying the smart grid at some level.

### Develop Communication and Outreach Mechanisms

Overall, there is a wide array of stakeholder outreach mechanisms. DOE should continue to post findings on smartgrid.gov and expand it. The Web site will become one component of the Communication and Outreach Strategy to meet stakeholder's smart grid information needs. Other mechanisms may include case studies, social media, enhanced search capability through matrix development, press coordination, trade articles, technical papers, and conferences.

- As communication mechanisms are entertained, DOE should also consider training on how to access and use information, especially if the internet is used in an interactive mode to provide easily accessible and understanding data visualizations, ability to access and manipulate information, and provide data summaries that are user-friendly. Developing such systems should be done in conjunction with Focus Groups and Partners who are likely to use them.

- It is important to conduct regular assessments to periodically get feedback on interpretations, concerns, and perspectives. The feedback will be used to make program adjustments.

### Develop and Organize Case Studies

A number of cases are emerging that illustrate the benefits described above. Such case studies are often compelling; however, they are not often presented in a manner that facilitates comparisons between them, or between the case studies and the "unique" situation of the utility, regulatory, or policy-making official attempting to determine applicability. Case studies should be developed and organized to permit the examination of issues or technology applications across projects with varying requirements, conditions, and constraints. For example, a utility in Idaho may believe that a Kansas utility's experience is interesting, but not relevant; a regulator in Tennessee may believe that California's policies are not transferable; or a policy-maker in the New England ISO may believe that ERCOT's experiences are not appropriate to Vermont. Similarly, a small public power system operator may not believe that American Electric Power's experience is transferable and a rural electric cooperative may disregard the lessons

learned by a high density urban utility. Finally, regulatory frameworks, budget constraints, geography, personalities, and other factors may interfere with the transfer of information/knowledge.

Capturing the value of the projects through case studies is a very important aspect of the message development. As mentioned above, work by Chattanooga (see Appendix 1) provides a good example of a recipient capturing the benefits of smart grid technology and disseminating information on those benefits in a way that will appeal to a broad variety of audiences. Additional case studies for nearly 20 ARRA-funded projects can be found on the DOE SmartGrid.Gov Web site at: http://www.smartgrid.gov/recovery_act/program_impacts/case_studies.

**Expand Smartgrid.gov**

While there is considerable information on smartgrid.gov, it lacks information on the usefulness for visitors. In addition, the EAC's assessment of the website is that it contains substantial data (e.g., on the projects funded and what the funds were used for), but it is difficult for users to translate that data into useful information. The Web site can and should be used to get two-way feedback from the users. Furthermore, the Web site should be expanded to serve as a clearinghouse of information to help Stakeholders keep abreast of current and planned activities dealing with the development, adoption, and associated practices of smart grid technology. For example, the Web site should:

- Contain a screening tool so that users such as utilities that have not yet undertaken significant deployment of the smart grid could quickly identify the DOE programs that are comparable to their situation, whether in size (GWh/kWh sales), number of customers, regions and states, technologies and techniques tested, or other criteria.

- Make the costs and level of benefits being derived from the DOE and non-DOE smart grid projects more clear so that other stakeholders have benchmarks for comparison.

- Elevate the section of the Web site that describes the benefit of smart grid technologies to a more accessible portion of the Web site.

- Add a section that includes a dynamic news feed publicizing DOE's current activities, which could consist of an index page providing headlines with short excerpts, an RSS feed subscription link, and articles that are linked to blogs where users can voice their opinion on a given topic.

- Include a smart grid events calendar to inform viewers of report-outs, presentations, ribbon cutting events, and other such milestones.

- Provide more individualized messaging that targets the interests of unique stakeholder groups such as regulators, investor owned utilities, cooperatives, public power systems, and academia.

- Include social media integration to better connect with current and potential viewers. Social network platforms such as Facebook and Twitter are a great way to convey a message on a much more personal level and increase back-and-forth communication among viewers.

- Work with Partners who have smart grid outreach missions and manage links to their respective sites to increase visibility and awareness of DOE activities.

**Provide Matrix Information**

The benefit and cost matrices developed by DOE describe benefits and costs associated with specific smart grid technologies. By focusing on technologies, this approach may fail to fully engage important elements of the Department's potential audience. Many stakeholders are focusing their attention on how to meet significant challenges facing the power industry. Although smart grid related technologies and policies can be important tools for meeting these challenges, they may be "outside the box" defined by more traditional approaches to these problems. And, their potential contributions to overcoming the challenges may not be fully understood by policy makers, stakeholders, and some industry participants.

One way to help utility executives, regulators, and policy-makers assess large amounts of information is to capture key elements in a matrix that permits the recipient to quickly identify system examples similar to theirs and thus focus their attention on relevant material to the decisions (budget, technological, policy) with which they are confronted. Once relevance has been established, DOE could provide links to more complete documentation that would permit the recipient to access and assess the complete set of DOE information available.

In concept, DOE could develop a matrix of pilot, demonstration, and full deployment experiences within the broad benefit categories noted earlier. In addition, DOE should classify results of the smart grid projects by type and size of the installation (e.g., number of meters; area of the country; types of systems installed such as AMI and MDM; rate options considered), and the values realized or benefit streams (as opposed to technologies). This will facilitate comparisons; help each stakeholder understand a state's or utility's uniqueness; identify smart grid opportunities; assess whether the benefits and costs would be near-term or longer-term; and possibly identify incremental policy, R&D, or workforce development opportunities.

This matrix would serve as a valuable starting point to permit decision-makers to quickly identify which case studies are relevant to their situation. For example, this would be helpful information for states and state commissions (e.g., NARUC, regulators and commission staff) to promote their understanding of smart grid technologies and the associated costs and benefits to facilitate acceptance, certainty, and adaptation. Search criteria can be entered to find lessons applying to their "local" geographic needs and conditions.

The EAC recommends that DOE use a consistent process throughout DOE to efficiently gather and consolidate information for the entire portfolio, of the relative benefits and contributions to the DOE goals.

## 8 What recommendations does the EAC have for DOE on smart grid outreach?

1. The EAC recommends that DOE focus on developing a process to systematically understand and communicate benefits and lessons learned by supplementing and shifting from its current one-way effort to a two-way smart grid outreach and communications program. Feedback should be solicited from key smart grid stakeholders, Focus Groups, and Partners. This will result in credible and unbiased information on the overall costs/benefits/value of smart grid installations for communications and outreach with stakeholders; recognizing that efforts need to focus on benefits rather than on the technology itself. Gaps and obstacles identified in the process can also be useful input for future developments and OE portfolio investments. Specifically, DOE needs to:

    - Supplement and shift focus from its current one-way effort to a two-way smart grid outreach and communications program. Feedback should be solicited from the EAC, existing Focus Groups, and customers to refine the research, funding, work force efforts, and policies.
    - Expand the role of the existing Focus Groups to provide input to the information dissemination aspect of the smart grid outreach effort.
    - The major benefits should be defined and utilized, and a method to capture and organize results, Focus Group responsibilities, policy papers, metrics, and outreach messaging should be established. The proposed major benefit categories to consider are:
        - Reliability and resiliency
        - Asset utilization and improved efficiency
        - Cyber security
        - Accommodate future technologies
        - Cost savings and operational benefits
        - Economic development
        - Retail customer choice and technology acceptance
    - Contributions from various smart grid efforts need to be defined, measured, and ultimately mapped by benefit area to the long-range grid reliability and performance goals that are to be achieved as a result of DOE's strategic vision for grid modernization.

2. Create a matrix of information on smartgrid.gov that enables users of smart grid techniques and technologies to quickly find the results and benefits of smart grid case studies that are comparable to their situation. Data needs to be classified and categorized to make it easy for users to find, sort, and use.

3. To maximize its outreach capability and effectiveness, the EAC recommends that the DOE identify Partners that have established smart grid outreach infrastructure and collaborate with them to disseminate information through existing communication channels that they have developed with their own constituents.

4. DOE should create channels for two-way communications with Partners and Key Stakeholders to help refine and tailor its outreach efforts, to include webinars and conferences. Additionally, the EAC Smart Grid Subcommittee may consult as needed to provide additional feedback, along with additional advice and insights for the smart grid communication and outreach efforts. DOE should consult with the EAC Smart Grid Subcommittee and develop a series of policy papers

focused on the following issues and describing the potential for smart grid deployment to contribute to their positive resolution:

- Aging infrastructure and required investment
- Enhancing grid reliability and resilience
- Renewables integration and environmental improvement
- Cyber-security
- Aging workforce and the need to achieve operational efficiencies

This supports DOE's role as the thought leader for smart grid deployment, encompassing outreach for both ARRA and non-DOE programs. These policy papers could provide the entry point for a larger audience to take advantage of the Department's existing work on smart grid benefits and costs.

5. The EAC recommends that the DOE develop a comprehensive Communication and Outreach strategy covering costs, benefits, risks, and the communications methods that DOE intends to use to disseminate messages. DOE should continue to post findings on smartgrid.gov and expand on it, using various communication and outreach mechanisms. The website will become one component of a much broader public outreach plan to meet constituents' smart grid information needs.

    - Near-term outreach efforts should be focused on the states and state commissions (e.g., NARUC, regulators and commission staff) by providing information that will promote their understanding of smart grid technologies and the associated costs and benefits to facilitate acceptance, certainty, and adaptation.

6. DOE's resources should reflect this new outreach focus, with designated staff that has the responsibility for public outreach and message management disseminated through a wide range of communication and outreach mechanisms. It should include sufficient resources to implement a multi-year program.

## 9 Appendix 1– Case Study: **EPB of Chattanooga– Smart Grid Investments to Create an Intelligent, Self-Healing and Interactive Electric Distribution System**

**Background**

A public power distribution system serving Chattanooga, Tennessee, EPB has been working with automation technologies since the early 2000s and began implementing a more defined smart grid strategy in 2007. The plan was slated for a 10-year construction period, and while implementation was in progress, the utility was awarded a matching stimulus grant by DOE to expedite it, shortening the proposed build-out into a three-year plan. Even while partially completed, EPB has seen positive results, including increased **reliability, power quality, asset management, and operational and cost-efficiency improvements**. Devices along the utility's smarter grid communicate with each other, the customer and the utility in near real time, due to the ultrafast fiber-optic network communications backbone. -In many cases, the grid can heal itself with little or no human interaction, and provide the utility maximum performance and predictive analysis.

EPB achieved this communication with a GPON (Gigabit Passive Optic Network) fiber-optic network deployed across all 600 square miles of its service territory. The 6,450 miles (10,380 km) of high-speed fiber-optic cable, of which 65% are steel lashed, provide a 5-msec average roundtrip time to devices across the network. With the addition of distribution automation, voltage optimization, advanced metering infrastructure (AMI), smart grid management software and a new supervisory control and data acquisition (SCADA) system, the grid becomes more reliable and operates more efficiently, helping to mitigate the rising cost of power. Additionally, it acts as a tool for the community's economic development efforts.

**Reliability**

Based on studies conducted by the University of California Berkeley Lab and the Electric Power Research Institute, EPB estimates power outages result in an annual cost of $100 million to the community as a whole. This cost is one of the major reasons EPB put together a comprehensive plan for building an intelligent, self-healing and interactive distribution system. EPB has installed approximately 1,200 S&C's IntelliRupter Pulse-Closers and an IntelliTeam SG Automatic Restoration System. IntelliTeam SG is a field-proven, universal smart grid solution that uses embedded intelligence to automatically reconfigure the distribution system after a fault and quickly restore service to segments of the feeder not affected by the fault. EPB developed an automation plan that included completing the implementation of fault isolation and service restoration (FISR) technology for its 46-kV sub-transmission system and implementing FISR technology throughout the service territory on its 12-kV distribution system. Each IntelliRupter is equipped to communicate with its peers and the SCADA system over the fiber-optic network. IntelliTeam SG substantially reduces customer minutes of interruption, markedly improving this measure of reliability. As switches were installed, fiber was run to each switch, with communication through Alcatel-Lucent's Optical Network Terminator, and protective settings were installed.

In 2011, the most violent year of storms in EPB's history, measurable results were realized even as the smarter grid was in its partial state of completion. At the time of a Labor Day storm in 2011, a remnant of Tropical Storm Lee, only 54% of the planned 1,200 S&C IntelliRupter automated switches were installed and less than 20% were configured into automation teams. While 63,000 homes and businesses were interrupted, 16,000, or 25%, avoided interruption altogether and an additional 9,000 customers, or 7%, experienced less than a 2 second interruption. The electric system's ability to heal itself through automated fault detection and isolation during this storm resulted in the utility avoiding 1,917,000 customer minutes of interruption. In the months following the year of violent storms, EPB's 12-month

ending system average interruption duration index (SAIDI) dropped 24%, from 109 minutes to 82.5 minutes, since December 2011.

On July 5, 2012, wind storms knocked out power at an estimated 41,300 homes and businesses throughout the service area for at least five minutes. However, the loss was only a fraction of what might have been without EBP's smart grid. Of the 41,300 homes, 7,000 experienced automatic restoration, shortening their outage time. Another 35,000 could have lost power, but instead they did not experience any outage or were automatically restored in less than five minutes. There were 59 feeders where an IntelliRupter was open instead of a feeder breaker. These IntelliRupters automatically isolated problems to affect the fewest customers.

EPB estimates that, by automating the switching function and using AMI and other distributed intelligence to pinpoint precise locations of damage, they were able to avoid 500 truck rolls and reduce their total restoration time by 1 ½ days. This reduction in restoration time and resources represents $1.4 million in operational savings.

**Power Quality**

Each of EPB's 1,200 automated switches provides a pole-top telemetry point on the electric grid, sending amps, volts and power factor to the SCADA system. These points will provide accurate inputs to the distribution management system, which is scheduled to become operational in early 2013. These telemetry points are already providing valuable insights into the electric system operations. Recently, a large commercial customer contacted EPB with a concern about its computer-controlled equipment tripping off-line. EPB was not aware of any voltage anomalies on the circuit serving this customer, but it queried the nearest IntelliRupter to the customer's service point. The investigation revealed the voltage had dropped to 70% of nominal for one cycle. The time of this event was correlated to a fuse blowing on a nearby circuit. The information was provided to the customer with a recommendation to review the settings on their equipment and possibly adjust the trip values to something less sensitive. This proved to be a good lesson for EPB in the need to understand more deeply the performance of the electric grid but also to recognize that customer' electric requirements will continue to grow as their equipment becomes more automated.

Additionally, the AMI deployment provides the utility with voltage readings to help it better understand the deployed facilities and correct problems proactively. One of the early phases of testing AMI outage alerts involved a comparison of the outage alerts issued by AMI meters with an identified cause. The intent was to reconcile the outage alerts with an outage in the outage management system (OMS) (planned or unplanned), a momentary outage recorded in SCADA or planned meter activity (disconnect/reconnect). One of the outage alerts could not be associated to any of the predetermined causes. A query of the meter reporting the outage indicated the customer did not actually lose power, but that the voltage had dropped below 80% of nominal, which EPB had set as the threshold for a power outage. Further investigation of the consumption showed power was only being used at night, and the drop in voltage corresponded with the time at which power was being used. Combining these two pieces of information with the customer record that stated this was service to billboard lighting revealed a possible open-neutral condition, which was verified and repaired with a field visit. The valuable lesson EPB learned here was that it could use AMI data to develop "signatures" of power-quality conditions, develop queries to search for them and initiate corrective actions — in some cases, even before the customer itself was aware of the problem.

**Efficient Operations**

The AMI deployment will provide 15-minute interval consumption data to customers within 15 minutes of when the energy is used; thereby allowing customers to better understand their energy usage and make more informed decisions. While only partially complete, the AMI project has already helped with operational efficiency during an especially critical time. After devastating tornados knocked out power to 75% of the utility's service territory in April 2011, smart meters enabled EPB to avoid 250 truck rolls during restoration. While the OMS was still reporting outages at these hundreds of locations, the utility was able to remotely ping meters to determine power had been restored at 250 locations, allowing the utility to use valuable resources in areas that truly needed them. When complete, EPB will have installed 10,000 remote switches under glass, with disconnect equipment integrated into the meter (hence, also under glass). This will not only allow the utility to respond more quickly to customer requests, it also will result in cost savings and pay for itself in less than two years.

**Asset Management**

The data collected by smart grid endpoints contributes to more efficient capital investment decisions when considering upgrading substations and electric system equipment and field software. For example, the speed and low latency of the network allowed a recent firmware upgrade to all of the IntelliRupter switches to be completed in roughly one-and-a-half days. Previously, the same upgrade would have required 600 work hours to upgrade in the field and involved numerous field workers.

**Customer Options**

EPB is in the process of implementing a 5,000-home pilot that will take advantage of the grid's two-way communication capabilities to offer new options for customers. Offerings will vary from traditional time-of-use rates, allowing customers to modify their usage behavior for cost savings, to products designed to reduce peak demand without customers needing to take any action at all, in addition to providing customers with near-real-time energy-usage information.

Independent economic assessments have forecasted that EPB's investment will create net economic and social benefits of $1.2 billion and create 3,700 jobs in Chattanooga. Reliable, affordable electric power is a critical component for site selectors and others looking to relocate to or expand business in an area. Chattanooga is already seeing tangible evidence of this and looking forward to more.

## 10 Appendix 2 - Table of Partner Groups, their Smart Grid Roles, and Outreach Relationship to DOE

| Organization | Membership | Smart Grid Role | Smart Grid Outreach Efforts by this Group | Current DOE Outreach Relation-ships to this Group | Future Opportunities for Joint Outreach Efforts | Other Questions and Comments |
|---|---|---|---|---|---|---|
| NARUC | State/FERC Utility Commissioners | PUCs regulate IOUs. Critical group as they determine smart grid customer funding. Also set tariffs, including consideration of dynamic pricing. | NARUC/FERC Smart Response Collaborative Committee meets at NARUC mtgs. DOE ARRA funding to NARUC for training. Smart grid often topic at NARUC panels. July 20, 2011 Smart Grid Principles Resolution. http://www.naruc.org/Resolutions/Resolution%20on%20Smart%20Grid%20Principles.pdf | On an ad hoc basis, DOE representatives speak at NARUC meetings. | • DOE could formally join NARUC/FERC Smart Response Collaboration<br>• Continued DOE grant funding to NARUC for smart grid training.<br>• Regular meetings to communicate findings and best practices from DOE's smart grid efforts, and receive comments from NARUC on how DOE could support their efforts. | 7/20/11 NARUC Resolution provides strong basis for DOE/NARUC cooperation and communication lessons learned by DOE from smart grid investments. Focus of NARUC will be on costs, risk, and identified customer benefits. |
| NASEO | State energy offices; correspond to DOE at the state level | Resiliency planning | Wrote Smart Grid & Cyber Security for Energy Assurance report | Recipient of many ARRA DOE smart grid grants | Work with larger SEOs (e.g., CA, NY) to promote and establish policies that the DOE SGDP and SGIG pro-grams have found to work | Few state energy offices have post-ARRA smart grid funding |
| APPA | Public power utilities, | Test new approaches; | Smart Grid summit can highlight how | Some members received DOE ARRA | • Take lessons learned (e.g., Chattanooga) and | How will APPA members view smart grid funding |

| Organization | Membership | Smart Grid Role | Smart Grid Outreach Efforts by this Group | Current DOE Outreach Relation-ships to this Group | Future Opportunities for Joint Outreach Efforts | Other Questions and Comments |
|---|---|---|---|---|---|---|
| | municipal utilities | Advocate implementation of proven and cost-effective SG technologies. | public power utilities can use smart grid to improve their communications | SG funding; others are proceeding without such funding | promote/ modify for local conditions.<br>• Develop more case studies;<br>• Jointly ID what works | post-ARRA? How can consumer concerns at the retail level with smart grid installations be best addressed? |
| EEI | IOUs | IOUs responsible for much of smart grid – AMIs, dynamic pricing tariffs, T&D automation | Smart Grid website featuring an interactive public site and an exclusive SG communications toolkit for EEI members | Some ARRA grant recipients, some not; commented on DOE RFI about addressing policy and logistical challenges to smart grid implementation | Continued collaboration:<br>• Present at EEI conferences (strategic forums; technical meetings; executive sessions)<br>• Develop case studies<br>• Test beds for technologies/policy approaches | Increased ratepayer funding in post-ARRA world so increased need for EEI members to show customer benefits. |
| NRECA | Cooperative utilities, public power districts | Demonstrating reliability, efficiency, and cost benefits to coop members | Smart Grid Demonstration Project, Smart Grid Summit | CRN received grant from DOE; close working relationship | Similar to APPA and EEI above | |
| IEEE | Professional association of electrical and electronics engineers | Standards development | IEEE Smart Grid web portal, IEEE Xplore digital library, IEEE Smart Grid e-newsletter, IEEE Smart Grid Transaction, 2250 Twitter followers, 10,000+ Smart Grid Linked-In followers, | ARRA case studies featured on Xplore digital, DOE guidance for reporting ARRA Smart Grid program – metrics are compliant with IEEE STD 1366 2003 | Increased collaboration<br>• Publish findings in IEEE Smart Grid e-newsletter<br>• Broadcast and get feedback through Linked-In group<br>• Connect with the press through Twitter followers<br>• Present findings at | IEEE is a trusted and unbiased source with significant reach and an established Smart Grid outreach process. Given the common mission, a partnership can be established to leverage their infrastructure to better connect with stakeholders. |

| Organization | Membership | Smart Grid Role | Smart Grid Outreach Efforts by this Group | Current DOE Outreach Relation-ships to this Group | Future Opportunities for Joint Outreach Efforts | Other Questions and Comments |
|---|---|---|---|---|---|---|
| | | | numerous conferences | | Conferences such as the IEEE PES General Meeting, Innovative Smart Grid Technology meeting,<br>• Present technical findings in peer-reviewed Smart Grid Transaction<br>• Highlight standards needs /gaps to drive incremental activity and cases where IEEE standards have been used | See http://smartgrid.ieee.org |
| NIST | Non-regulatory agency/ Department of Commerce/ Government agency | Brings together manufacturers, consumers, energy providers, and regulators to develop "Interoperable standards" | SG Advisory Committee, Smart Grid Wiki collaboration site (http://collaborate.nist.gov/twiki-sggrid/bin/view/SmartGrid/WebHome) | Smart Grid Investment Grant recipient | • Both have key roles defined by EISA, collaboration between the EAC and SGAC.<br>• Regular coordination meetings;<br>• Possible joint efforts and sharing of objective info | |
| NASUCA | State Consumer Advocate Offices | Representing retail consumers in regulatory proceedings and policy discussions regarding smart grid deployment | Developed smart grid resolutions and joined with other national consumer organizations in publishing paper on smart grid | Ad hoc meetings between NASUCA members and DOE officials | More formalized dialogue to identify consumer benefits and concerns on smart grid deployment | Through their relationships with retail consumers in their states, NASUCA members can serve as a valuable resource to DOE in both communicating consumer |

| Organization | Membership | Smart Grid Role | Smart Grid Outreach Efforts by this Group | Current DOE Outreach Relation-ships to this Group | Future Opportunities for Joint Outreach Efforts | Other Questions and Comments |
|---|---|---|---|---|---|---|
| | | | consumer protections. www.nasuca.org/smart grid consumer protection white paper (August 2010) | | | benefits and identifying consumer concerns regarding smart grid deployment |
| EPRI | Independent non-profit | Smart Grid Demonstration – integration of distributed energy resources. | Smart Grid Resource Center, regional demonstrations | • DOE picked EPRI collaborative to help protect the US electricity grid, numerous MOUs with ARPA-E<br>• Methodical Approach for Estimating the Benefits and Costs of Smart Grid Demo Projects report | • Regular discussion of research needs<br>• Joint research efforts<br>• Joint articles, outreach | |
| DR SG Coalition | private corporations | Educate and provide information to policymakers, utilities, the media, the financial community, and stakeholders | Policy recommendations, fact sheets, white papers, | DRSG commented on DOE RFI about addressing policy and logistical challenges to smart grid implementation | | |
| NAESB | Industry forum for wholesale | Standards development | Smart grid standards | | | They have a link of relevant smart grid |

| Organization | Membership | Smart Grid Role | Smart Grid Outreach Efforts by this Group | Current DOE Outreach Relation-ships to this Group | Future Opportunities for Joint Outreach Efforts | Other Questions and Comments |
|---|---|---|---|---|---|---|
| | and retail electricity | | development subcommittee | | | documents and work papers on their website, which includes papers from NIST, FERC, and NERC |
| National Electrical Manufacturers Association (NEMA) | Manufacturers of electrical equipment | NEMA represents companies that manufacture equipment that is essential to the functioning of the smart grid, such as smart meters, switchgear, and transformers | Issue briefs, brochures, and white papers for various audiences on smart grid and cyber security topics | No known ongoing relationships; NEMA responded to DOE's September 2010 Smart Grid Request for Information | Increased collaboration and outreach on RD&D for new smart grid technologies | Specifically named in EISA 2007 as an organization from which NIST must solicit input and cooperation with respect to the Smart Grid Interoperability Framework |
| Association of Home Appliance Manufacturers (AHAM) | Manufacturers of home appliances | AHAM represents manufacturers that sell consumer appliances, some of which are or will be designed to take advantage of the smart grid | Smart Grid Task Force, white paper on principles and requirements for achieving a widely accepted smart grid, assessment of communications standards for smart appliances | No known ongoing relationships; AHAM responded to DOE's September 2010 Smart Grid Request for Information | Increased collaboration and outreach on:<br>• consumer-focused pilot projects<br>• RD&D for home appliance applications of Smart Grid technologies | The companies that actually make and sell consumer products are a key audience because they have unique access to market research and probably understand consumer needs and wants better than any of the other listed stakeholders |

Richard Cowart
Chair, Electricity Advisory Committee