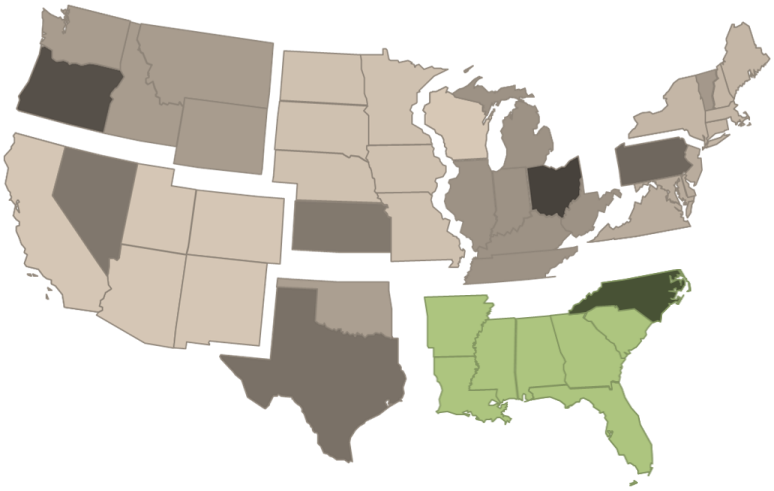
Southeast Smart Grid Peer-to-Peer Workshop

October 26-27, 2011, Charlotte, North Carolina



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Acknowledgments

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Introduction

Smart grid modernization projects throughout the United States are transforming the nation's electric grid—how the modern grid functions, how consumers interact with electricity, and how utilities plan for the future. In an effort to leverage the knowledge from deployments of early generation projects, the Department of Energy's Office of Electricity Reliability and Energy Delivery (DOE OE), in partnership with utility hosts, is convening a series of regional smart grid workshops. These workshops bring together stakeholders to engage in unique peer-to-peer dialogue to identify lessons learned and best practices on technical implementation and consumer engagement. The workshops provide a forum for smart grid implementers to share their experiences in making the smart grid a reality.

On October 26–27, 2011, the Southeast Regional Smart Grid Peer-to-Peer Workshop took place in Charlotte, North Carolina. Hosted by Duke Energy, Progress Energy, and DOE OE, more than 110 stakeholders from the Southeast region attended, including representatives of large investor-owned utilities (IOUs), rural cooperatives, municipal electrical authorities, utility regulatory commissions, consumer advocacy organizations, universities, and a range of elected bodies. A participant list is provided in Appendix 1 and a workshop agenda is provided in Appendix 2.

The first day of the workshop focused on industry-led dialogue regarding issues, challenges, and lessons learned with smart grid deployments and demonstrations. Participants included representatives from both DOE-funded and non-DOE-funded smart grid projects. The agenda for the day was divided into two main topics: *Sharing Lessons that Create Value* and *Major "Aha" Moments.* The main panels were followed by interactive question-and-answer sessions with the audience and topical breakout sessions. Breakout session topics included strategic change management, technology "futureproofing," business models, communicating with customers, and business processes. The second day of the workshop brought together a broader cross-section of stakeholders including regulators, state energy officials, consumer advocates, economic development policymakers, and state and local government representatives. The session was designed to promote open communication and relationship building to ensure continued success with current and future grid modernization efforts. The agenda emphasized discussions integrating various perspectives on smart grid deployment successes and lessons learned, both in technical deployment as well as in consumer engagement.

Discussions from the workshop provided insight into the state of grid modernization efforts in the Southeast and helped provide an understanding of the economic, consumer, and electrical system impacts of smart grid efforts. Several important themes emerged:

- **Change is accelerating**. While grid modernization in the Southeast has been underway in an incremental fashion for decades, modernization efforts in the region are accelerating more rapidly than at any time in more than 50 years. This acceleration represents a new chapter in grid evolution and is challenging traditional models and ways of doing business.

- **Success requires a strategy for change management.** Change management is becoming a priority for utilities modernizing their infrastructure. The technical, social, and economic context of doing business is in flux and requires organizational changes in response. Specific issues that were identified include breaking through "silos," an increasing need for staff training and development, changing customer engagement methods, upgrading data management systems (DMS), and improving vendor management. As with any successful transition, smart grid modernization calls for a well-articulated vision, champions of change at all levels of the organization, and engaged allies in regulatory and consumer communities.

- **Customers are diverse and require diverse solutions**. The diversity of customer energy needs and preferences is widely recognized. Utilities are implementing diverse systems for customization of electricity offerings—from a range of pricing programs to varied platforms through which customers can manage their energy. Utilities are also designing outreach programs that are tailored to the unique needs of different groups. For example, seniors and low-income customers are two customer segments that often have the most to gain from energy savings but can also be challenging to reach. Utilities are innovating new means to cultivate participation by these groups. Successful approaches include sponsored programs at community colleges and "train-the-trainer" networks at local non-profits. In the words of one participant, "It takes a village to build a smart grid."

- **Successful projects prioritize early and consistent consumer engagement**. Participants emphasized the importance of working with customers, community leaders, and regulators early in the project deployment process. High-quality engagement served to familiarize stakeholders with the rationale, benefits, and user-experience of smart grids.

- **Successful projects measure and effectively communicate benefits to consumers**. Smart grids bring a wide range of system impacts, which translate into both tangible and intangible benefits to consumers. Successful projects track both of these and communicate them to consumers and other stakeholders. For example, increased system reliability, increased convenience and choice, the avoidance of new power plant construction, increased economic development and modernization, and avoided cost increases are all benefits that are important to communicate but are not always easy to track. Communicating these benefits through key impact data and illustrative stories are both useful and necessary.

Together, all of these themes point to a dramatic transformation in progress, and as observed during the workshop, the effects can be far reaching. Managing this transformation is a central challenge to utilities. Participants recognized the importance of coming together to discuss these challenges: Through constructive dialogue, solutions can be highlighted and possible pitfalls avoided. Overall, the message in Charlotte was clear—this is an exciting time to work in the utility industry.

The following report highlights the main themes that emerged at the Southeast Workshop in more detail, with an emphasis on reporting unique observations, lessons learned, suggestions for best practices, and insights into the future of grid modernization.

1: Organizational Change for the 21st Century Utility

Overview

Across small municipal utilities, rural cooperatives, and IOUs, the pace of technological change is accelerating. The impacts of this change are not just on the technical side of the business but on all divisions of the organization. Below are key observations from the workshop:

- **Cross-functional technologies require organizational changes**. Utilities are realizing that smart grid implementation often requires organizational structure changes. Smart grid technologies interface with multiple departments within a utility, requiring strategic changes to functional processes. Single-purpose jobs are now cross-cutting jobs. Customer service personnel need to understand outage-management implications of smart grid. Linemen need to understand in-home devices. Executive-level personnel need to understand smart grid activities at all levels. Utilities are grappling with how to best restructure the organization to handle the cross-cutting nature of smart grid technologies and are re-designing their organizational structures, staff training, and human resource management protocols.

- **Enterprise-wide engagement.** Related to the point above, employees at all levels have a role to play in smart grid project success, both internally as well as externally. Executive support and involvement is a key factor to program success, and various methods for top-level involvement were shared. For example, one recommendation was to establish executive steering committees to demonstrate high-level support for grid modernization activities. Furthermore, participants noted that every department needs to understand the impact of smart grid on its operations. Various participants described providing factsheets to personnel on project details as well as FAQs on common concerns to prepare them to explain programs to customers.

- **New models of value and success emerge**. Utilities are identifying new ways to measure and define benefits and to evaluate project success. In parallel, the need to measure and encourage consumer awareness and participation is increasing. Utilities are finding that smart meter deployments, and the capabilities and reliability that smart grid systems enable, are increasing customer satisfaction and enabling economic growth. Additionally, some communities have found that a modern grid enables broader economic benefits.

- **Technology integration.** With new smart grid technologies, utilities are finding themselves in the role of technology integrator and manager of an "ecosystem" of new vendors. To successfully overcome these challenges requires enterprise-wide changes in business processes, which themselves should be mapped, communicated, coordinated, and implemented according to an articulated project management plan. The role of the utility is also extending to that of managing an ecosystem of technology vendors whose innovative products are key to project success.

2: Engaging Customers and Communities

Overview

Customer and community engagement is a crucial element in effective smart grid implementation. Participants observed that consumer engagement methods and communication channels are evolving rapidly. Below are various elements that were identified in successful consumer engagement programs during the workshop.

- **Early and consistent communication.** Establishing early and multi-phase communication is key to raising awareness and gauging interest. Important information to communicate might include the changes that will take place and why, what the expected benefits are, what the choices are, and what consumers can do to maximize benefits. Various participants suggested that information supports higher levels of engagement: early engagement with customers during Advanced Metering Infrastructure (AMI) deployments, when ample information is provided, has resulted in a favorable response, resulting in relatively low numbers of opt-outs. With good advance work, technical execution, and follow-through, customer reaction has generally been positive.

- **Segmentation.** Consumer preferences and needs vary widely. To meet these different needs, it is important to establish various communication channels and methods that align with the preferences and knowledge level and interest of different consumers. Utilities are recognizing the need to understand market segmentation and to design approaches targeted at these segments.

  Segmentation is also relevant to consumer interactions with in-home technologies. For many grid modernization programs that bring new control options into homes and businesses, the degree of customer engagement directly affects program success. This is especially true in the deployment of home energy management systems (HEMS) and In-home displays (IHDs), which can provide real-time information and control of the home thermostat, water heater, pool pump, and other major electrical demands. One utility deployed web-based HEMS technologies to a specific sub-group in which 75% of participants had a college degree and 93% were computer literate. When the utility compared resulting usage to others, this group saved roughly an additional 6%.

- **Deploying in-home technologies.** A variety of practices for deploying in-home technologies were shared:
  - Respond to the level of technology support desired by the customer. One utility offered customers a range, from "high-touch" to "low-touch" levels of customer support. "Touch" represented how much interaction the consumer would have with utility personnel. The utility found that many customers who first opted for low-touch device support later called back for more support.
  - Engage the entire household. If not, a "civil war" might ensue. When various people in the same household share a HEMS/IHD, the settings need to

Partnering with Community Colleges

One utility partnered with a trusted community resource—a local community college—to reach low-income and Hispanic groups. The plan was so successful that it is now being rolled out to all community colleges in the area.

Implementation steps included the co-development of an energy curriculum to teach consumers how to use the in-home energy dashboard and manage their energy. The resulting curriculum can be adapted to specific audiences, such as elderly, lower income, and non-English speaking residents. The utility and community college also hosted regular consumer "Expos" to introduce the equipment and the program to the community.

accommodate the usual routines of all the members of the household, not just the one setting the controls. It has been found that one unhappy person in the home can derail participation.

- **Communicating benefits and managing expectations**. Before, during, and after deployment of AMI and other grid modernization projects, it is essential to align customer expectations with realistic technical goals. Utilities should be cautious about only emphasizing direct cost savings to individuals. Participants have found that it is necessary to focus on broader system benefits such as increased system-wide reliability, avoided operating costs, avoided outages, faster outage recovery, greater integration of renewable energy, and economic development. Various participants noted improved system performance during recent extreme weather events.

City-Wide Partnerships

The director of the consumer enrollment program in a mid-sized city outlined their successful partnership-based consumer outreach program and the lessons they learned.

Program elements from the partnership included:

- The utility reached out to community and non-profit organizations. Partners were selected based on level of accessibility and credibility and were incentivized through stipends, computers, and office supplies.
- Training was provided to the non-profit partners as a "train the trainers" program.
- A utility customer service representative was assigned to each partner to provide a once-a-week check-in and support.
- A dedicated technical-support line for the program was established.
- Follow-on surveys were developed to respond to concerns and to measure satisfaction.
- Advance research and outreach to prospective participants was used to generate interest.

The following lessons learned were observed:

- Establishing relationships in advance of project launch with agencies, community organizations, and non-profit organizations whose missions and constituents could provide platforms for mutual benefits—with the grid modernization program leveraging their missions and vice-versa—was important.
- Partner locations along major bus lines were especially popular.
- Be sensitive when framing program language so as to avoid any potential stigma with participation. It was found that "income based" rather than "low income" increased participation.
- Scaling up a pilot program may require additional staffing to maintain comparable coverage.
- Partnering with non-profits and community organizations meant that the utility did not need to verify income or ask for this type of personal information when consumers were already members of the community organization reducing several participation barriers.
- Regular (quarterly) contact with consumer advocate offices to learn what types of calls, questions, and comments they are receiving related to the smart grid project and smart meters is beneficial.
- Engagement via multiple media channels was important, including segments on local public television and social media presence on Twitter and Facebook.

- **Consumer confidence.** While acceptance is generally broad, it is not automatic. Participants highlighted the importance of providing consumers information about issues of concern. For issues, such as privacy, health, or security, multiple participants recommended providing credible, third-party sources of information. The use of independent and objective sources carries a level of credibility without the potential appearance of conflict. Potential sources include the Smart Grid

Consumer Collaborative (SGCC),[1] Electric Power Research Institute (EPRI),[2,3] not-for-profit research organizations,[4] national laboratories, and universities.

With regard to communicating with consumers on these issues, or responding to consumer concerns, various practical strategies were discussed by participants:

- Prepare a "media kit" of materials and strategies to assist project implementers in being prepared with messages on costs and benefits, Q&A, issues, and responses.
- Identify and work with media members who are educated, objective, and neutral about smart grid modernization projects.
- Consider an opt-out provision—some programs in the Southeast already include this in their deployment plans.

- **Unexpected benefits with smart meter installations.** Several utilities noted that their smart grid project has realized not only benefits anticipated at the project outset but also several unexpected benefits.
  - Due to the additional, timely information provided by smart meters in some instances, unanticipated heavy usage was identified early in the month. By noting this heavy usage early, consumers and the utilities working together were able to identify the malfunctioning appliances, energy drains, or other causes, thus preventing an extraordinarily high bill. In two of these cases, it avoided monthly electric bills on a pace to reach $500 and $700.
  - Smart meters were able to identify that a customer's charging of certain battery-powered equipment was the source of periodic peaks in that family's usage and bills—settling a family dispute over who was running up the electric bill.
  - One utility reported that with the use of their smart meter data, a resident in a vacation community was able to determine that their home was broken into based on energy consumption data. This allowed them to notify police in the area much earlier than they would have if they had noticed the break-in the next time they visited the home.
  - In the same vacation community, the utility reported that they have been able to identify and resolve outages when residents were not in the houses, allowing the residents to return to the house without being impacted by the outage.

"Pre-Pay" Programs

Pre-pay programs allow customers to pay up front for service, typically in whatever increment they wish, with payments being applied to the ongoing balance. If the account balance hits certain threshold levels, the customer is notified by email or phone so they can add more money to the account. Utility participants have reported that this has benefited both budget-constrained customers and utilities.

For the customers, it reduces or eliminates the required deposit balance. This is a significant benefit. Besides keeping cash in the customer's pocket, for those customers serviced by a co-op, they are able to become voting members of the co-op rather than having to get someone to co-sign and provide the deposit. Pre-pay has also shown benefits in helping consumers manage monthly usage more effectively.

For some utilities deploying pre-pay programs, write-offs have been cut by half, which benefits all customers. In one community, vendors reported that the pre-pay option, since daily costs are made more visible, reduced usage 12%–20%.

[1] http://smartgridcc.org/research/sgcc-research
[2] http://my.epri.com/portal/server.pt?Abstract_id=000000000001021126
[3] http://my.epri.com/portal/server.pt?Abstract_id=000000000001022270
[4] http://www.ccst.us/publications/2011/2011smartA.pdf

3: Technology Integration and Futureproofing

Overview

Smart grid technology development is dramatically increasing visibility into the electricity system and is also enabling new delivery capabilities. Since so many diverse components are being deployed, the full capabilities of the resulting systems are still being explored and validated. In all cases, this work requires a highly collaborative management effort, typically with new relationships within the utility as well as with external vendors. Utilities increasingly find themselves in the role of "technology integrator." As utilities embrace new technologies, they are interested in "futureproofing" their investments. Utilities want to ensure that their technology choices today do not impede future opportunities. Some of the other prominent observations, themes, lessons learned, and suggestions for best practices in this area are set out below.

- **Changing vendor relationships.** Project implementers emphasized the importance of working closely with vendors from early in project planning stages throughout implementation to ensure products meet project specifications and needs. Interoperability is a key consideration and new equipment decisions require early collaboration with vendors to make sure that new equipment will be fully compatible with legacy and other new equipment. Finally, one of the most important balances to maintain in working with vendors is to keep the project budget and priorities on track.

- **Strengthening IT departments.** AMI and distribution automation projects in particular entail significant data management challenges, as well as opportunities to leverage data to support operations. Leveraging all this new data right away is very difficult. Participants remarked that a staged approach is more effective than attempting to do everything at once. It may take years to leverage everything, and staging gives the utility the chance to do it right and to get everyone engaged—both employees and customers.

> **New Data Handling Infrastructure, Partners, and Processes**
> One large utility described a pilot project that uses power-line-based communication and then stores and processes data on secure cloud servers before it is returned to the utility for use. Vendors are enlisted to help at multiple points: installation contractors are hired to change the meters, a Web contractor is retained for the consumer portal, and another contractor handles billing.

- **Increasing engagement with technology standards development**. Some participants suggested that utilities should take a more active role in developing the relevant National Institute of Standards and Technology (NIST) standards. Currently, the process includes many more vendors and other stakeholders than utilities. It was suggested that utilities should increase their involvement to ensure that the results best serve the interests of the utilities and their customers.

- **Scalability and architecture for the future.** Several participants pointed out the need to build for future demands and communications requirements, looking beyond today's requirements. The current generation of project implementers needs to establish a system architecture that will be robust under future technologies. At the same time, utilities are looking for backward support from vendors—a problem if commercial carriers indicate they will drop 1G when they upgrade to 4G cellular networks. These futureproofing considerations require changes not only in component acquisition but also in the practices of system engineers and other staff who develop and install the equipment.

- **Prioritizing multi-purpose communications capabilities.** Successful projects select communications platforms that can handle a wide range of communication protocols, such as distributed automation, capacitor control, and meter data. One utility had to switch out an entire system because it was only built to handle meter data. Equipment management systems are vital to manage all of these new endpoints. And systems that can accommodate over-the-air updates minimize costs, as opposed to systems requiring manual updates.

Distribution System Demand Response (DSDR)

One utility's technical requirements for implementing their DSDR program required a feeder conditioning initiative with four main elements: tamp lines, phase wires to balance load, relocating 400 line capacitors, and line voltage regulators. They noted that DSDR also requires four additional enabling capabilities: a DMSstem, a network of sensors, fiber communication to substations, and wireless capability. Note: Why is this important?

Large-Scale AMI/DMS/OMS Integration

One new system being deployed by a large IOU will include smart substations, microprocessors, modernized relays, digital fault reporters, and widely distributed system monitors. The Outage Management System (OMS) will be integrated into the DMS using the same vendor. There will be one user interface for operations, rather than multiple screens and multiple applications. The electricity monitoring display will integrate system supervisory communications and data acquisition (SCADA), OMS, and geographic information systems (GIS) data. The goal of the system is to turn large amounts of data into actionable visualizations so that operators can make good decisions. Operators are trained on a simulator, similar to those used in transmission, providing a path for distribution management to catch up with established transmission management practices. Self-healing aspects of the system will include: fault detection, 800 new distributor-breaker relays, distribution automation, fault detection, and transmission automation.

- **Cellular networks**. At present, a number of utilities prefer to rely on proprietary cellular/wireless communication networks rather than tie into consumer Internet provider networks. Relying on customer Internet provider networks is not always viable as residents may need to periodically reset home routers. This reliance results in unacceptable fail rates. However, some utilities observed that there may be better options to leverage existing data infrastructure in the future**.** Working with telecommunications networks would save duplicate infrastructure spending, but the proper capabilities may not be available yet. There is an internal debate among telecom partners about what types of data are critical and non-critical, and meter data is stuck in the middle. The outcomes of these debates, and the resulting business practices, will decide the extent to which utilities can leverage existing telecommunication networks.

4: Smart Grid Benefits and Business Cases

Overview

A cornerstone of defining a business case for a smart grid project is the cost-benefit analysis. In support of tracking smart grid investments and demonstrating their value, participants are employing a wide range of technical, cost, benefit, and customer metrics. Although measuring benefits of a smart grid project may require new methodologies to capture the benefits, participants in the workshop provided a number of cases where they worked within existing frameworks. While efforts are underway to catalog this type of information (for example, through the Smart Grid Research Consortium project and a growing impact data collection effort available on SmartGrid.gov), participants asked for more frequent peer-to-peer sharing of case studies and best practices. Some of the key elements of the business case discussion, and specific examples of business cases and cost-benefit analyses, are below:

- **Working within traditional business case evaluation methods**. Investment business cases for utilities (especially IOUs) typically encompass six fundamental areas: revenues, operational improvements, reliability, regulatory requirements, capacity/demand, and customer satisfaction. Many smart grid modernization projects have been assessed and approved within these traditional models. To the extent the investment is tied to system reliability or asset management, or is incorporated in an infrastructure improvement project that is otherwise justified, smart grid deployments are easier to justify using standard cost-benefit analysis. Even in these cases, however, there are shortcomings in existing methodologies, creating difficulties in estimating future benefits and allocating costs. For example, many impacts of new systems depend to some degree on new consumer behaviors using new products in new markets. Some workshop participants noted that the traditional cost-benefit methodologies may not fully measure the system and consumer impacts of new smart grid systems. Further public-private collaboration in this area was suggested.

- **Toward new evaluation paradigms.** The broader system benefits from smart grids call for new paradigms of cost-benefit analysis. These might include an expanded view of the energy system as an enabler of customer participation, methods of valuing the ability to accommodate new technologies (e.g., plug-in hybrid vehicle charging), and extensions of existing methods of valuing avoided interruptions.

Diverse Business Cases for Smart Grid Systems

- **Enabling the system as a resource.** By deploying coordinated voltage reduction in the distribution system, one large IOU was able to reduce load by more than 200 MW, thus "enabling the system as a demand management resource." Business drivers for the project included increased energy efficiency, reduced operating costs, and a reduced likelihood of low-probability/high-impact events (i.e., power outages during peak times).
- **Unexpected benefits**. One cooperative utility in the region transitioned from a decades-old system of customer-read meters to full AMI. The change saved the members 11,000 truck rolls for disconnects and reconnects, with the associated savings in time, fuel, and vehicle expenses and a lower carbon footprint. A different co-op in the region transitioned to AMI and derived various benefits and cost savings including:
  - 3,350 fewer truck rolls
  - 1,420 fewer man hours
  - 15,000 fewer travel miles
  - 300 more active prepaid customers, estimated to increase to 1,500 by the end of 2012
  - Restoration of 40 outages affecting 1,600 customers without the need for a customer call to identify outages
  - Addition of 4 MW of distributed residential solar PV generation.

- **Community economic development**. One major city in the region met their economic revitalization goals in large part through an integrated upgrade of communication infrastructure. The project spanned Internet and smart grid backbones, including enhancing Internet communications infrastructure with fiber-optic lines and installing hundreds of sensors and automatic switches throughout the grid. As a municipal utility, the business case was made with a focus on improving the attractiveness of the community—via both improved service to existing customers and a more competitive value proposition for attracting new businesses. Commissioned studies estimate a payback to the city of two to three times the investment over the first 10 years. While many factors contributed to the subsequent success of the city, the expanded capabilities and reliability of the grid encouraged several new companies select the city for new corporate facilities. Just two of them brought $1.3 billion in investment and 2,300 jobs. Similarly, a neighboring co-op rolled out a joint broadband project and attracted a large manufacturer to the area when the project was complete.

- **Avoided generation**. Another large utility project successfully articulated a business case for avoided generation to its regulator: A DSDR system enables the operator to reduce overall demand, without disrupting service, by lowering system voltage and controlling the magnitude of voltage along approximately 1,100 distribution feeders. This will enable the utility to strategically reduce peak load in the range of 235 MW, obviated the need for new generation, and removed two turbines from the future resource plan. The project will allow the utility to use the "least-cost" mix of demand- and supply-side resources to meet requirements. DSDR qualifies from a regulatory perspective as demand-side management. In order to do so, the company is developing methods to leverage it in the economic dispatch order.

- **Virtual power plants**. One mid-sized municipal utility, which does not generate its own power, deployed a distribution automation system that enables it to act as a virtual power plant and sell dispatchable demand-side resources back to its system operator or into the market. To accomplish this, the city installed 700 automated switches on the 12-kV feeder system, which in addition to enabling operation as a virtual power plant also improved reliability. The projected impact is a 40% reduction in the System Average Interruption Duration Index (SAIDI). Data from a recent storm event showed that although 60,000 customers had their power interrupted, the system of automatic switches kept power on to another 25,000 customers whose service would have otherwise been interrupted.

- **Creative solutions.** Innovation and flexibility with smart grid components allowed a rural utility member without a typical outage management system to integrate AMI with GIS to monitor voltage levels. The utility manager noted that with this system they were able to create a "poor man's outage management system." This is an example of how innovative uses of smart grid modernization components can improve system operations and reliability in new ways. As the panelist said, it enables creativity by "small utilities with big ideas."

5: Challenges and Opportunities Ahead

Overview

Although enormous progress has been made in a relatively short amount of time, there remain issues that call for further exploration. The final panel of the workshop focused on looking ahead to the future. A diverse range of panelists identified issues that they believe will persist in future conversations of smart grid deployment:

- **Managing change**. Change has historically advanced at a cautious pace in the utility industry, but in other fields (especially IT), rapid change has been the norm for decades. Going forward, utilities will be challenged to join a faster stream of evolution. Some utilities are well on the way. A critical enabler of this transition is ensuring an organizational capacity to manage, measure, and evaluate new technological systems.

- **Cyber security and privacy**. Cyber security concerns warrant significant changes in operational procedures, from vetting the hardware supply chain to identifying custody of consumer data across all vendors. Relevant regulations, especially the North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection (CIP) standards, will set an important precedent. Several participants suggested the importance of guidance that simplifies the complex set of compliance requirements into something more manageable at the utility level.

- **Addressing consumer concerns**. Some consumers are raising concerns about potential health impacts of low emission radio frequencies from metering equipment. This is likely to be an area that requires careful attention and rigorous study and may serve as a driver for potential opt-out provisions in AMI programs. Utilities will be well served to listen and respond to consumer concerns.

- **Independent technology validation**. One participant recommended continuing support for technology validation, certification, and integration efforts. This could take various forms. For example, it could support an independent network of testing centers to validate products and vendor claims (especially with regard to cyber-security, interoperability, and modularization). This could be carried out in conjunction with EPRI, NIST, KEMA, and other credible independent technical organizations. Additionally, DOE could support research on technology benefits as well as health, safety, and privacy issues.

- **New value paradigms**. New products, new markets, and new consumer behaviors call for new paradigms for evaluating business cases for smart grid investments. There is a need to refine the qualitative and quantitative measures of costs and benefits for use in developing business cases, rate cases, energy markets, and customer engagement platforms. Broader research and additional work remain to be done in this area.

- **Strategic outreach.** As data and qualitative information on projects are collected and evaluated, and as plans expand for broader smart grid modernization around the country, there is an increasing need to "get the message out" to customers, communities, and policymakers. This outreach and education could leverage the accumulated resource of hard-won project experience to engage a broader range of customers and policymakers in what smart grid modernization entails, so that the full spectrum of stakeholders can make informed decisions.

Resolving these issues and leveraging future investments to sustain grid modernization will be a critical focus of the next decade. These issues will motivate further peer-to-peer meetings, where a growing community of practitioners can work together to share lessons learned and advance U.S. smart grid efforts.

* * *

Appendix 1: Participant List (alphabetical by organization)

Blake Clifton Abundant Power Group	**Michael Clement** Blue Ridge EMC	**Rand Smith** Blue Ridge EMC	**Bob Morgan** Charlotte Chamber of Commerce
Tom Couch City of Camden, SC	**Jerry Marthers** City of Camden, SC	**AJ Molnar** City of Camden, SC	**Chuck Robinson** City of Charlotte Business Support Services
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Jeffrey Gates Duke Energy	**David Mohler** Duke Energy	**Dan Phillips** Duke Energy	**Eric Sieckmann** Duke Energy
Tracy Tinsley Duke Energy	**Jim Glass** Electric Power Board of Chattanooga	**Katherine Horton** Electricities	**Kathy Moyer** Electricities
Tanya Burns Energetics	**Wayne Wilkins** Energy United	**Floyd Galvan** Entergy	**Toni Green** Entergy New Orleans, Inc.
Polly Rosemond Entergy New Orleans, Inc.	**Mark McGranaghan** EPRI	**Rick Anderson** Fayetteville PWC	**Joel Brown** Fayetteville PWC
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Robert Onsgard Florida Power and Light Company	**Bob Triana** Florida Power and Light Company	**Jamie Barber** GA Public Service Commission	**Alan England** Georgia Power
Mark Reeves Georgia System Operations Corporation	**Clay Smith** Georgia System Operations Corporation	**Roger Jones** Greenville Utilities Corporation	**Jim Morozzi** GridWise Alliance
Wes McDowell Gulf Power	**Joe Schatz** Gulf Power	**John Janowiak** International Engineering Consortium	**Victor Monfort** Jacksonville Electric Authority
Anthony Foxx Mayor, City of Charlotte	**Ron Littlefield** Mayor, City of Chattanooga	**David Warden** MCNC	**Mike Stanley** MEAG Power

Alonzo Weaver Memphis Light, Gas, and Water Division	**Carol Painter** National Energy Technology Laboratory	**Russell Duncan** NC Department of Commerce - Energy Division	**Ward Lenz** NC Department of Commerce - Energy Division
Jeff Warren NC Senate President Pro Tempore Staff	**James S. McLawhorn** NC Utilities Commission	**Jack Floyd** NC Utilities Commission - Public Staff	**Robert Gruber** NC Utilities Commission - Public Staff
William Bowen North Carolina A&T State University	**Wesley Davis** North Carolina A&T State University	**Mike Burnette** North Carolina Electric Membership Corporation	**Ajaz Sadiq** North Carolina Electric Membership Corporation
Cecil Smith North Carolina Electric Membership Corporation	**John Hewa** NRECA	**Tracy Warren** NRECA	**Steve Hauser** NREL
Mackay Miller NREL	**Randolph Brecheisen** Piedmont EMC	**Richard Mabbott** Piedmont EMC	**Sue Hardison** Progress Energy
Becky Harrison Progress Energy	**Will Lowder** Progress Energy	**Lee Mazzocchi** Progress Energy	**Hershell McCarty** Progress Energy
Jay Oliver Progress Energy	**Robert Simpson** Progress Energy	**Dan Woodall** Progress Energy	**Lloyd Yates** Progress Energy
Allyn Powell SC Office of Regulatory Staff	**Heather Anderson** SC Senate & House Staff	**Andy Fiffick** SC Senate & House Staff	**Katie King** SC Senate & House Staff
Palash Das South Carolina House	**Rep. John R.C. King** South Carolina House	**Rep. Robert Williams** South Carolina House	**Kevin Brownlee** South Central Arkansas Electric Coop
Jerry Ford Southeastern Consulting Engineers, Inc	**Greg Detwiler** Southern Company	**Steven Pigford** Southern Company Services, Inc.	**RaSarah Browder** Talquin Electric Cooperative, Inc.
Bill May Talquin Electric Cooperative, Inc.	**Jeremy Nelms** Talquin Electric Cooperative, Inc.	**Lee Collins** TECO - Tampa Electric Company	**David Goodman** Tennessee Economic and Community Development - Energy Division
Michael Elliott The Integral Group	**Deana Perlmutter** The Integral Group	**Judith Schwartz** To the Point	**Don Bowman** Wake EMC

Appendix 2: Workshop Agenda

The Southeast Grid Modernization
Peer to Peer Workshop

Building a Community of Practice

WEDNESDAY, OCTOBER 26 Hosted by Duke Energy

8:30am – 9:00am	**Registration / Light Breakfast** Hilton Charlotte Center Place, Mecklenburg Hall
9:00am – 9:30am	**Welcome and Introduction** Don Denton, Duke Energy **DOE Overview and Introduction** Eric Lightner, DOE
9:30am – 10:30am	**Panel: Sharing Lessons That Create Value**
10:30am – 10:45am	**Break**
10:45am – 11:45am	**Breakout Discussions** • **Strategic Change Management:** How are deployments impacting your organization? Dunn Room • **"Futureproofing":** Grid Investments (breaking silos; modularizing components) Graham Room • **Business Models:** Creating Value between IOUs, Munis, and Co-Ops (interop; cost/benefit; etc) Graves Room • **Communicating with Customers, Managing Social Media:** What does the brave new world hold? Mecklenburg Hall • **Business Processes:** How have business processes changed in the era of smarter grids? Mecklenburg Halll
11:45am – 1:00pm	**Networking Lunch** Hilton 1st Floor Atrium
1:00pm – 2:00pm	**Panel: Biggest Aha! Moments from Implementation**
2:00pm – 3:00pm	**Breakout Discussions** • **Strategic Change Management:** How are deployments impacting your organization? Dunn Room • **"Futureproofing":** Grid Investments (breaking silos; modularizing components) Graham Room • **Business Models:** Creating Value between IOUs, Munis, and Co-Ops (interop; cost/benefit; etc) Graves Room • **Communicating with Customers, Managing Social Media:** What does the brave new world hold? Mecklenburg Hall • **Business Processes:** How have business processes changed in the era of smarter grids? Mecklenburg Halll
3:00pm – 3:15pm	**Break**
3:15pm – 4:15pm	**Breakout Discussion Report-out**
4:15pm – 4:30pm	**Closing Day One**
4:30pm – 5:30pm	**Free Time**
5:30pm – 7:30pm	**Reception** Duke Energy Center, Vista Room – 46th Floor

The Southeast Grid Modernization
Peer to Peer Workshop

Building a Community of Practice

THURSDAY, OCTOBER 27 Hosted by Duke Energy

8:00am – 8:30am	**Registration / Light Breakfast** Hilton Charlotte Center Place, Mecklenburg Hall
8:30am – 9:15am	**Welcome and Introduction** Lloyd Yates, President and CEO, Progress Energy Carolinas **Keynote Address** Patricia Hoffman, Assistant Secretary, DOE, Office of Electricity Delivery and Energy Reliability
9:15am – 10:15am	**Panel: Grid Modernization: Operational, Economic, and Competitiveness Impacts** **Introductory Remarks** Ron Littlefield, Mayor of Chattanooga, TN
10:15am – 10:30am	**Break**
10:30am – 11:00am	**Breakout Discussions** • **Business Models (IOUs, Munis, Coops)** Dunn Room • **Consumer Engagement and Impact** Graham Room • **"Futureproofing" Grid Investments** Graves Room • **State and Federal Policy Drivers** Ardwell Room • **Economic Development and Competitiveness** Mecklenburg Hall • **Change Management (Utility, Policy, Regulatory)** Mecklenburg Hall
11:00am – 11:15am	**The Charlotte Experience** Remarks by Anthony Foxx, Mayor of Charlotte, NC
11:15am – 12:00pm	**Breakout Discussion Report-out and Discussion** 5 minutes per table
12:00am – 1:15pm	**Networking Lunch** Hilton 1st Floor Atrium
1:15pm – 2:00pm	**Panel: Measuring Progress: What Does Success Look Like?**
2:00pm – 2:15pm	**Break**
2:15pm – 3:00pm	**Panel: The Big Picture: Looking Ahead to What's Next**
3:00pm – 3:30pm	**Closing Remarks** Eric Lightner : Don Denton : Becky Harrison