Progress Energy

November 1, 2010

U.S. Department of Energy
Office of Electric Delivery and
Energy Reliability
ATTN: Smart Grid RFI:
Addressing Policy and Logistical Challenges
1000 Independence Avenue, SW
Room 8H033
Washington, DC 20585

Re: Smart Grid RFI: Addressing Policy and Logistical Challenges

To Whom It May Concern:

Thank you for providing Progress Energy the opportunity to respond independently to this important RFI. As a recipient of the Smart Grid Investment Grant, we take pride in knowing we are helping transform the Grid to better serve our customers throughout the Carolinas and Florida. The company is pursuing a balanced strategy for a secure energy future, which includes aggressive energy-efficiency programs, investments in renewable energy technologies and a state-of-the-art electricity system.

We have provided responses to all the questions and have listed these in order of appearance in the RFI.

Please don't hesitate to contact me if you have any questions.

Sincerely,

Becky Harrison

Becky Harrison
General Manager – Smart Grid Program Office
(919) 546-6274

Progress Energy Service Company, LLC
P.O. Box 1551
Raleigh, NC 27602

I. Definition and Scope

I.1. We invite comment however on whether this [Title XIII] is the best way to define the smart grid. What significant policy challenges are likely to remain unaddressed if we employ Title XIII's definition? If the definition is overly broad, what policy risks emerge as a result?

- While Title XIII starts framing the necessary committee's and organizations needed to start outlining the Smart Grid discussion, it is lacking in the clear definition of the objectives that the Department of Energy (DOE) should be trying to convey to the public and industry.

- Policy challenges will always continue to exist with a topic with the breadth and depth of Smart Grid. However, by steering the discussion towards what the objectives of Smart Grid should be, the DOE will allow the public and industry to clearly define what the Smart Grid will become through a variety of solutions based on the end users identified needs. There will, most likely, not be a 'one size fits all' for Smart Grid.

- Progress Energy views Smart Grid as a decade-long series of investments in equipment, systems, technologies, and communication infrastructure that add "intelligence" to the power delivery system, from the generation of power to the end use customer, while enabling optimized performance. This optimization will be across the entire Energy Value Chain. Out of these investments, Progress Energy sees lower CO_2 emissions, increased efficiency and reliability within the power grid, better customer decision making, and more affordable energy for our customers into the future.
    - Progress Energy has structured our investments to provide
        - Enhanced customer-facing capabilities and interface
        - Advanced grid-side capabilities and enhancements, including the integration of renewable generation

- Progress Energy believes it is vital for the long-term success of the Smart Grid that the DOE sets clear objectives to balance supply and demand and place the customer in control for the future without defining the solution. The electrical industry, vendor community and engaged public are equipped to offer these solutions.

I.2. We also invite comments on the geographic scope of standardization and interconnection of smart grid technologies. Should smart grid technologies be connected or use the same communications standard across a utility, state, or region? How does this vary between transmission, distribution, and customer-level standards? For example, is there need to go beyond ongoing standards development efforts to choose one consumer-facing device networking standard for states or regions so that consumers can take their smart appliances when they move and stores' smart appliance will work in more than one service area?

- As stated in the answers to Question I.1, Progress Energy believes it is appropriate for the DOE to set the objectives of Smart Grid but should not mandate a single network standard or device. As Smart Grids are deployed across a utility service territory, no one networking technology is likely to be optimum for all geographic areas. In fact, choosing one device or technology may impede innovation and cause the customer to disengage. Innovative solutions to handle all of the issues with Smart Grid will come from the electrical industry, vendor community and engaged public.

- Optimizing the energy value chain through the implementation of Smart Grid is a complex systems challenge requiring an enterprise level approach to integrating multiple Smart Grid objectives. In order to fully realize all the potential benefits for an individual utility or customer, a holistic view must be taken. All players in the value chain must be engaged in defining and implementing the solutions. Integrated Utilities are well suited to meet this challenge, however, whether you are dealing with an integrated utility or not, you will have to have all the players at the table in order to solve this systems challenge and capture the full optimization opportunity.

- New radio frequency spectrum options must be made available to utilities to allow them to develop and implement the reliable wireless networks necessary to support the stringent requirements of the Smart Grid. A new policy where the Federal Government grants the utilities the spectrum necessary, in a suitable bandwidth, to enable the development of the wireless systems necessary to make the Smart Grid a reality. The spectrum should provide adequate reach and broadband capacity. Progress Energy supports Utilities Telecom Council (UTC) in sharing the 700 MHz Public Safety Broadband Spectrum with Utilities and Other Critical Infrastructure Industries. *Reference FCC Public Notice released September 28, 2010 PS Docket No. 06-229.*

II. Interactions With and Implications for Consumers

II.1. For consumers, what are the most important applications of the smart grid? What are the implications, costs and benefits of these applications? What new services enabled by the smart grid would customers see as beneficial? What approaches have helped pave the way for smart grid deployments that deliver these benefits or have the promise to do so in the future?

- Consumers cannot be addressed in a one-size-fits-all approach. They vary in their wants, needs, motivations, and preferences. It can be misleading to generalize. The costs of potential services, which will vary by utility are not yet known and may be viewed as beneficial by consumers include:
    - Shorter outage duration
    - Payment and rate options
    - Improved power quality and reliability
    - Near real time information about electricity usage
    - More and/or enhanced DSM/EE options, including demand response
- At this time, customers do not understand the intricacies of the current system, therefore, their understanding of smart grid applications/services and their potential benefits is not well-developed. Significant communication is needed to help educate customers. Savings to the customer will not be inherently obvious. They will come in a multitude of ways, including avoided costs, societal benefits from improving reliability and a small direct cost savings component. Many of the savings being promoted as benefits of smart grid can be achieved simply through customer behavior changes that do not require smart grid technology to be deployed.
- Consumer privacy and shared data ownership issues must be resolved.

II.2. How well do customers understand and respond to pricing options, direct load control or other opportunities to save by changing when they use power? What evidence is available about their response? To what extent have specific consumer education programs been effective? What tools (e.g. education, incentives, and automation) increase impacts on power consumption behavior? What are reasonable expectations about how these programs could reshape consumer power usage?

- Customers do not have a good understanding of these concepts. Industry studies/pilots have been and are being conducted. More research on price as well as societal norms is needed to understand the multiple drivers that will impact a customer's behavior (refer to recycling program success and smoking cessation).
- Customer choice should help "pull" the deployments, in stages, to targeted audiences from a portfolio of options identified to meet customer needs
- Progress Energy believes that only a small portion of customers will change behavior based on price alone and buy into Smart Grid programs. Convenience, consumer

lifestyle and personal societal objectives are all components in the customer's decision. All of these components must be engaged to be effective. Therefore, DOE needs to clearly establish Smart Grid objectives and let the market drive the solutions.

II.3. To what extent might existing consumer incentives, knowledge and decision-making patterns create barriers to the adoption or effective use of smart grid technologies? For instance, are there behavioral barriers to the adoption and effective use of information feedback systems, demand response, energy management and home automation technologies? What are the best ways to address these barriers? Are steps necessary to make participation easier and more convenient, increase benefits to consumers, reduce risks, or otherwise better serve customers? Moreover, what role do factors like the trust, consumer control, and civic participation play in shaping consumer participation in demand response, time-varying pricing, and energy efficiency programs? How do these factors relate to other factors like consumer education, marketing and monthly savings opportunities?

- Customer education is a significant factor in eliminating barriers to adoption. Customers are not likely to accept and adopt smart grid technologies until they have a better understanding of its:
    - Purpose and benefit
    - Impact to their comfort
    - Privacy and security
    - Ease of use

- Part of the challenge will be to determine the right amount and type of information to provide to customers to help them see the value and make the connection from their behavior to their energy consumption in a way that is actionable for them.
- The electric industry should leverage lessons learned from other industries such as the cellular industry in their transition to simple, easy to understand billing plans; the recycling industry in their successful campaigns to get people to understand the importance of recycling. These factors will drive the marketing and communication plans necessary to encourage adoption of these products/services by customers once they are available.
- It will be important for customers to consider their utility as a trusted partner and systems expert, engaged in the community, for the full value proposition of smart grid to be realized. If customers are willing to allow their utility to control their appliances and equipment as advanced control capabilities are developed, utilities will be able to optimize the demand side of the supply/demand curve based on the customers' preferences and choices to optimize the energy value chain.

II.4. How should combinations of education, technology, incentives, feedback and decision structure be used to help residential and small commercial customers make smarter, better informed choices? What steps are underway to identify the best combinations for different segments of the residential and commercial market?

- We expect to implement pilot programs (pricing options, prepay, and more – not yet defined) to help us better understand how to develop effective programs that will help residential and small commercial customers make informed choices.
- Progress Energy is a member of the Smart Grid Consumer Collaborative in order to pool resources to gain knowledge of what consumers need and how to communicate with them.

II.5. Are education or communications campaigns necessary to inform customers prior to deploying smart grid applications? If so, what would these campaigns look like and who should deploy them? Which related education or public relations campaigns might be attractive models?

- Lessons learned from the recycling programs and smoking cessation should be applied to Smart Grid consumer education campaigns to find the best ways to change behavior. This could be a combination of Government and Utility education programs. This will help create customer choice to "pull" the deployments, in stages, to the targeted audiences from a portfolio of options identified to meet customer needs
- Education campaigns are key and will focus on helping customers understand the potential benefits of smart grid. Since there are varying approaches to smart grid, these campaigns should primarily be carried out by each utility. A more broad education campaign at the DOE/industry level could also be effective in establishing some baseline consumer knowledge about smart grid technology. Also, as a partner in the Global Intelligent Utility Network Coalition (GIUNC), Progress Energy shares best practices, including marketing and communications, among other utilities advancing smart grid technologies.
- At Progress Energy, we have a diverse mix of customers (demographics, psychographics, etc.) and we will need to use a diverse mix of tactics to reach them. Campaigns will include public relations and marketing tactics, using the web, video, email, direct mail, collateral, and more.

II.6. What should federal and state energy policymakers know about social norms (e.g. the use of feedback that compares a customers' use to his neighbors) and habit formation? What are the important lessons from efforts to persuade people to recycle or engage in other environmentally friendly activity? What are the implications of these insights for determining which tasks are best automated and which should be subject to consumer control? When it is appropriate to use social norm based tools?

- More research is needed to understand how customers will respond to social pressures associated with reducing energy use. Social norm studies should be a component of a holistic approach to customer research. Lessons learned from the recycling programs and smoking cessation should be applied to Smart Grid consumer studies to find the best ways to change behavior.

II.7. How should insights about consumer decision-making be incorporated into federal-state collaborative efforts such as the Federal Energy Regulatory Commission's (FERC) National Action Plan on Demand Response?

- Insights into consumer decision-making should be incorporated into the communications plans resulting from the FERC National Action Plan. However, the line between general consumer education and direct demand response program marketing should be clear. While similar in concept, there are differences in the programs offered to customers by each utility. Each respective utility should be conducting the direct marketing and communication surrounding program specifics.

III. Interactions With Large Commercial and Industrial Customers

III.1. Please identify benefits from, and challenges to, smart grid deployment that might be unique to this part of the market and lessons that can be carried over to the residential and small business market. Please identify unmet smart grid infrastructure or policy needs for large customers.

- Large Commercial and Industrial Customers are expected to benefit from smart grid deployment in these areas:
  - Power system reliability - Large Commercial and Industrial customers expect their utility to minimize service outages and to be able to provide them timely and accurate information regarding anticipated restoration time when outages do occur. Progress Energy currently provides customers with estimated time of restoration.
  - Power quality – Improved voltage and service parameters on the distribution system. Improved voltage regulation and enhanced ability to quickly locate and repair problems on the system. Progress Energy Carolinas has improved its response time with the ability to provide fault location quickly to crews. We are currently working to incorporate the Distribution System Demand Response infrastructure to address any voltage regulation needs.
  - At this time, the following needs are largely unmet:
    - Manage and control the cost of their electric service –benefit by the use of real time metering information at all their facilities, including sub metered locations, allowing them to more easily utilize energy management systems to monitor and control their demand and usage. This enhanced metering information will enable them to participate in additional Demand Response (DR) and Demand Control (DC) applications to manage and lower their costs.
    - Enhanced rate applications – The intelligent metering systems will enable advanced rate applications which will provide customers additional operational and usage options for their businesses.
    - Enhanced metering and billing information which will allow multi site customers to easily compare and benchmark data among their locations.
    - Enhanced ability to utilize renewable generation services to meet all or a portion of a customer's electric service needs. As the costs of photo-voltaic systems fall, installations of these systems will continue to escalate. Deployment of smart grid will enable the customer and the utility to integrate these systems into the distribution system to manage costs and to enhance reliability.
    - Standard Energy Management platform compatible to all Customer facilities in all States and all Utilities.

- Challenges to smart grid deployment. Large Commercial and Industrial Customers will be reluctant to participate in:

    - Energy management, DR or DC applications which may negatively impact their operations or customers' perceptions of their business without the ability to Opt Out.
    - Smart grid applications which may result in revealing proprietary operational information about their business or relinquish control of their Energy Management System or usage data.
    - Smart grid applications which do not have a clear, tangible and certain benefit to them such as higher prices or losing existing benefits
    - Smart grid applications which are complex or difficult to understand.

IV. Assessing and Allocating Costs and Benefits

IV.1. How should the benefits of smart grid investments be quantified? What criteria and processes should regulators use when considering the value of smart grid applications?

- There is no special category of "Smart Grid" projects. This question and many of the following questions highlight the confusion around Smart Grid projects.
  - Smart Grid projects are simply projects that utilize digital technology and electronic advances. A demand response (DR) or demand side management (DSM) program that relies upon a "smart meter" to enable a customer to shift load, is still a DSM program. It is simply using Smart Grid technology.
  - New distribution system monitoring and control equipment allowing a utility to know in real time the cause and location of an outage is simply a cost effective improvement to the utility's distribution system and no different from a utility moving to AMR which allows a utility's to discontinue sending a representative to visually read all customer meters and instead simply drive by the meter and receive the meter data wirelessly.
  - In evaluating the value of a Smart Grid application, regulators should weigh the benefits against the costs over the life of the application. Traditionally, the benefits of such applications are the costs the Smart Grid applications allow the utility to avoid. The costs of the application are the costs incurred by the utility to administer the program. Questions exist as to whether there are other qualitative benefits that should be considered and whether the costs of the application should also include: costs incurred by the participants; incentives paid by the utility to the customer to encourage adoption of the application; and utility lost revenues. The utilities need a cost/benefit methodology and cost recovery mechanism agreed to by the state regulators. In the absence of such direction, utilities may not pursue certain Smart Grid programs that fail a traditional utility project evaluation.

IV.2. When will the benefits and costs of smart grid investments be typically realized for consumers? How should uncertainty about whether smart grid implementations will deliver on their potential to avoid other generation, transmission and distribution investments affect the calculation of benefits and decisions about risk sharing? How should the costs and benefits of enabling devices (e.g. programmable communicating thermostats, in home displays, home area networks (HAN), or smart appliances) factor into regulatory assessments of smart grid projects? If these applications are described as benefits to sell the projects, should the costs also be factored into the cost benefit analysis?

- State regulators and their utilities must partner to ensure the potential benefits, cost, and risk for customers are balanced appropriately with the risk and benefits for the utility shareholders. If shareholder risk increases, they will expect a comparable increase in the return on their investment to compensate for the increase investment risk profile. If this is not done, utilities will not make the necessary investments to advance smart grid.

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- The DOE needs to have clearly stated objectives and identified metrics for the Smart Grid that are directly aligned with the state regulators objectives for the benefit of their customers and the utilities they serve.
- Progress Energy believes it is vitally important to the success of the Smart Grid to understand how to treat the societal benefits from the advancement of Smart Grid. This again emphasizes the need to justify these Smart Grid expenses even if the benefits do not come back directly to the utility.
    - Smart grid benefits, including the potential to avoid other generation, transmission and distribution investments, are necessary components associated with the smart grid forecast. Uncertainties will exist and a utility must use the best information available at the time for its forecasts. The calculation of benefits should include a reasonable range of possibilities (e.g., low, medium, high) to recognize risk levels. Cost-effectiveness calculations should also include conservative estimates of benefits to minimize risk and ensure value over the widest range of potential outcomes.
    - From a societal (Total Resource Cost) perspective, the cost-benefit analysis should account for any costs incurred by customers (or benefits accrued to customers). To the extent that enabling devices provide enhanced benefit opportunities, then their costs and benefits to all relevant parties should be recognized

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IV.3. How does the notion that only some customers might opt in to consumer facing smart grid programs affect the costs and benefits of AMI deployments?

- Before a large scale AMI or other smart grid deployments take place, Progress Energy should understand what the customers want out of these programs. Being a part of the Smart Grid Consumer Collaborative will help Progress Energy understand these unknowns. The groups' fundamental objectives are to listen to the consumer, help educate the consumer, and collaborate with the consumer to bring a portfolio of programs that fit their electrical objectives.

- Deployments should occur for only those customers that “sign up” for the services and phase in technology in a stair step approach.

- This question highlights the need to provide multiple applications and strategies in order to offer several alternatives to consumers. Provide enough infrastructure for the customer to see the benefits.

- Non-participant based benefits from AMI technologies should be considered within the cost and benefit analysis. As such the costs and benefits of AMI deployment should be quantified from the perspective of each customer group (opt-ins and opt-outs) as well as all customers as a whole.

- In addition, proper program development and planning is required to mitigate the chance of a program’s participation rate falling below the cost-effectiveness threshold. This requires proper market research and piloting with target customers to gather useful requirements and ensuring these requirements are met during implementation. Also, supporting the program with effective marketing techniques to gain and keep participants will be required to maintain the program benefits.

IV.4. How do the costs and benefits of upgrading existing AMR technology compare with installing new AMI technology?

- Leverage experiences gained from past AMR deployments to educate customers and phase in AMI.
    - Upgrading existing AMR technology may not be a cost effective or a workable solution. Field tests have shown that converting the AMR signals into interval data is not accurate enough for time of use billing purposes. Also, communication signals to these AMR meters are typically one-way. This eliminates one of the best benefits from an AMI network which is two-way near real-time communications.
    - Progress Energy and other utilities that have already installed an AMR system have captured approximately 50% of the business case benefits of AMI. AMR has provided the financial benefit of reduced meter reading costs.

- Use a stair step approach. Progress Energy is taken the approach of targeted AMI. This plan initially targets 5% of customers for the AMI upgrade. Progress Energy wants to allow the customers who desire more control of their energy profile to have more options to better manage their consumption. We believe this approach will allow initial deployments to gain momentum and more closely mirror costs and benefits for the AMI deployment. With the successful initial deployment, our customers will provide deeper layers of AMI participation at their pace and not the utilities.

- The first generation of AMI technologies will quickly evolve and likely not provide the full benefit of the expected AMI benefits, so with Progress Energy's stair step approach, investments in AMI infrastructure limit the stranded assets as the technology evolves.

IV.5. How does the magnitude and certainty of the cost effectiveness of other approaches like direct load management that pay consumers to give the utility the right to temporarily turnoff air conditioners or other equipment during peak demand periods compare to that of AMI or other smart grid programs?

- Progress Energy believes that answering this question will require more education for our customers not only about Smart Grid; but also, the way the traditional utility has operated for many years. The electrical grid is still a very complicated system even before we add the layers of complexity that Smart Grid brings.

- Market pricing does not truly reflect the total cost of energy. Utilities have a significant fixed cost. This cost is a large part of the rate structure for our customers. Another very large portion of the rate structure is the fuel pass through cost. So informing our customers of the part of their bills that might be affected by programs like Critical Peak Pricing and Real Time Rebates need to be fully explored with them. They need to understand the variable component of their bill each month is relatively small.

- Progress Energy also knows that we are not going to be able to treat all of our customers the same. For example, we need to understand the different needs for a residential customer versus one that has a home business. Being able to have a robust portfolio of offerings will allow Progress Energy to meet individual customer needs better through offering a customize solution to meet their unique needs and desires.

- Offering the lowest cost option for customers who participate in demand response can serve as an introduction to customers for Smart Grid technologies.

- Direct Load Control (DLC) is much more reliable as a load reduction mechanism than sending a price signal to a customer that may or may not decide to reduce his load based on that price signal. Two way communications on the new DLC switches can allow for load sequencing control.

- The future DLC switch needs to be included in the holistic customer program portfolio. This portfolio will provide programs that give more environmental value and the ability to saves more electricity.

- One way to overcome objections and entice more program participation is to offer customers additional services/features besides just bill credits. These new capabilities and features that an AMI network will facilitate can add new participants that traditional

DLC programs cannot acquire plus they are more likely to stay on a DR program when needed because it better fits their lifestyle and needs. These include:

- Opt-out capability
- Automatic, customer pre-set appliance control
- Time-of-use rates
- Usage disaggregation
- In-home displays
- Alarms
- Benchmarking
- On-line energy analysis

- DLC is more reliable in delivering demand response benefits. However customer-controlled programs supported by AMI systems, may appeal to additional customers and these customers will be are more likely to continue in their DR program since it better fits their needs and desires. The larger number of participants and potentially higher impacts per customer can provide more overall benefits and reliability in the long run.

IV.6. How likely are significant cost overruns? What can regulators do to reduce the probability of significant cost overruns? How should cost overruns be addressed?

- The label "Smart Grid project" really only connotes the tools used to accomplish the utility system improvement or the Demand Side Management (DR/DSM) or Energy Efficiency program. Such expenditures should only be made after the performance of proper cost benefit analyses. As the programs/projects are being implemented actual benefits and costs should be subject to measurement and verification and evaluation. Depending on the results of the measurement, verification and evaluation, the programs/projects should be expanded, altered or abandoned. Assuming the costs incurred are reasonable and prudent, the costs should be recovered from the customers who directly benefited from the program/project.

- Do not make new Smart Grid standards or regulations retroactive to existing installations. By having the DOE place firm objectives out to the industry now and allowing the rule making bodies to pursue firm standards and regulations, the Smart Grid will be able to better fulfill the benefits that have been laid out for it without experiencing significant cost increase and schedule impacts.

    - Progress Energy believes we can look to the past for some answers to these questions. Taking the development of the nuclear power industry in our country forty years ago, the standards and regulations in that industry were evolving rapidly as the nuclear power plants were being constructed. Adherence to these new standards was mandated and the industry had to go back and retrofit these new standards and regulations to existing plants or plants under construction. These changes significantly drove up the cost eventually eroding some of the benefits that were initially promised through this new technology.

IV.7. With numerous energy efficiency and renewable energy programs across the country competing for ratepayer funding, how should State Commissions assess proposals to invest in smart grid projects where the benefits are more difficult to quantify and the costs are more uncertain?

- There is no special category of "smart grid" projects. "Smart grid" projects are simply projects that utilize digital technology and electronic advances. Cost effective programs and projects that use "smart grid" technology should be prioritized and implemented accordingly. Regulators need to understand and account for the various levels of uncertainty and risk associated with each type of project.

- The regulatory compact between state commissions and the investor owned utilities (IOU) must be understood as new rules are being evaluated. In the past, in order to have access to sufficient capital to build the electric infrastructure we have today, the IOUs had to pay out a rate of return equivalent to the risk profile for the investors. If more risk is shift to the IOUs, the utility shareholders will expect a higher rate of return to invest. Either way, it must be recognized that the customers ultimately pay, either through higher rates to cover the investments or high rate to cover the increase cost of the utility.

- Utilities serve a critical societal service. In order to perform this service, they must attract capital funding, for programs like Smart Grid, by providing a low risk guaranteed rate of return. So, the regulator component of the Smart Grid cannot be minimized.

IV.8. What are appropriate ways to track the progress of smart grid implementation efforts? What additional information about, for example, customer interactions should be collected from future pilots and program implementations? How are State Commissions studying smart grid and smart meter applications in pilots? In conducting pilots, what best practical approaches are emerging to better ascertain the benefits and costs of realistic options while protecting participants

- While there is no special category of smart grid projects from a regulatory cost/benefit analysis perspective, it may be helpful for the industry and public education to see different projects identified and metrics associated with them. Use of national smart grid websites like (www.smartgrid.gov) and (www.sgiclearinghouse.gov) or the consumer collaborative website (http://smartgridcc.org/) could be kept current and be used to track progress of nationwide smart grid implementations efforts.

IV.9. How should the costs of smart grid technologies be allocated? To what degree should State Commissions try to ensure that the beneficiaries of smart grid capital expenditures carry the cost burdens? Which stakeholder(s) should bear the risks if expected benefits do not materialize? How should smart grid investments be aligned so customers 'expectations are met?

- The costs of smart grid should be allocated to all customers who directly benefit from its approved implementation. For smart grid investments that directly benefit all customers, standard cost of service allocators should be used. As explained earlier, for utility side "smart grid" expenditures should be based on standard utility cost benefit analyzes. For customer side of the meter expenditures, the standard DSM/EE cost benefit tests should be performed with the results properly considered. Proper and thorough market research for customer side of the meters should be performed prior to implementation.

- The Utility ultimately bears the risk for imprudent investments. Customers ultimately bear the risk for prudent investments.

- Investments should be aligned such that customer choice would "pull" the deployments in stages to targeted audiences.

IV.10. When should ratepayers have the right to opt out of receiving and paying for smart grid technologies or programs like meters, in home displays, or critical peak rebates? When do system-wide benefits justify uniform adoption of technological upgrades? How does the answer depend on the nature of the offering? How should regulators address customer segments that might not use smart grid technologies?

- Customers should have options to participate in any program they qualify for, but where utilities have demonstrated the value proposition for all customers for specific investment then all customers should pick up the cost of the program, not just the individuals that directly participate and benefit.

- Technology should be deployed in stages to provide investment in upgrades should be allowed based upon favorable general business case, which includes assumed participation and response rates.

- The uniform adoption of system-wide technological upgrades should be adopted when those upgrades are deemed to be cost effective.

- Regulators will not have to address customer segments that do not use Smart Grid technologies if customer choice "pulls" the deployments, in stages, to those targeted audiences from a portfolio of options identified to meet customer needs.

IV.11. How might consumer-side smart grid technologies, such as HANs, whether controlled by a central server or managed by consumers, programmable thermostats, or metering technology (whether AMR or AMI), or applications (such as dynamic pricing, peak time rebates, and remote disconnect) benefit, harm, or otherwise affect vulnerable populations? What steps could ensure acceptable outcomes for vulnerable populations?

- It is appropriate that cost of service based cost assignments be maintained irrespective of population. Vulnerable populations would have the same opportunity to participate in consumer-side smart grid technologies as any other customer with usage characteristics that might directly benefit from a specific program.

  - Low usage customers, who may see limited direct consumer-side benefit opportunities, are not at all disproportionately low income. Vulnerable populations also would realize the indirect benefit of distribution wide smart grid initiatives.

- Maintaining customer choice in the adoption of consumer-side smart grid technologies, would maximize benefits and minimize harm to individual customers

- Cost based pricing signals would motivate customer behavior and their choice of service offering. This is not to say that agencies or groups, other than the utility, could not provide consumer-side smart grid technologies or other types of assistance to vulnerable populations. It is important to point out that if smart grid technologies are a least cost option, vulnerable populations should be better off than had other resource options been employed.

- Prepay billing is an example of program that could provide a benefit to certain customer groups. This program will help the customer with budgeting and usage education. Salt River Project has received good customer satisfaction ratings from their customers enrolled in a prepay billing program.

- HANs and customer-operated devices that participate in Demand Response programs give the vulnerable customer more control and flexibility than DLC options.

- Remote disconnects can provide these customers with faster restoration times plus a reduction in the overall cost for both the disconnect and restoration process which get reflected back into the rates.

- Engage vulnerable populations in the planning stages of any AMI/Smart Grid project. This will help ensure their concerns and suggestions are heard and addressed in the implementation phase of the project.

V. Utilities, Device Manufacturers and Energy Management Firms

V.1. How can state regulators and the federal government best work together to achieve the benefits of a smart grid? For example, what are the most appropriate roles with respect to development, adoption and application of interoperability standards; supporting technology demonstrations and consumer behavior studies; and transferring lessons from one project to other smart grid projects?

- Full alignment on objectives for smart grid would allow the industry to advance quicker.
- A new policy must be established for the FCC to grant the utilities the radio frequency spectrum necessary in a suitable bandwidth to enable the development of the wireless systems necessary to make the Smart Grid a reality. See also the response for Question I.2.
    - One of the major challenges for the Smart Grid is the development of network systems capable of supporting the significant information flows for the full Smart Grid implementation. Both current and newly developed wireless technologies will be crucial for providing the required geographic reach and bandwidth necessary to support the requirements of the Smart Grid. A significant stumbling block in establishing these new wireless systems will be the availably of appropriate radio frequency spectrum.
- Many of the standards being developed through the NIST effort fall under the purview of what states are charged with regulating. For utilities to be able to successfully align with these standards, state regulators and the federal government must be aligned if they are going to require adoption.
- The federal government should continue to support the development of interoperability standards, which are key to developing markets for smart grid components.

V.2. How can federal and state regulators work together to better coordinate wholesale and retail power markets and remove barriers to an effective smart grid (e.g. regional transmission organization require that all loads buy ‘‘capacity’’ to ensure the availability of power for them during peak demand periods, which makes sense for price insensitive loads but requires price sensitive loads to pay to ensure the availability of power they would never buy)?

- Do not mandate a single regulatory model. A vertically integrated utility is uniquely positioned to provide shared benefits by optimizing the functionality of all its assets.
- Progress Energy is of the opinion that a vertically integrated utility will have the most to offer its customers in the Smart Grid world. Having generation, transmission, distribution and retail service in one company allows Progress Energy to provide a more complete portfolio of offerings for the environment and our customers.

  - Distribution System Demand Reduction (DSDR) program will allow Progress Energy to reduce load on the distribution system during peak times which alleviates the need to bring additional generation online to serve this load. The DSDR program ensures that during the load reduction that the customer's voltage stays within allowable boundaries. Reducing the load on the distribution system also optimizes the entire electrical grid by increasing capacity at distribution and transmission substations and lines while saving fuel costs for our customers and reducing CO_2 emissions. If Progress Energy was not a vertically integrated utility, the value of these benefits would be significantly reduced or difficult to justify.

  - The investments for DSDR also establish the foundation for future integration of distributed energy resources into the grid.

- Help maintain a relationship of trust between utilities and customers. At Progress Energy, we value our partnership with customers where the utility is entrusted with providing reliable electricity at a low cost. Maintaining this relationship is crucial to the success of a Smart Grid.

- The DOE and state regulators can fund work that will result in a value based plan that can stand alone. Care must be taken to avoid a one size fits all approach. Adding what's cost effective for each region's customers will enhance the overall benefits of Smart Grid. The addition of grants or other cost incentives to offset regional differences will also further the Smart Grid work.

- "Barriers" are more or less natural due to regional differences, available fuel mix, geography, or stiffness of the regional transmission grid. Existing wholesale and retail power markets have evolved over time to optimize regional costs and reliability and are not necessarily related to a common "business model".

- Federal and State Regulators can work together to create a common level of understanding; expand educational opportunities for the industry, public and government to better understand these regional issues. This can facilitate a targeted Smart Grid, regional approach to improve:

  - Generation Life cycle costs
  - Load shifting – optimizing the balance between supply and demand
  - Reduce fuel costs
  - Optimize fleet usage/O&M reduction
  - Reduce emissions

V.3. How will programs that use pricing, rebates, or load control to reduce consumption during scarcity periods affect the operations, efficiency, and competiveness of wholesale power markets? Will other smart grid programs have important impacts on wholesale markets? Can policies improve these interactions?

- Leverage lessons learned from other industries such as Recycling programs. Show the benefits to gain behavior changes.

- Economic incentives have historically been ineffective to attract significant reductions. Focus Smart Grid on reliability and fleet optimization as listed in #2 above will help improve operations, efficiency, competitiveness and acceptance.

- It will take at least a decade to realize the full value of smart grid investments. It must be recognized that smart grid is addressing a "systems" challenge. No one investment or advancement will make smart grid a reality. Appliance have to be upgraded, control systems have to be developed and deployed, distributed energy resources have to evolve and be deployed and all this has to be integrated into the existing grid. None of these things will happen overnight. All this takes time and investments in the enabling smart grid technologies need to be evolutionary over the next decade as these interdependent changes occur.

V.4. Do electric service providers have the right incentives to use smart grid technologies to help customers save energy or change load shapes given current regulatory structures?

- Direct load control programs have a long standing history of utility management with various incentive structures. Enhanced behavioral modification and load shape / control applications will develop once cost of generation is more closely associated with the cost of consumption by the customer and therefore associated with value of the incentive.

- The customers will only change their behaviors if they buy into the objectives of the Smart Grid program and these changes do not significantly impact their lifestyles. It is vital that the DOE continue to push for clear objectives and customer choice from the Smart Grid.

V.5. What is the potential for third-party firms to provide smart grid enabled products and services for use on either or both the consumer and utility side of the meter? In particular, are changes needed to the current standards or standard-setting process, level of access to the market, and deployment of networks that allow add-on products to access information about grid conditions? How should the interaction between third-party firms and regulated utilities be structured to maximize benefits to consumers and society?

- Similar to the public having to request a Permit for electrical work on the customer side of the meter through the local Authority Having Jurisdiction, Utilities must be aware of all work being performed on the utility side of the meter for security reasons, Labor Union contracts, National Electrical Safety Code (NESC) adherence and public safety.

OSHA regulations also require workers to be trained and qualified to perform work on the utility side of the meter. This necessitates Utility knowledge and approval of any work being performed. Therefore, installation of all products on the Utility side of the meter should be done by the Utility with reimbursement from the third party. Lease payments for use of equipment space will ensure the rate payers do not subsidize these installations. This is already in place and similar to make ready charges and pole rentals for cable TV or telephone companies' attachments. An example of this is DOT requested radar antennae on distribution poles to measure traffic flow and provide real time traffic information on the internet. The installations required Utility Crews with reimbursement and lease payments from the third party (other solutions were later determined by the DOT, however that didn't involve the Utility).

- Customer approvals to gather data by third parties must be required. Customer usage data must be kept in confidence and secure to prevent unauthorized use by others.

- For Security and reliability reasons, grid conditions and operational data should be obtained, maintained and stored by the utility and provided to third parties only if there is a documented need. Outage information along with relevant data such as estimated times of restoration can be provided to the customer or third party.

- Current NIST Interoperability Standards efforts are aimed to address this concern. There needs to be more meaningful participation by other utilities for this to be successful as it applies to technical interoperability, privacy and information sharing. In order for the Smart Grid to be interoperable, the gap that exists between policy, standards creation and manufacturer's development must be narrowed significantly.

V.6. How should customer-facing equipment such as programmable communicating thermostats, feedback systems, energy management systems and home area networks be made available and financed? Are there consumers behavior or incentive barriers to the market achieving efficient technology adoption levels without policy intervention?

- This equipment and technology is in its early stages. Like early Personal Computers, there will be shorter viable life and these components will need to be replaced every 3-4 years until the market matures. Therefore, it makes sense that customers provide the equipment they desire during the early adoption period. Government incentives can be used to encourage early adoption.

- In the open market, over the counter by innovative companies, including utilities.

- Once communication and interoperability questions have been answered, utility based programs can integrate programs based on cost/benefit analysis. In the interim, these devices are available for individual customers based on their independent valuation.

- Advanced rate structures that associate cost to produce, with cost to consume, will provide incentives for and use of energy information and automation that modifies behavior.

V.7. Given the current marketplace and NIST Smart Grid Interoperability Panel efforts, is there a need for additional third-party testing and certification initiatives to assure that smart grid technologies comply with applicable standards? If there is a need for additional certification, what would need to be certified, and what are the trade-offs between having public and private entities do the certification? Is there a need for certifying bodies to oversee compliance with other smart grid policies, such as privacy standards?

- Yes, the challenge utilities have is the ability to validate vendor compliance to the IEC CIM Model. The Standard Certification body can be a private entity authorized by the Government Agency such as EPRI. The ramp up time to use existing industry bodies like EPRI would be much faster than starting a new testing lab as an arm of the government. There are still some logistical challenges as to who would need to bear the cost of testing interoperability for vendor products needs to be addressed. The interoperability standards between the various systems for Information Exchange are used in other Industries such as HIPAA Data Exchange standard in Healthcare and Electronic Data Interchange (EDI) for retail transactions.

- In order to fully leverage the automation capabilities which are available from the smart intelligent devices, utilities need to be able to better understand the data from these devices in conjunction with existing systems in use at the utilities.

VI. Long Term Issues: Managing a Grid With High Penetration of New Technologies

VI.1. What are the most promising ways to integrate large amounts of electric vehicles, photovoltaic cells, wind turbines, or inflexible nuclear plants? What approaches make sense to address the possibility that large numbers of other consumer devices that might simultaneously increase power consumption as soon as power prices drop? For instance, what is known about the viability of and tradeoffs between frequently updated prices and direct load control as approaches to help keep the system balanced? How do factors like the speed of optimization algorithms, demand for reliability and the availability of grid friendly appliances affect those trade-offs?

- Much research investment is needed in these areas. The National Science Foundation-funded FREEDM project is addressing the issues related to integration of large amounts of electric vehicles and distributed resources, and Progress Energy would recommend increased attention to this effort.

- An objective of the DOE should be in advancing storage technologies. One way to handle future variations in both distributed generation (renewable) and atypical loads (EV) would be through the use of utility-owned and controlled energy storage. As the EV market matures, there may be opportunities to leverage the technological advances in energy storage for the utility market. Storage could be at the customer level, neighborhood, feeder, substation or other suitable level with some corresponding price compensation.

- Price changes should be stepped or applied with some diversity across the T&D system, and also in a timeframe that closely matches ramp rates for overall system loading that are similar to what is currently experienced.

- Study should also evaluate rate structures that allow for advanced forecasting tools that can accurately predict system load based on price signals.

- Progress Energy believes reliability comes first and any tools (DLC, optimization of the distribution grid) must be capable of being implemented very quickly (seconds to minutes). The Smart Grid will need to be able to handle the potential for a trillion transaction market to be dynamically linked to grid operations. An intermediate step is to demonstrate the linkage of customer devices to an advanced distribution system.

- A limitation to integration of multiple devices and/or technologies is communication. Developing standards or agnostic protocols that enable capability across the utility grid and with each other will advance adoption, and support the development of new applications.

- The public also will need to understand that even if they have an EV, DG, wind turbine, etc. that is feeding back into the grid, there is not a “net zero” calculation. The utility has spent many years and millions of dollars building the electrical grid. So it is not feasible for the customer to believe he or she will be able to sell a kW back to the utility at the same price that they have to buy one at.

VI.2. What are these strategies' implications for competition among demand response, storage and fast reacting generation? What research is needed to identify and develop effective strategies to manage a grid that is evolving to, for example, have an increasing number of devices that can respond to grid conditions and to be increasingly reliant on variable renewable resources?

- Further investment in the FREEDM project is needed which is focused on dealing with high levels of variability on the distribution system. The high voltage grid with large generation and transmission must be maintained, enhanced, and protected in order to maintain its unique role in large power transfer and system reliability.

- Distributed resources that are located coincident to loads and are distributed and diversified with respect to location and type (residential and commercial PV, wind, etc.) can be more easily integrated on the existing T&D system. The FREEDM project will enhance the ability for this type of generation to operate on the system.

- Depending on what level the energy is stored, the complexity of the energy management will vary. If the energy is stored at the point of renewable interconnection or "abnormal" usage, then the resulting power flow will simply appear as a reduced energy usage and will minimize reverse power flow situations. If we store at a "utility" level, then we are exposed to reverse power flows on the distribution grid. While there are standards preventing back feeds during fault conditions (IEEE 1547), the result could be a spike in usage after a fault when distributed generators are off.

- Load Forecasting Models will have to become much more granular on an hour ahead basis in order to economically dispatch all resources and create benefits for the customers. Models will have to show risk of any resource not available and risk of load variances, appropriate actions to take based on rates and price signals, etc.

- Demand response, storage, and fast reacting generation offer unique value propositions under various scenarios of reliability, renewable energy deployment, and grid stability. Additional research and demonstration to define operational advantages and differences that can be used to justify these valuations and define desired applications is needed.

- Overuse of load control will reduce customer's desire to continue its use and we need to identify alternatives to load control.

VI.3. What policies, if any, are necessary to ensure that technologies that can increase the efficiency of ancillary services provision can enter the market and compete on a level playing field?

- Progress Energy believes a level playing field is needed in this Smart Grid environment; but there needs to be an understanding by third party players that the grid has been and will continue to be funded through base rates paid by the utility's customers. Consideration in pricing out use of that grid will have to be evaluated and charged.

- New radio frequency spectrum options must be made available to utilities to allow them to develop and implement the reliable wireless networks necessary to support the stringent requirements of the Smart Grid. A new policy where the Federal Government grants the utilities the spectrum necessary, in a suitable bandwidth, to enable the development of the wireless systems necessary to make the Smart Grid a reality. The spectrum should provide adequate reach and broadband capacity. Progress Energy supports UTC in sharing the 700 MHz Public Safety Broadband Spectrum with Utilities and Other Critical Infrastructure Industries. *Reference FCC Public Notice released September 28, 2010 PS Docket No. 06-229.*

VI.4. What policies, if any, are necessary to ensure that distributed generation and storage of thermal and electrical energy can compete with other supply and demand resources on a level playing field?

- Before policies will be effective in moving the electric industry towards smart grid, clear measurable objectives must be established. The objectives need to focus on the end goal not the "how" for achieving the end goal. The market will develop the solutions needed once the goal it is established.

- Progress Energy believes a level playing field is needed in this Smart Grid environment; but there needs to be an understanding that the grid that a third party will be using is part of the base rates paid by the utility's customers. Consideration in pricing out use of that grid will have to be evaluated and charged.

- Regulatory policies that more properly allocate costs are always better. In North Carolina, speculation has been made that rates have, over decades, favored residential customers over industrial customers, due to utilities commission desire to protect the low-income customer. If rates were more reflective of actual costs, customer classes with higher utility costs would be better able to consider renewable energy and energy storage as an alternative, which over time would ensure that the appropriate types of energy conversion and storage mechanism were utilized most efficiently.

- Smart Grid investments should be optimized over the entire energy value chain. Progress Energy, as a fully integrated utility, has an advantage in developing the business case for using the distribution system to offset generator ramp up or additional plant construction.

- The system nature of the grid must be recognized and fully understood with regards to advancing smart grid in the industry. The utilities are in a unique position to managing the increasing complexity of the electrical grid and its interdependent components.

VI.5. What barriers exist to the deployment of grid infrastructure to enable electric vehicles? What policies are needed to address them?

- PEV charger Manufacturers and distributors of the product must provide some form of notification or education to customers that the product may impact the grid and they should contact the utility prior to purchasing.
    - For example, customers installed electric instant water heaters purchased "over the counter" without any education and this impacted voltage flicker and transformer loading such that some customers incurred additional costs to upgrade their transformer, erasing any savings they might have realized. This may be synonymous with quick charging PEV chargers, if utility notification is not required for installation. Another example is the change in the 1990's to "scroll" type A/C compressors and the elimination of soft starters. There was no customer education when upgrading and this created flicker complaints and service replacement orders to accommodate.
- No real barriers exist to enabling electric vehicles, except for localized capacity increases (services, transformers) until a significant market penetration is reached (20% or greater for a given area). Therefore, permitting requirements and codes must be streamlined and include all stakeholders. Utility distribution infrastructure upgrades will likely be necessary to accommodate localized cluster of vehicles. Although handled at the state regulatory level, appropriate cost recovery mechanisms will be necessary to allow utilities to serve this increased load.
- Normal Estimated Annual Revenue (EAR) rules should be applied to any system upgrades that are needed.
- Encourage off-peak usage to minimize the impact on the capacity issues. The customer is always going to want the choice of when to charge, so we will be in a position to assume they will be charging during the peak period and we will have to design the system to support.
- Provide a set of requirements for building developers to consider in new or remodel construction to address the future installation of electric vehicle supply equipment (EVSE)
- Utility generation capacity may need to be added in the long run, however the use of well integrated smart charging programs will be able to minimize this impact.
- A relatively small number of publically accessible charging stations will be necessary to alleviate range anxiety for electric vehicle purchasers; however the business model to support such stations is not favorable. Tax incentives related to infrastructure

deployment and appropriate cost recovery mechanisms for utilities to cover such deployments would allow for a starter network of stations.

- There is no well established, universal payments mechanism for publically accessible stations that would allow any user to have access and pay in any location. Many models involve private subscriptions; however this creates complexity and discourages open access. The idea of consumers having roaming vehicles charges appears on their home electricity bill is also not feasible given the level of grid intelligence necessary, the costs and IT associated with it, and the number of utilities in the country. A national, third party, non-profit or regulated clearing house would allow for a single access/payment card with which all consumers and utilities could arrange billing solutions.

- Upfront cost for plug-in vehicles is expected to be higher than conventional vehicles in the short run due to battery technology. Incentives to offset this early cost, such as tax credits as well as R&D and manufacturing support for related technology, are critical to spur early adoption and allow for rapid cost improvements.

- Depending on future carbon legislation, utilities may bear the costs of incremental carbon output due to the increased load from vehicles even if the net environmental impact is positive. Utilities should be allowed to take credit for any net carbon benefit or at a minimum not be penalized for a net environmental benefit.

VII. Reliability and Cyber-Security

VII.1. What policies are needed to facilitate the data sharing that will allows sensors (e.g., phasor measurement units)and grid automation to achieve their potential to make reliability and performance improvements in the grid? Is there a need to revisit the legal and institutional approaches to generation and transmission system data collection and interchange?

- Sufficient modeling detail already exists in the NERC bulk power (Transmission) level system models that are updated annually and used by both Transmission Planners (for non-real time simulations and forecasting studies) and Transmission System Operators (in conjunction with various SCADA sensors to determine the "state of the system" and run contingency analyses).

- Adding more detail at the distribution level does little to improve one's knowledge of the bulk power/transmission level condition. One possible exception is that a lot of work is currently being done to understand the demographics of distribution loads (i.e. percentages of small motors, large motors, discharge lighting, etc. and what are appropriate modeling parameters to use for these different types of loads). Future NERC Transmission level standards may require more detailed modeling of this. However, this is more an issue of determining "likely load makeup" rather than data mining.

- Also, imposing additional data gathering and reporting requirements at the distribution level raises other potential concerns, such as consumer privacy.

VII.2. What is the role of federal, state, and local governments in assuring smart grid technologies are optimized, implemented, and maintained in a manner that ensures cyber security? How should the Federal and State entities coordinate with one another as well as with the private and nonprofit sector to fulfill this objective?

- Many Smart Grid Technologies are relatively new. We are struggling to find suppliers that understand the most basic cyber security controls (e.g. access control, authentication, security patches) not to mention having these basic capabilities in their solution sets. All of this seems to be moving quickly to the level of mandatory enforceable compliance standards which is getting the cart in front of the horse when there are not solutions to meet the standards.

- Another concern deals with in-depth code reviews, we are budgeting to do this kind of evaluation with suppliers but we are finding that most suppliers will not allow this type of analysis even under the tightest of controlled circumstances. We believe the Testing and Certification work under the NIST Standards work should help to address this but the suppliers don't seem to be too aware of this.

- Tailor Smart Grid objectives to allow customer choice and the opportunity to develop many solutions/offerings to allow the customer to self select. Utilities which have traditionally used mechanical devices for managing distribution grid are moving towards devices capable of two way communications. This introduces an opportunity to engage the customer and better understand customer behavior through demand response and innovative pricing options. This involves data collection and analysis and the use of Business Intelligence technologies.

- The Regulatory framework should support the use of standard technologies including Interoperability Testing/Certification between several vendor products and it should also define a set of standard measurements/metrics that can be used by utilities to clearly demonstrate service improvements and better management of power consumption through the use of Smart Grid technologies throughout the distribution network.

- Many markets in the U.S have an Independent System Operator (ISO) in place which has traditionally defined the data interchange standard between the generators and transmission. The Regulatory agencies can help craft a data interchange standard for generators and transmission operators at the national level which will help standardize data exchange across markets.

VIII Managing Transitions and Overall Questions

VIII.1. What are the best present-day strategies for transitioning from the status quo to an environment in which consumer-facing smart grid programs (e.g., alternative pricing structures and feedback) are common? What has been learned from different implementations? What lessons fall into the ‘‘it would have been good to know that when we started’’ category? What additional mechanisms, if any, would help share such lessons among key stakeholders quickly?

- One of the values of the ARRA SGIG grants will be the lessons learned from all the projects that are funded by the grant and the associated matching funds. DOE needs to allow time for the industry to learn from this and understand the Smart Grid. There is also a need to recognize that smart grid will enhance the existing grid and will not replace it.

- Learn from the experiences of the telecom industry over the past years with offering customers more choices and programs. One of the themes that have come to the surface with the telecom industry is the need for simple billing. In the past, the Telecom's billing structure was extremely complicated and depended on minutes used, calls made, texts made, etc. Now, we have seen a shift to a one price centered strategy. This is due to the extremely negative feedback the Telecom industry received about their bills.

- Help maintain the partnership effort between customer and utility that keeps confidence in the relationship on price and reliability.

- Tailor Smart Grid objectives to reinforce customer choice.

- Build upon lessons learned from other industries and best practices such as Cyber Security models used in the Financial Sector, Pricing models from Telecom sector and Customer focus models from the Consumer Staples sectors (e.g. Proctor & Gamble).

- The Smart Grid Maturity Model is a good tool for understanding the complexity of the industry transition to Smart Grid. It is not just about the technology. There are eight domains that need to be considered as utilities advance their efforts. These domains include:
    - Strategy and Management
    - Organization
    - Technology
    - Societal and Environmental
    - Grid Operations
    - Work and Asset Management
    - Customer Management and Experience
    - Value Chain Integration

- Key aspects of any smart grid roadmap include careful and customer-focused technology planning, internal and external alignment of resources, disciplined processes for technology evaluation, and an open standards-based approach to technology innovation.

- The characteristics of the resulting scenarios are used to help prioritize and select smart grid technology projects. Those opportunities which seem to be relevant and viable across multiple future scenarios receive additional consideration, in comparison to those opportunities which might seem promising in a single future scenario but may look irrelevant or risky under other scenarios. In addition, for each future scenario, it is important to develop specific proactive responses based on the implications of that scenario.

- As the ARRA funded Smart Grid Investment Grant and Regional Demonstration projects progress, it will be important to capture lessons learned and business benefits that can be broadly shared.

VIII.2. Recognizing that most equipment on the electric grid, including meters, can last a decade or more, what cyber security, compatibility and integration issues affect legacy equipment and merit attention? What are some strategies for integrating legacy equipment into a robust, modernized grid? What strategies are appropriate for investing in equipment today that will be more valuable if it can delay obsolescence by integrating gracefully with future generations of technology?

- In order to speed the adoption of smart grid, IOU shareholders have to be fairly compensated for the risk they are asked to bear, otherwise, in order to avoid the higher cost of capital required for infrastructure additions, utilities will move slowly and with significant caution to protect their shareholders.

- Much of the existing base of equipment supporting energy generation and delivery has limitations in its ability to support modern interfaces, current networking protocols (i.e. IP), and to accommodate the new and evolving security constraints and standards as will be necessary to protect the energy generation and delivery infrastructure and the customer. This will limit their ability to effectively and natively participate in the Smart Grid. Potentially, some of the existing equipment will need replacing or a retrofit, the cost of this retrofit or replacement should be categorized as recoverable cost.

- Legacy equipment may be reused in a manner that potentially could satisfy the new requirement of the Smart Grid if suitable interface adapters and security mechanisms can be installed or adapted to this legacy equipment. Any new equipment acquired to support the evolving Smart Grid, should itself have built in flexibility to adapt to newer technology and security requirements as may be reasonably expected to evolve during the useful life of that equipment. This would include procuring the equipment with the flexibility to easily expand memory and processing power as may be needed to accommodate the expected changes in operation modes, configurations, and functions.

- A phased approach to smart grid implementation should, in the long term, provide a more consistent advancement of the electric grid into a modern, forward-looking system for all participants.

VIII.3. How will smart grid technologies change the business model for electrics service providers, if at all? What are the implications of these changes?

- We are dependent upon a Regulatory environment and one where investors are provided a fair rate of return. In order to maintain investor confidence, the regulatory compact may need to adjust to incent new Smart Grid objectives.

- The skill sets of the labor force will need to adjust over time to understand the operations characteristics of the Smart Grid and how it impacts system configurations, asset maintenance and restoration.

- Because the smart grid will be developed and deployed over a long period of time, periodic monitoring of the scenarios will help to understand if adjustments in the smart grid vision, strategy or development timing are required.

VIII.4. What are the costs and benefits of delaying investment in metering and other smart grid infrastructure while the technology and our understanding of it is rapidly evolving? How does that affect the choice of an appropriate time to invest?

- Each Utility has its own strengths and diverse grid characteristics. Different approaches to Smart Grid deployment will be necessary, for instance, Progress Energy is further along in fault location and feeder monitoring than other utilities. Delaying investment in one area while ramping up in another will be necessary and beneficial to all parties.

- Allow utilities to play to their core competencies and learn from others with different core competencies. This will result in a better shared risk model than pushing all utilities to implement all aspects of smart grid.

- Applying a single solution to this diverse mix would be costly and will not serve all customers equally.

- Clearly laid out objectives will provide the industry and customers the ability to create innovative solutions to meet the needs of the nation.

- Deferring deployment will allow the time for riskier technologies to mature and evolve.

VIII.5. What policy changes would ensure that the U.S. maintains global competiveness in smart grid technology and related businesses?

- Recognize that new developing nations are building their Smart Grid infrastructure from the ground up and provide a regulatory environment in the U.S. that stimulates and attracts investments in our mature industry.

- One of the most critical policy changes necessary to allow the U.S. to obtain and maintain a effective competitive stance in the global Smart Grid market is to allow the use of broadband wireless technologies in the U.S. comparable to those enjoyed by some of our international neighbors so that the U.S. Smart Grid companies can develop a consistent product set for both domestic and international consumption. This new policy must be adopted by the FCC but would also greatly benefit the U.S. utilities by allowing them to acquire the spectral bandwidth necessary, in a suitable spectral band, to enable the development of the wireless systems necessary to make the Smart Grid a reality.

- Need to develop shared risk models for deploying smart grid. If the utilities are expected to bear the majority of the risk, smart grid deployment will slow down and there is the potential that the full benefits possible will never be realized.

- Initiate a collaborative national process that would encompass all major stakeholder groups including the electric industry, vendor community, public groups and regulators (state and federal).

- The collaborative process would focus on development of best practices for the resolution of various policy, regulatory and implementation issues that are arising as smart technology is being deployed.

VIII.6. What should be the priority areas for federally funded research that can support smart grid deployment? Finally, as noted at the outset, we invite commenters to address any other significant issues that they believe implicate the success or failure of the transition to smart grid technology.

- Storage solutions – neighborhoods as well as Utility Scale Storage

- FREEDM Center – PEV impacts and advance other Smart Grid technologies such as further Power Electronics research.

- Priority for research in areas of developing globally accepted standards for effective and efficient Home Area Networks and Neighborhood Area Networks will be a great catalysis for growth and deployment of the Smart Grid.

- A new policy must be established for the FCC to grant the utilities the spectral bandwidth necessary in a suitable spectral band to enable the development of the wireless systems necessary to make the Smart Grid a reality.