GALVIN ELECTRICITY INITIATIVE
Sponsored by The Galvin Project, Inc.

November 1, 2010

Patricia Hoffman
Assistant Secretary
Office of Electricity Delivery and Energy Reliability
U.S. Department of Energy
Room 8H033
1000 Independence Avenue, SW
Washington, DC 20585

Subject: DOE RFI DOE RFI 2010-23251 - Addressing Policy and Logistical Challenges to Smart Grid Implementation

Dear Assistant Secretary Hoffman,

The Galvin Electricity Initiative commends the Department of Energy for reaching out to key stakeholders to obtain input and comments on ways to improve electricity service. Your questions were comprehensive and should provide insights on ways to produce specific consumer benefits through the application of innovative technology, system design concepts, and enabling policies. The Galvin Electricity Initiative, a non-profit organization, has dedicated its resources to researching and developing both prototypes and policy reforms that demonstrate the art of the possible in terms of grid performance (see Attachment 1 for additional background).

Please find attached our input on most of your questions (Attachment 2). These questions and responses reveal an opportunity to dramatically improve electricity system performance through research into advanced technology, system designs, and policy reform. This includes empowering and valuing consumers, strengthening utilities, and removing barriers to private investment. Some specific research areas that warrant further discussion include:

Topic 1: Consider developing smart grid performance metrics leveraging lessons learned from other state smart grid proceedings such as California. Utilities are proposing billion-dollar smart grid investment programs. Measurable performance goals or outcomes provide consumers, the utility, regulators, and DOE with the ability to track smart progress and performance. Measurable goals identified by stakeholders include reliability (SAIFI, MAIFI, SAIDI), carbon reduction, source energy reduction, and reduced utility costs. See Attachment 3 for a more detailed discussion.

Topic 2: Consider establishing minimum smart grid program design requirements for AMI/dynamic pricing, low-voltage smart grid designs, and high-voltage smart grid designs. See Attachment 4 for a more detailed discussion.

Topic 3: The DOE should research and identify innovative policy reforms that will maximize consumer value, including leveraging best practices from other states. New rules are

needed to allow consumers to maximize the value of smart technology. States across the country have been creating innovative policies that value/enable consumer participation/action. This includes policies that maximize utility performance and accountability that are critical given the significant level of proposed smart grid spending. See Attachment 5 for a more detailed discussion.

Topic 4: The DOE should consider developing and deploying comprehensive prototypes. We recommend prototype projects that are built to scale – for a small city, large development, or campus-type setting. Prototypes performed with local governments provide for measurable results, program refinement, and community support. These prototypes will reveal barriers, issues, and opportunities. Community-scale prototypes will provide evidence and data regarding costs and benefits.

Topic 5: Consider making local governments a key partner in the development and deployment of smart grids. Local governments provide for leverage and efficiency in terms of implementation and performance outcomes.

The Galvin Electricity Initiative extends full support to the Illinois Smart Grid Innovation Cluster and looks forward to working collaboratively on this important issue. The Perfect Power Center at IIT provides a unique opportunity for assisting new smart technology businesses.

Given the number of critical issues covered by this RFI, Initiative staff and our state advisors – Paul Afonso, Paul Hudson, Glen Thomas, Bill Flynn, and Jack McGowan – respectfully request a meeting with you to discuss our response in more detail. We will follow up shortly to discuss. Please refer any comments and questions on this response to the Galvin Electricity Initiative Deputy Director, John Kelly at jkelly@galvinpower.org or 630-464-7020.

Sincerely,

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Attachment 1 – Galvin Electricity Initiative Background

The nonprofit, public interest Galvin Electricity Initiative advocates for the reinvention of how electricity is generated, delivered, and used. The Initiative is motivated by the conviction that the economic vitality of the U.S. is threatened by an obsolete and vulnerable electricity system, a system that has staved off innovation and renewal for decades.

In 2008, the Galvin Electricity Initiative hosted a series of smart grid workshops and an "electricity constitutional convention" with key stakeholders to establish a set of guiding Electricity Consumer Principles that would provide a foundation for establishing a more consumer-driven electricity system. These Principles were designed to guide policymaking and implementation that continuously adapts to changing circumstances. They have been endorsed by several Illinois local governments and include the following highlights:

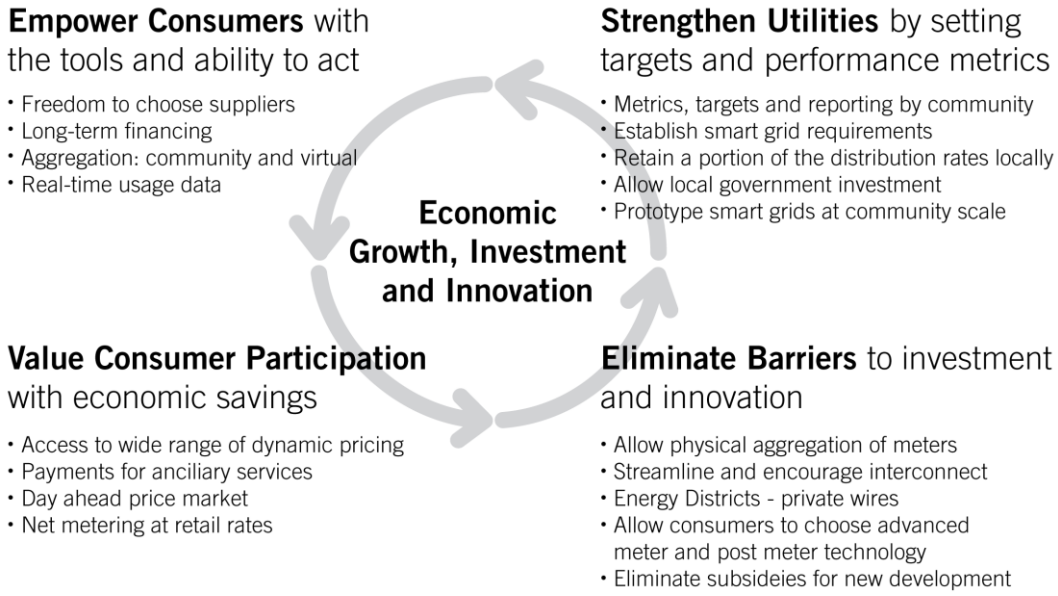
1. All electricity consumers have the right to receive information on the ever-changing, real-time price of electricity — called dynamic pricing — and the means and incentives to use this information to their best advantage.
2. All electricity consumers have the right to system reliability and service quality that protects life and safety under all conditions, and meets the needs of today's digital society.
3. All electricity consumers have the right to hold their utilities accountable to a publicly open set of performance standards.
4. All electricity consumers have the right to buy their electricity services from any source they choose in open, competitive markets.
5. All electricity consumers have the right to sell the excess power they produce or store back to the grid at a fair market price.
6. All communities have the right to improve their electricity distribution system, with the full cooperation of their utility, to best serve citizen needs.

These principles have been utilized by the Galvin Electricity Initiative to benchmark policy reform best practices from across the nation. Forward-thinking policymakers from New York to California have been designing innovative policies to encourage investment and consumer/community participation in the transformation of the grid. This vision of a twenty-first century power system depends on communities and consumers, large and small, collaborating with utilities and entrepreneurs to most effectively leverage smart technology. These innovative policy leaders cited the following goals or drivers for electricity system transformation:

- Create local jobs and improve the competitiveness of states and cities, facilitating economic development and ensuring that American cities can compete in global markets;

- Engage consumers, local governments, and entrepreneurs in managing cost, demand, and environmental impacts;
- Unlock the benefits of smart grid technology and encourage investment and innovation;
- Prepare utilities for this technology revolution, which will forever change the way consumers use electricity; and
- Substantially increase reliability, accountability, and efficiency of the grid while achieving climate change goals.

Some of the policy best practices include:



Bob Galvin, founder of the Galvin Electricity Initiative, researched and wrote a book on the influence of the Scottish Enlightenment on our Nation's founding fathers, which is summarized in the following bullets. Mr. Galvin revealed – and the Initiative uses – the following wisdom to guide our program efforts:

- A group of leaders "must step outside the crowd and advocate for what is right. "
- The proposed change must be accompanied by a candid acknowledgment of the deficiencies of the existing structure or governance. Mr. Galvin stated that "…leaders and the people alike are naturally blame placers. To them, their condition is the fault of some else…. As long as a country (or industry) hides behind this invalid excuse, it will languish."
- "Change must come from noble purposes" such as creating jobs and ensuring our cities and businesses are competitive.
- The application of "enlightened thinking – a way of thinking that is free, open, objective, rational, and tolerant versus a thinking that is self-centered and unduly traditional" – is critical.
- "Resistance to existing restrictive ways is a natural right, is in order, and is essential."

- "The new governance structure must provide for adequate checks and balances."
- "The constructive roles of commerce and property must be embraced."

Attachment 2 - Responses to DOE Smart Grid Questions

We have only answered those questions which were within the scope and expertise of the Galvin Electricity Initiative team.

1. Interactions With and Implications for Consumers
2. Interaction With Large Commercial and Industrial Customers
3. Utilities, Device Manufacturers and Energy Management Firms
4. Assessing and Allocating Costs and Benefits
5. Reliability and Cyber-Security
6. Long Term Issues: Managing a Grid With High Penetration of New Technologies
7. Managing Transitions and Overall Questions

1. Interactions With and Implications for Consumers

1a *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 have made their expectations clear to the Galvin Electricity Initiative. Their expectation is that the smart grid will produce measurable performance outcomes and benefits. This includes:

- Improved reliability and power quality (SAIFI, SAIDI, MAIFI, voltage fluctuation);
- Improved conservation and energy efficiency;
- Reduced environmental impacts;
- The ability to pay for improvements by eliminating waste; and
- Freedom of choice regarding technology suppliers, allowing early adopters to test and prove out technology.

DOE ARRA awardees such as Naperville, IL; Leesburg, FL; and Chattanooga, TN have demonstrated that dramatic electricity system improvements can be achieved without raising rates. Each of these utilities paid for smart grid technology (advanced meters, smart switches, circuit looping, substation automation, and communications) by eliminating waste or diverting funding from system expansion to system improvement.

LBNL, DOE, and EPRI[1,2,3,4] estimate that electricity system outages cost consumers between $30 billion and $400 billion a year in economic losses. This does not include placing a cost on deaths and injuries that result from public contact with power lines or

[1] Understanding the Cost of Power Interruptions to U.S. Electricity Consumers, LBNL 55718 p xi

[2] A Framework and Review of Customer Outage Costs: Integration and Analysis of Electric Utility Outage Cost Surveys, LBNL 54365.

[3] Understanding the Cost of Power Interruptions to U.S. Electricity Consumers, LBNL 55718 p xi & Figure ES-1

[4] Understanding the Cost of Power Interruptions to U.S. Electricity Consumers, LBNL 55718 p xiii

power interruptions. $200 billion in economic losses equates to 5c/kWh, more than what consumers currently pay for distribution services.

1b *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?*

In response to consumer demand, communities across the country have committed to reducing the CO_2 emissions associated with electricity use (green cities). Meanwhile, state regulators have sought to design and pilot pricing and load-control structures that reduce peak load when the system is constrained, typically only a few hours a year. Furthermore, Independent System Operators in restructured markets are creating a wide variety of market- and event-based pricing structures to encourage consumer participation in electricity markets.

In 2007, the Brattle Group published a comprehensive evaluation of the many utility-designed dynamic pricing pilots that have been tested over the past decade[5]. This report revealed that the utility pilots have focused on "event-based" demand reduction, or direct load control. A year earlier, in 2008, a Synapse report on the New Jersey critical peak-pricing structure (CPP) — a structure in which a utility calls for voluntary reduction in electricity use — revealed that customer annual savings were estimated at about $25 per year[6]. Typically, a CPP occurs eight to 12 times each summer for four to five hours of load reduction per consumer, totaling about 50 hours per customer annually.

These reports confirm that customer response to CPP — and the rebates offered as incentives — effectively reduces demand for that event, but does little to reduce consumer annual costs or to reduce demand daily. Nor does CPP appear to maximize annual conservation. Furthermore, neither study provides information on what pricing structures would affect these typical consumer goals.

The Galvin Electricity Initiative encourages regulators to establish specific goals for new smart grid dynamic rate plans that include as a minimum maximizing conservation, consumer cost savings, and permanent demand response (See Galvin Electricity Initiative Dynamic Pricing fact sheet[7]). Armed with goals, regulators can design and pilot dynamic rates to achieve these goals. The Initiative recommends the deployment of both event- and market-based dynamic rates:

[5] Zen and the Art of Dynamic Pricing, Ahmad Faruqui, Brattle Group, December 1, 2009
[6] Advanced Metering Infrastructure – Implications for Residential Customers in New Jersey, Rick Hornby et al., Synapse Energy Economics, Inc., July 2008
[7] http://www.galvinpower.org/sites/default/files/DynamicPricing_0931.pdf

- Event-based rates or programs that apply some type of price signal or load control device for a limited number of hours throughout the year to mitigate a supply/demand issue or event.
- Market-based rates that continuously (e.g., every hour/daily) provide a financial incentive to reduce demand or shift demand to off-peak periods by establishing a variation in hourly rates. This variation creates savings opportunities that lead to investment and action.

The effectiveness of market-based rate programs may depend upon the following program design elements. Prototype programs should be designed to include these design elements to determine their impacts.

- Consumer access to secure wireless near-real-time usage data directly from the meter;
- Consumer choice regarding their post-meter device selection;
- Consumer access to ancillary service payments (e.g., direct load control, CPP, demand response, capacity, day-ahead markets, etc.);
- Providing consumers with seamless interoperability and integration of customer facing devices to support new market entrants and innovators; and
- Providing sufficient time for market response (multiple years). Entrepreneurs in response to these new market pricing programs will develop and continuously improve upon new products and tools, lowering costs and improving performance (conservation and savings). Many devices deployed in the first year of prototype programs could be rendered obsolete within a year.

1c *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?*

Once all consumers have access to a wide array of market- and event-based dynamic pricing, DOE can expect a wide array of new market entrants and an explosion in innovation and education (e.g., leveraging the iPhone/iPad/droid platforms, intelligent software, and automation) that will forever change the way consumers interact with the grid. This assumes that utility smart grid programs will enable and encourage this transformation by providing direct access to AMI real-time usage data and seamless interoperability. Consumers can expect new innovative offers from retail and

technology suppliers. Within a decade, electricity markets could become truly price elastic.

1d *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?*

Please see response 2c.

1e *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?*

At Gridweek, one of the panelists noted that ratepayer-funded education programs may pale in comparison to marketing and education that can be expected from new market entrants such as Google, Best Buy, Microsoft, and others who routinely spend hundreds of millions on marketing of and education about new products. However, smart grid program benefits vary from utility to utility, and effective messaging, whether delivered by a vendor or utility, will need to reflect this regionality. Smart grid offers an incredible opportunity for utilities to begin to view customers as partners rather than simply ratepayers – a powerful message in itself for opening the conversation about electricity. We would submit that the issue is one of program design as well as communications. Customer needs should be listened to and integrated into system design up front, rather than trying to sell customers on a program that has been designed without them. The mechanisms for this can include online surveys, town hall meetings, or simply knocking on doors. These tactics not only gather information but begin the education process, making the communications task easier down the road and generating buy-in simply because consumers know they are being heard. In addition, it may be valuable to engage objective sources or support entities to assist with ratepayer-funded programs. Research such as that being fielded by the Smart Grid Consumer Collaborative will add to our knowledge base about customer needs. But it is important to remember that we are not selling smart grid, we're selling better electricity service and whatever benefits a particular utility manages to implement.

1f *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 is it appropriate to use social norm-based tools?*

Bill Novelli's speech at GridWeek provided some excellent insights in response to the questions above. Bill is the founder of PR firm Porter Novelli, former CEO of AARP and

currently a professor at Georgetown University McDonogh School of Business. His remarks are included, with permission, as Attachment 7.

1g *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?*

The Initiative recommends that FERC continue to advocate for fully transparent pricing markets in all regions with real-time hourly pricing, day-ahead hourly pricing, capacity charges ($/kW/mo), ancillary service payments (DR, VARS, spinning reserve, etc.). In addition, FERC should weigh in on consumer rights to direct real-time access to advanced meter usage data.

2. Interaction With Large Commercial and Industrial Customers

Large commercial and industrial customers behave differently than residential consumers and small businesses. They regularly use sophisticated strategies to maximize their energy efficiency, to save money and to assure reliable business operations. Indeed, some already are or others are seeking to participate directly in wholesale energy and ancillary services markets. 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.

At a recent Best Buy/Galvin event in Minnesota on September 29, 2010, Medtronic provided a comprehensive summary of what large commercial and industrial customers expect from smart grid programs (see Figure 1G below).

- Dramatic improvement in system reliability and power quality;
- Improved total electricity system efficiency (lower costs);
- System security;
- Access to real-time and downloadable interval usage data; and
- Accurate, automated, efficient, and consistent metering reading.

Figure 1G
Source: John H. Rolfe, Corporate Energy Manager, Medtronic, Inc. during his presentation at the "Empowering Consumers through the Smart Grid" conference on September 29, 2010, hosted by Best Buy and the Galvin Electricity Initiative.

3. Assessing and Allocating Costs and Benefits

Regulators pay a great deal of attention to the costs and benefits of new investments, appropriate allocation of risk and protection of vulnerable customer segments. The many unknowns associated with smart grid programs make these ubiquitous questions particularly challenging, which suggests a great need to share perspectives and lessons.

3a *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?*

Smart grid benefits should be separated into the four different and separate electricity markets:

- Generation – Customers are seeking access to generation sources that are less expensive, more efficient, emit fewer pollutants, use less water, and use more renewable sources. As such, smart grid program benefits can be revealed by having providers report and trend the following metrics:
  - Cost in $/MWh
  - U.S. EPA has defined a generation efficiency measure called Source Energy which is the fossil mmBTU consumed per MWh
  - Carbon, SO2, NOx emissions in lb/MWh
  - Water consumption in gallons/MWh
- Transmission – Customers are seeking cost-effective, reliable and efficient transmission services. Smart grid program benefits can be revealed by having providers report and trend the following metrics:
  - Cost in $/MWh
  - Losses in %
  - Reliability in SAIFI, SAIDI
- Distribution – Customers are seeking cost-effective, reliable and efficient distribution services as well. Smart grid program benefits can be revealed by having providers report and trend the following metrics:
  - Cost in $/MWh
  - Losses in %
  - Reliability in SAIFI, SAIDI, MAIFI, CEMI-4
    - Separate for rural, suburban and urban areas
    - Separate for high, medium and low voltage
- Consumer Action – It is more difficult to measure and track benefits from consumer action in response to meter data and dynamic pricing. Some possible metrics include:
  - Peak demand vs. calibrated historical data
  - Usage vs. calibrated historical data
  - New services

3b *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?

Generation, transmission and distribution benefits should be immediate. Smart Grid investments should produce immediate results in terms of:

- reduced O&M from automation of manual processes
- improved reliability resulting from substation automation, circuit smart isolation switches with looping, undergrounding of circuits, etc.
- lower O&M costs due to reduced repairs

Paul Kalv of Leesburg, Florida at Gridweek noted that they were able to pay for their advanced meters with savings from conservation voltage reduction and demand response. Southwest Airlines is now a premier transportation provider because of their relentless focus on providing improved service for less.

3c *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?*

From a consumer perspective, the Initiative would argue that the purpose of a smart meter is to enable the implementation of a robust set of dynamic pricing programs and consumer direct access to real-time usage data. Once armed with these tools, consumers should have access to a wide array of innovative products and services that will improve over time.

3d *How do the costs and benefits of upgrading existing AMR technology compare with installing new AMI technology?*

The Initiative would argue that if a utility is not going to give the consumer direct access to the real-time meter data or if regulators are concerned with technology obsolescence, then AMR may provide a lower-cost option. Lower-cost AMR can be used to send interval data to utilities for the purpose of enabling dynamic pricing and automating billing.

Some would argue that AMI technology will improve rapidly, creating stranded assets for utilities. This market may be better left to third parties who can supply AMI to consumers as part of a packaged solution in response to dynamic pricing or customer choice. As a minimum, the current New York approach of allowing consumers to choose from several AMI meter options should be considered.

3e *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 turn off air conditioners or other equipment during peak demand periods compare to that of AMI or other smart grid programs?*

As discussed in the response to 1a, utility event based pricing does little to encourage conservation. The Galvin Initiative recommends that consumers be provided access to a wide array of event and market based pricing options. See the Galvin paper on dynamic pricing (www.galvinpower.org).

3f *How likely are significant cost overruns? What can regulators do to reduce the probability of significant cost overruns? How should cost overruns be addressed? Where possible cost overrun risks should be shared or shifted to the private sector.*

More important is the risk of creating stranded assets. It is likely that AMI and PMD technology will improve significantly while costs are driven down over the next few years. Will this lead to technology obsolescence with consumers footing the bill?

3g *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?*

Several municipalities (Naperville, Chattanooga, and Leesburg) have demonstrated that smart grids can be paid for by eliminating waste and eliminating subsidies for new development. Again, Smart Grid investment decisions should be evaluated separately for generation, transmission, distribution, and customer facing technology. As a minimum, State Commissions could justify investment in smart distribution systems based on a specific commitment to improve reliability indicies. Consumers would then see immediate measurable reliability improvements for their investments.

3h *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?*

See Attachment 3, Smart Grid Performance Goals and Metrics.

3i No response.

3j *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?*

Regulators should consider technology obsolescence issues and providing consumers the ability to choose customer-facing technologies that are likely to improve dramatically within a few years.

3k *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?*

Customer-facing technology choices, when combined with dynamic pricing options and direct access to real-time meter data, can provide "vulnerable" customers with powerful tools for lowering costs. Choice also allows early adopters to test new technology which will improve. Over time, new market entrants will invent packaged technology services that allow vulnerable customers to save more.

4. Utilities, Device Manufacturers and Energy Management Firms

4a *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?*

Federal and state regulators should consider ways to establish market rules that enable and empower utilities, consumers, and suppliers to innovate and invest in technologies and services that produce measurable results. The Galvin Electricity Initiative has completed benchmarking and identified 15 enabling policy reforms. See Attachment 5 for a summary and the policy white paper, Smart Grid Issues in State Law and Regulation, that can be download from our website (Visit www. Galvinpower.org and look under News).

The information that consumers will acquire via their smart meter will provide them a newfound opportunity to participate in wholesale market programs. State regulators need to recognize this opportunity and shape policy to accommodate it. For example, Maryland requires its utilities to use smart meters to draw DR out of the system that they then bid into capacity auctions. The dollars generated from the capacity auctions are then used to finance a piece of the smart meter program.

4b *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)?*

Continue to work with the ISOs and RTOs to create ever more transparent price and performance signals in regional markets. This includes real-time, day-ahead, ancillary services (capacity, efficiency, DR, carbon, etc.), generation emissions profiles, and so on.

4c *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?*

See the response to 3c. As price and performance transparency increase, markets will become price elastic. For example, Princeton University in response to robust price signals from PJM has been expanding its price response capability each year and now can remove 24MW of demand at a moment's notice based on the real-time price of electricity or a demand response price signal. One can imagine a future where thousands of MW of demand will disappear as prices rise during the day, creating a price-elastic electricity market. Increasing peak demand would halt and grid asset utilization would increase, further lowering electricity prices for all consumers.

4d *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?*

This question applies to all new market entrants (ADT, Google, Best Buy, GE Appliance, etc.). All of the new market entrants are impacted by regulations including consumer choice and price transparency. Consumer choice and direct access to dynamic pricing and meter interval data are the drivers or engine for innovation. The Galvin Electricity Initiative would argue that flat rates, event based pricing, and a lack of choice have kept the innovators on the sidelines.

4e *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?*

In the absence of transparent pricing and choice, suppliers have only one customer – utilities. Today, most smart grid vendors are selling to utilities who administer efficiency and smart grid investments.

This is beginning to change in markets where retail providers have access to sell services to consumers or robust dynamic pricing signals are in place. In these markets, third-parties are inventing new technology, software, and services that enable consumers to save money or gain access to cleaner generation. Some examples include:

- TXU recently offered leased solar PV for $35/mo in Texas.

- Best Buy's geek squad is providing energy audits and home automation services and could easily expand into metering and HAN's
- Intel, Google, and Microsoft are developing home energy portals and devices
- Numerous new market entrants are developing advanced energy applications on the Apple and Google droid based iPhone's and iPad's platforms.

4f *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 consumer's behavior or incentive barriers to the market achieving efficient technology adoption levels without policy intervention?*

First and foremost, consumers can expect an explosion in innovation in this service area with improved products and lower costs over the coming decade. New market entrants such as Best Buy, Sprint, Verizon, ATT, and ADT will be integrating home automation, energy management, security, and home networking into packaged services. In addition, communities will be implementing PACE type financing to provide consumers with long-term low interest financing.

4g No response

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

Significant change in the technologies used to generate power and to keep supply and demand balanced is likely to occur over the foreseeable future. We invite comments on the steps that should be taken now to give the grid the flexibility it will need to deal with transitions that are likely in the next few decades. Commenters might address the following questions, some of which have more immediate implications.

The Initiative suggests that the ISOs and RTOs implement fully transparent pricing markets in all regions with real-time, day-ahead, capacity charges ($/kW/mo), ancillary service payments (DR, VARS, spinning reserve, etc.) and interoperability/interconnect standards that make connecting and interfacing with the grid efficient and seamless. In addition, FERC should weigh in on consumer rights to direct real-time access to advanced meter usage data.

5a *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?*

In restructured markets with real-time pricing, low off-peak rates provide greater economic incentive for customers to move ahead with PHEV. Automation, software, and intelligent agents will provide for immediate response to changes in price. Nodal

pricing will incentivize consumer response to relieve constrained areas. Price transparency will be essential to managing the integration of new technology into the grid.

One of the more significant benefits from robust market pricing is that PHEV and other technology will flatten the supply curve. If vehicles are drawing at night it will help the problems associated with negative LMP's due to wind and, in theory, should help reduce the amount of power need to shave peak demand.

5b *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?*

See previous comments.

5c *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?*

See previous comments.

5d No response.

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

To ensure the PHEVs' full value is realized, consumers will need access to real-time pricing and the ability to sell stored energy back to the grid.

***6*. Reliability and Cyber-Security**

We invite comment on the reliability opportunities and challenges that smart grid technologies create, including: What smart grid technologies are or will become available to help reduce the electric system's susceptibility to service disruptions
The greatest challenge to date is the lack of commitment to report, trend and improve reliability leveraging smart technology and designs.

The Galvin Electricity Initiative suggests that DOE and FERC establish federal reliability standards similar to Europe. This includes the required reporting and trending of reliability metrics at the City or low voltage level. This includes reporting and trending of reliability metrics for each city/county in the U.S. while dividing cities into urban, suburban and rural categories to provide for comparative benchmarking. Reliability reporting should include all outages and be reported on a three year rolling average to dampen weather related variations.

Also, the Initiative supports the efforts of NIST to establish interoperability and cyber security standards.

7. Managing Transitions and Overall Questions

The following questions focus on managing incremental change during the gradual evolution of the grid that may transform the power sector over the next few decades.

7a **No response.**

7b **No response.**

7c *How will smart grid technologies change the business model for electric service providers, if at all? What are the implications of these changes?*

Smart grids should result in significantly better reliability and power quality to support the competitive of U.S. businesses and allow for the seamless and efficient integration of new market entrants and technology. Utilities will serve as innovation/technology enablers and efficient system stewards. The focus will change to quality, elimination of waste, and performance.

7d *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?*

Because of technology obsolescence and stranded asset issues, consumers may be better served by moving forward with lower cost AMR deployments that provide for automated meter reading and support dynamic pricing billing. Thereby, leaving AMI and PMD technology obsolescence risk to the private sector.

7e *What policy changes would ensure that the U.S. maintains global competiveness in smart grid technology and related businesses? The Galvin Electricity Initiative has completed benchmarking and identified 15 enabling policy reforms.*

See Attachment 5 and the policy white paper mentioned earlier.

7f *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.*

Attachment 3 — Performance Goals and Metrics

States across the nation are being asked by utilities to increase rates to implement smart grid programs. Consumers should expect and require the establishment of specific goals and outcomes from the investment in smart grids. Defining the specific outcomes will guide design and program activities.

Specific measurable outcomes are critical for determining if smart grid investments are producing the intended outcomes. Ultimately, consumers will determine the success of smart grid investments based on their experience with the improved electricity system. For the consumer and communities, this means asking/answering the following questions:

- Do they have the ability to control costs through access to an array of dynamic prices and new products to assist them with lowering costs?
- Do they have direct access to their usage and cost information in real-time?
- Do they have the ability to conserve energy, acquire green products or have the means to finance improvements (e.g., how many consumers pay cash for purchasing a new car)?
- Have certain O&M costs gone down?
- Have T&D losses gone down?
- Has reliability improved for them and their community (outage duration and frequency)?
- Has the grid caused economic losses due to power outages or quality events? Tracking grid impacts and repair costs can justify investments in improvements.
- How much carbon or other emissions are released and fossil fuels consumed because of their consumption of electricity?

Smart grid performance management should include specific reporting requirements that ensure transparency for all key program metrics and expected benefits/costs. Some examples are listed below, as well as in Attachment 6 on page 23.

Table 1: Summary of Galvin Initiative, CA PUC and DOE Performance Criteria[8, 9]

Performance Area	Ultimate Performance Metric	Interim Performance Metrics
Maximizing the Value of Distribution System Improvement Value		
Safety	• Electricity-related injuries	• Consider outage related injuries/deaths
Reliability	• CAIDI, SAIFI, and MAIFI • Power quality	• Outage response time • Component overloads
Cost/Asset Management	• T&D Cost, $/MWh • Repair cost and O&M cost • Investment cost • Lost productivity and damages	• Operations cost • Maintenance cost • % of miles operated under dynamic line ratings
Efficiency	• T&D losses	
Environment	• Aesthetics, % system underground	

[8] February 8, 2010. Assigned Commissioner and Administrative Law Judges' joint ruling sending scoping memo and inviting comments on proposed policies and finding pertaining to the Smart Grid, Rulemaking 01-12-009.
[9] DOE Guidebook for AARA Smart Grid Program Metrics and Benefits, http://www.oe.energy.gov/09_SG_Kickoff_Guidebook.pdf.

Performance Area	Ultimate Performance Metric	Interim Performance Metrics
Technology Ready	• Average days from interconnect application to activation • % of substations capable of handling reverse power	
Maximizing AMI Value		
Efficiency/ Conservation	• Grid supply — fossil fuel intensity • Building efficiency • % renewable generation	• MW and MWh of CHP/DG • MWh of EE
Demand Response	• Asset utilization • Demand factor which is the ratio of annual peak demand to the average off-peak demand	• MW of DG by type • % of customers served by DG • Event based DR, MW • Permanent DR, MW
Cost/Asset Management	• Energy Cost, $/MWh • Demand factor • Asset utilization	• Ancillary service cost • # of minutes when at least one nodal price is negative
Environment	• Total carbon emissions or carbon intensity, tons/MWh • Water in gallons/MWh	• Pollutant emissions
Market Participation	• % of customers participating in retail competition	
Policy Structure that values, enables and motivates consumer participation	• Consumer ability to choose supply • Consumer access to dynamic pricing— TOU, real-time, day-ahead • Consumer access to ancillary service payments— DR, capacity, renewable requisitions, carbon requisitions • Community-led grid improvement; long-term financing • Consumer access to net-metering— rollover, virtual and physical • Consumer access to 10-to 20-year low-cost financing for EE, DG, DR, home automation, plug-in infrastructure, etc.	• Consumer ability to choose meter and post-meter device supplier • Effective interconnect process

Attachment 4 — Smart Grid Program Requirements

The NY Commission should consider developing specific smart grid program design requirements that must be met to receive cost recovery. As an example and best practice, the state of Texas developed a set of specific AMI program requirements that had to be met for utilities to receive cost recovery.[10]The Initiative recommends program requirements be developed for the following four areas at a minimum:

1. **AMI/Dynamic Pricing/DR**— This program could be designed to provide consumers with the ability to lower costs by taking advantage of: 1) direct access to real-time usage information to foster conservation, 2) lower cost off-peak power prices, 3) demand response payments, 4) day-ahead pricing, 5) carbon offsets and 6) other innovative rate designs, some of which could be optional. The state should establish specific goals and metrics, requiring annual reporting of metrics at the substation or community level. All conservation and demand response reporting should be normalized to weather data (HDD/CDD). With purpose, goals and metrics in place, the program elements can be designed to optimize the outcome (e.g., AMI specifications, consumer and community access to data, dynamic pricing options, etc.). Then a pilot can be designed to test and refine the program elements. Our assessment is that these pilots should take place on a community scale to provide for meaningful results and to garner the resources of a city to help ensure that the results are maximized. Measurable goals could include: 1) consumer bill cost reduction, 2) conservation, 3) carbon reduction and 4) peak demand reduction.
2. **Low Voltage Smart Distribution System** (upstream of the meter)— The primary benefits from a smart distribution system are improved reliability and job/income creation through higher productivity. Utilities can also reduce operations, maintenance and repair costs. There may be a few other small ancillary benefits. The GEI is overseeing the building of a smart grid at IIT and understands fully the benefits and costs. These demonstration projects reveal that significant improvements in reliability stem from combining smart grid components with redundancy at a specific location. Naperville has built a smart, low-voltage grid over the past 15 years that includes all of the most advanced smart distribution features. The Naperville smart grid also includes the following features, which significantly improved reliability and performance[11]:
    - Redundancy to all substations with digital electronic smart switches to automatically identify and isolate a fault on any one of the supply feeders
    - Substation automation
    - Substation feeders are looped (tied together for redundancy) with S&C smart switches in the loops to identify faults and isolate them to a small section
    - Most of the circuits are installed underground for protection and esthetics
    - One of the most advanced control rooms in the country that oversees system operation, pinpoints problems and dispatches crews immediately
3. **High Voltage Smart Distribution and Transmission Systems**
4. **Facilities** (downstream of the meter)— Helping empower consumers to lower their bills by valuing conservation, ancillary services, taking advantage of lower off-peak prices, etc. The private sector and community leaders are taking action to work with their constituents to set and meet conservation and carbon coals through community-based programs. Ensure that consumers have direct access to secure wireless meter data and a wide variety of post-meter device suppliers.

[10] http://www.puc.state.tx.us/rules/subrules/electric/25.130/25.130.pdf

[11] http://galvinpower.org/galvin-conducts-naperville-smart-grid-initiative-case-study

Attachment 5 — Policies that Empower Utilities, Consumers, Suppliers and Communities to Act and Invest

New rules are needed to empower states, cities and consumers to meet aggressive carbon, conservation and green power goals. States across the nation have been implementing new rules, legislation and rates designed to empower consumers and communities to increase their ability to act to maximize the value of smart grids and wholesale restructuring. States should implement policies that both protect and empower consumers while building and researching prototypes to better understand performance, cost and benefits. Below are examples of innovative polices that have been implemented by other states:

- PJM in Pennsylvania and NYISO in New York are two ISOs offering demand response and ancillary service payments. This includes real-time pricing, day-ahead pricing, demand response payments, capacity payments and voltage support. Smart grids should facilitate consumer access to ISO services.
- Numerous states have implemented multi-tier dynamic pricing with AMI to incent consumers to reduce usage and lower peak demand.
- Ohio, California, Massachusetts, Illinois and other states have established community aggregation rules that allow communities to procure the generation source of their choice, including renewable and low-carbon electricity generation
- Rider LGC in Illinois allows for community investment in electricity system infrastructure upgrades, which allows communities to invest in smart grid improvements that produce measurable reliability improvements. This policy could be expanded to include on-bill financing of improvements approved by local governments.
- Connecticut implemented a rule allowing the establishment of privately owned special energy districts or microgrids that allow privately built and operated distribution systems to cross public right of ways without being designated a utility.
- California, New York, Colorado, Virginia, New Mexico, Texas and Ohio implemented laws that pave the way for community on-bill financing mechanisms for energy efficiency, distributed energy and back-up power.
- Pennsylvania established a virtual net metering rule via ACT 129 that includes both virtual and physical aggregation of meters.
- Several states have implemented stricter distribution level reliability metrics and targets (e.g., Massachusetts, Illinois and New York) which complement the NERC transmission reliability standards.
- Maryland implemented a smart growth policy that prevents utilities from subsidizing system expansion outside designated smart growth areas.
- Massachusetts implemented legislation establishing performance-based rate recovery to incent utilities based on performance.

Attachment 6 — Performance Based Rates

The electricity sector is in the midst of a technology revolution that started with the restructuring of high-cost electricity markets. Today, some consumers in restructured markets have access to a wide variety of dynamic pricing rates and the ability to generate revenue from supplying ancillary services. Myriad new, innovative companies have emerged to create and supply new technology and offers to consumers that will empower consumers to lower demand and usage to both save and make money.

Smart grids done right can accelerate investment in innovative technologies that can dramatically reduce bulk power electricity sales. State renewable and efficiency mandates will accelerate demand reduction. Coupled with a slower economy, usage has already started to decline. Current rate recovery models may not be capable of dealing with the impacts of Smart grid technologies and market changes. The NY Commission should reevaluate cost recovery methods, as the current methods may not be appropriate for smart technology and may be obsolete in a few years. The Commission should explore new rate recovery models such as performance-based smart grid rates. Performance based rates, if designed properly, could realign utility incentives and help make the utility a partner in clean energy investment and growth.

Table 2: Electricity Usage Impact Estimates over a 10-Year Period[12]

Possible Impacts – City of 50,000 using 340,000 MWh	Usage, MWh
7,500 kW Solar PV	-3%
20% Reduction from Efficiency, DR and Automation	-20%
Cogeneration for on-peak supply, 15MW	-9%
Storage/on-peak DG, 10MW	-4%
Usage growth 10 Years, 10%	10%
Electric Vehicle, 5,000	7%
Net % Reduction	**-18%**

Several utilities including Public Service New Mexico and Commonwealth Edison are advocating for decoupling or rate recovery from power sales as a means to hedge against declining sales. Decoupling fixes utility revenue regardless of annual power sales. Some utilities and policy makers favor using a customer fixed-charge approach whereby they are allowed to charge a large fixed charge to each customer regardless of the amount of electricity the customer consumes. There are some obvious issues with this approach:

1. If utility revenues remain fixed while electricity usage falls, rates will go up, possibly dramatically. Ironically, decoupling could result in political pressure for policy makers and consumer protection groups to help keep utility sales rising so that rates do not increase.
2. Implementing a large fixed fee on the electricity bill will erode the financial payback or return on investment in efficiency and local clean energy, reducing deployment. Massachusetts favored staying with volumetric charges to support investment in EE and local clean generation.

[12] This table includes estimates of impacts by the Galvin Electricity Initiative. Assuming electric vehicle full charge is 26kWh with a 50 percent capacity factor for the year, and plug-in at night only, http://www.theautochannel.com/news/2008/03/26/081988.html.

3. Under most decoupling rules, utilities are not held accountable for performance improvements. How will service reliability be ensured? Fixing utilities' revenue could lead to demand for higher rates to support improvements and efficiency programs with no checks or balances on the efficiency of utility operations.

Decoupling may not be the appropriate terminology and simplifies the issue to being just about the separation of utility revenue from electricity sales. Instead, policy makers should consider a focus on research into performance-based rates. This implies a shift to allowing utilities to generate earnings based on performance regardless of revenue and electricity sales. Some possible benefits of performance-based rates are that they:

- shift the focus to utility earnings, not revenue. In this way, utilities that reduce operating costs while meeting performance targets can earn more. This incentivizes utilities to become more efficient buyers, producing higher earnings with less revenue and allowing rates to go down.
- establish and continually improve a set of performance metrics and benchmarks/targets that track and trend key performance measures. Allowing utilities to earn more if they exceed performance. See list of possible performance measures provided below.
- shift the focus to quality and efficiency of service and reward performance through increased earnings.

In terms of performance metrics, consumers and businesses have been clear regarding their requirements:

- Reliability— measured in terms of the frequency and duration of outages (SAIFI and SAIDI). With AMI utilities can now track momentary outages. Reliability metrics should be reported at the circuit, substation, area substation and local government/county level.
- Power quality— dropped phases, voltage events, harmonics.
- Other reliability and power quality measures that would reveal hidden costs of outages and power quality events:
    - Safety— Deaths and injuries related to power outages and interactions with power lines should be reported and trended. This will provide justification for investments that reduce deaths and injuries.
    - Economic impacts – Economic losses resulting from power outages should be reported and trended.
- System costs— utilities currently use cost codes based on tax or accounting needs. A new set of cost codes is appropriate to reveal performance trends and opportunities to invest in improvements that lower costs.
    - Operation cost codes should be expanded to report separately on meter reading, billing, customer service, etc.
    - Maintenance cost codes should be expanded to report separately on preventative maintenance, tree trimming, etc.
    - Repair costs should be reported separately. Repairs are any unplanned replacements of equipment. Repairs reveal recurring failures that if eliminated produce savings for consumers. Tracking repairs provides justification for investment in improvements that eliminate the recurring failures. For example, if a particular overhead line fails every

year at a cost of $200,000 per year, an investment of $1,000,000 to bury the line would be justified. All private sector businesses track repair costs and seek to invest to eliminate repairs.

- Improvement cost— expand cost categories to report all improvements by system voltage level and include cost categories for expansion vs. equipment upgrade. This will allow utilities to determine the effectiveness of improvement investments. For example, if 80 percent of the improvement spending is on high voltage system components and 90 percent of the outages are from failures in the low-voltage system, resources can be shifted.

- Efficiency and environment
  - Measure, trend and report on the total fossil fuel consumed to deliver a MWh of energy to the utility transmission system. This is a measure of the generation and regional transmission efficiency.
  - Measure, trend and report on the MWh lost to transmit and distribute power to the customers' meters for the entire system.
  - Building efficiency. Measure, report and trend the total kWh consumed annually by all customers corrected for HDD/CDD, divided by the number of customers separately for residential, commercial and industrial customers. The results could be skewed by a number of factors. If utility performance cannot be measured accurately, consumers will be exposed to abuses and waste.
  - Measure, trend and report on carbon, NOx and SOx emissions per MWh delivered to the consumers' meters.
  - Measure, trend and report on water consumption per MWh delivered to the consumers' meters. All generators should report total site water consumption per MWh.
  - Measure, trend, and report on the percentage of the system in miles that is underground to account for esthetics and other grid impacts.

Attachment 7

"Engaging the Public in the Smart Grid Transformation"

GridWeek, 2010 , Oct. 19, 2010, Convention Center, Washington, D.C.

Bill Novelli, Professor, McDonough School of Business, Georgetown University

- Thanks for introduction, Anto Budiardjo
- Some years ago I was invited to speak to a class at Columbia University, and I asked a student for directions to the building. She inquired who the professor was, and when I told her, she said, "He's famous." I said, "Really, what for? And she answered, "he's famous for being a great teacher."
- What wonderful praise. And that's what I aspire to now. As you heard, I'm teaching in the business school at Georgetown. And I'm working on an Initiative in Social Enterprise there.
- And what I've discovered is just what I had hoped. Our MBA students, most of whom are headed for business careers, are vitally interested in social responsibility and in making a difference in this world beyond the bottom line, or even better, as part of the bottom line.
- And it's not just at Georgetown. There is an explosion of interest among students across the country in personal and corporate responsibility, and how to view business as part of a larger community.
- That's important, because it tells us that we have the opportunity to broaden our horizons, to engage corporate and other leaders of today and tomorrow to make positive social change more powerful and effective.
- There are several Georgetown MBAs here today. They represent a number of clubs and activities devoted to clean and green technology and to what they see as acquiring the business tools to lead the next industrial revolution.
- One of our MBA teams is working on a SmartGrid project with the Carbon War Room, an NGO founded by Richard Branson to apply market-based solutions to energy and climate change.
- So how <u>do</u> we create positive social change? Back in my Porter Novelli days, a client asked me, how do you create a social groundswell, and how much does it cost? Good questions…

- Social change has always been part of America, but it seems to be occurring faster, in more complex and disruptive ways, and often with unforeseen consequences.
- Technology contributes to this, with innovations such as electronic health records, new biomedical technologies and the SmartGrid.
- Political gridlock and disharmony aren't new, either, but they are powerful forces today, often blocking needed change.
- And where is the American public in all this. Basically, people are worried, about the future. And they should be – not just for themselves, but for their children and grandchildren. They fear change they don't understand, like the new health care reform legislation. They fear that the next generation is going to end up worse off than they are.
- And very few people are comfortable with where they are. A recent poll showed that over half the respondents said that, due to the economic climate and their own financial insecurity, they plan to vote against the incumbent in the upcoming elections regardless of the incumbent's political party.
- Housing foreclosures, job losses and a painfully slow recovery, lack of retirement security, energy and environmental problems – including the Gulf oil spill – an aging population, a fiercely competitive global economy, federal and state debt and deficit projections, are all huge and all here right now.
- We need to tackle these big issues. Muddling through does not seem to be a smart long-term strategy.
- I'm working on two huge challenges right now: reducing the national debt and deficit, as part of the Debt Reduction Task Force of the Bipartisan Policy Commission. We are scheduled to report our recommendations in mid-November. The second one equally or even more challenging: to reform advanced care illness. Living with and dying from advanced illness in America is painful, isolating and costly. This is a situation and a system that fails the public, our health providers and society.
- I have a favorite Haiku: "Problems worthy of attack, prove their worth by attacking back." These are the big, tough, seemingly intractable problems staring us in the face, and they don't yield to timid responses.
- As John Gardner once said, "We are all faced with a series of great opportunities, brilliantly disguised as insoluble problems. I also recall

Senator John McCain's comment during the fight for national legislation to regulate the tobacco industry a decade ago. He said, "Remember, it's always darkest…before things go completely black."

- So we can go either way with these monster social challenges –we can achieve positive solutions…or suffer a blackout.
- With the SmartGrid – and I don't pretend to be an expert on this – you have great promise: increased reliability, fewer outages, and benefits to customers in energy usage and costs. The Grid can lead to even more technological advances, such as renewable generation sources. Automated metering can make the Grid even smarter.
- But this transformation depends on significant changes in consumer behavior, which can by no means be taken for granted. Why do consumers want to engage in what they may see as leaps into the unknown? What's in it for them? What might they fear they will lose rather than gain, and where does it fit in their daily lives and those multiple concerns that I outlined earlier?
- This is not easy to figure out. Public behavior is a strange and wonderous thing. What people say want and what they do are often quite different.
- For example, people say they want more nutrition information on food packages. But there is little indication they do anything with it. They say they want to lead healthier lives, but regular exercise has gone down in the past two decades. They say they would buy smart appliances to control their energy consumption once the SmartGrid was installed. But do they really mean it? Or is it more of a socially acceptable answer?
- I'd like to offer you several ways to think about this—about engaging the public and your direct customers, including business customers, to bring about successful partnerships and successful change that will help them, help you and help the country.
- First, we need to strive for <u>two</u> major levels of change. On a large scale, we need to create <u>environmental</u> change, so that <u>appropriate</u> behavior is seen as <u>normative</u> behavior. That means influencing the environment in which people actually live and work and play. Smart energy choices should be what people see as the right way to go.
- Now, how do we achieve broad environmental change? We live in a media society—in front of TV sets, video games, movies and computer screens, on

cell phones and other devices that connect media influencers to us and us to each other. That's where change needs to be targeted.

- In addition, policy change often drives environmental change. Private and public policies influence how people see their world and perceive their choices in it. So, integrating federal, state and local policy advocacy is usually necessary to achieve widespread social change.
- The other major level of change is at the individual and family level….to inform people and educate them, and yes, persuade them to take advantage of the cost savings, economic growth and efficiencies the SmartGrid can bring.
- The second thing I want to suggest to you is to take advantage of the systematic planning process that has grown up over the years in the social marketing field. Just as in commercial marketing, this requires a relentless focus on the consumer. It means researching and identifying consumer segments based on how ready they are to adopt the new behaviors you are advocating.
- And it also means promoting specific behaviors that people can actually perform, with clear benefits that they can receive as immediately as possible. These benefits can be monetary, such as direct cost savings they can readily see. And they can also be intangible benefits, such as recognition within their peer groups and communities.
- There are lots of barriers that need to be removed or reduced to make it easier for consumers to act. They might believe that smart meters lead to overcharges. They may reject upfront fees or the cost of purchases that will provide renewable energy. And there is a high level of public distrust in government and corporations today. One obvious barrier is lack of understanding of what this is all about. A GE survey conducted in March of this year showed that 79 percent of U.S. consumers are not familiar with the term "smart grid."
- Part of this planning process is to clearly let people know what the less attractive alternatives are to buying in, and what the costs and other disadvantages of those alternatives are.
- No single strategy is likely to work for big social issues, and so we need multiple strategies, multiple channels, including media and direct. And we

need multiple change agents, such as volunteers, sales people, advocates and networks.

- Very few social change initiatives are alike, but it's still a good idea to look at previous campaigns and programs to see what has worked… and what hasn't. There are often mistakes that are easy to spot. One is lack of consumer research and instead making assumptions about what people know, want and need.
- Another is overreliance on mass messages, without direct appeals to community opinion leaders and other thought leaders. This two or three step approach is important. It's what Malcolm Gladwell refers to as "marketing ideas to mavens."

- Next, with good planning and research in hand, look for the creative edge. Look for the pressure points to capitalize on opportunities. For example, is there a villain…someone we and the public can get mad at? It can help to rally against a common adversary. Speaking hypothetically, could it be the petro-countries of the Middle East, where we are sending so much money for fossil fuels? And what can we link to our cause? Voter anger? Climate change? The overseas outsourcing of American jobs?

- Can we make this appeal intergenerational? Older people care deeply about their children and grandchildren and about leaving this country better than they found it. Young people care about their parents and grandparents. The generations are glued together in a very powerful way in America. Is this an edge we can use?

- And with regard to the SmartGrid, as you do your research and planning, ask yourself, what do <u>women</u> want? In almost every dimension, voting, jobs, education, career advancement, American women are moving ahead of men. They're making more and more decisions. Can this be a pressure point for energy change?

- Sometimes you find yourself going into all new territory. For example, a colleague of mine is working with African American beauticians to reach black women with weight control messages. He got the idea from learning how much time and money they spend on professional hair care.That's a

novel approach, supported by research, that may provide a creative edge in the battle against obesity.

- Next – and a very important part of reaching out-- are partnerships. These aren't new in social change, but they are growing and becoming more creative and dynamic. Companies want nonprofit partners that can marshal citizen armies to operate at the grass roots level. Nonprofits want corporate partners with clout and resources and a common passion for the social problem to be solved.

- Nonprofits are drawing increasingly on business techniques to tackle social problems. And corporations are becoming more focused on sustainable social responsibility initiatives.

- There are still managers in the social sector who see corporations as the bad guys, or at the least, to be held at arm's length. And caution may be called for. Nonprofit organizations that had partnered on environmental issues with BP found themselves under pressure as a result of the Gulf oil spill.

- But more and more, business, government and nonprofits are becoming increasingly interconnected as stewards of the environment and of society, and increasingly, they are joining forces.

- My last suggestion in this recipe for consumer engagement and social change is one you already know, I'm sure. And that is that leadership really, really counts.

- If you are going to create a consumer- centric SmartGrid, you have three obligations. The first is to listen to consumers and learn what they know, what they don't, and what they want and need. Second, you need to inform and educate the public and involve them in decisions and opportunities. And third, at the end of the day, your obligation is to lead—to make the difficult choices and to show the way to improve the environment, reduce costs and transform our system for tomorrow's world.

- A book with a powerful lesson is "The Last Lecture," by Randy Pausch. I wonder if you've read it. He was a professor at Carnegie- Mellon who died of pancreatic cancer. After learning he had only a few months to live, he was invited to deliver a last lecture at his university.

- His talk was not about his academic discipline, nor was it about his battle with cancer. Instead, he gave a lecture as a legacy to his kids. It's about achieving childhood dreams, about life's lessons, and about never giving up.

- He talked about running into brick walls. He said that those walls are there for a reason: "They let us prove how badly we want things. And they're there to keep out people who don't want it as badly as we do."

- Bringing consumers into the SmartGrid, creating huge changes in consumer behavior, fighting through the transformation of technology – these must seem like brick walls to you. They do to me, as well. So you have lots of opportunities to prove how badly you want to get this done.

- And I'm pulling for you to succeed. Because we have to bust through some brick walls if we're going to defeat those big, tough problems that prove their worth by attacking back.

- Good luck, and thanks very much.