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UNITED STATES DEPARTMENT OF ENERGY
Office of Electricity Delivery and Energy Reliability**

In the matter of:

Smart Grid RFI: Addressing Policy and
Logistical Challenges to Smart Grid
Implementation

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COMMENTS OF VERIZON AND VERIZON WIRELESS

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As the Department of Energy (DOE) correctly notes, Smart Grid technology that “better integrates information, communication, and intelligent control technology [] into the nation’s electrical system” holds “significant promise.”¹ Smart Grid technology not only can help “achieve environmental goals at lower cost,” but also “has the potential to improve power quality, manage power scarcities, and reduce transmission congestion costs.” *Id.*

As Verizon² has explained in response to previous DOE inquiries, effective communications networks and services are critical to the success of Smart Grid technology, and commercial communications providers – with their widespread, existing broadband networks and their expertise in providing wireless and wireline communications capabilities in an efficient, reliable, and secure manner – are well positioned to work with utilities to meet the communications demands associated with Smart Grid implementation. Indeed, Verizon already is actively engaged in promoting Smart Grid deployment. From partnering with utilities to deploy smart meters at customer homes to linking its own facilities to an electrical utility’s system to reduce energy costs by participating in demand/response programs, Verizon is committed to helping utilities and consumers use intelligent commercial broadband networks, data centers, and the security expertise of commercial service providers to implement Smart Grid in an efficient and cost-effective manner.

As policymakers consider how best to implement Smart Grid, they are faced with significant challenges in changing the mindset of consumers and other stakeholders to encourage awareness and use of the full range of technologies that can improve the way we use, provide,

¹ *Addressing Policy and Logistical Challenges to Smart Grid Implementation*, 75 Fed. Reg. 57006, 57007 (September 17, 2010) (“*RFT*”).

² In addition to Verizon Wireless, the Verizon companies participating in this filing (“Verizon”) are the regulated, wholly-owned subsidiaries of Verizon Communications, Inc.

and manage electricity. Indeed, the toughest challenges in the effort to transform the country's electricity grid into a Smart Grid rest not with technology, but with the various business and market issues, such as encouraging trends – such as home networking – that will facilitate consumers' demand and use of Smart Grid applications and ensuring that state and federal regulation create the appropriate incentives for the use of Smart Grid technologies.

I. ENCOURAGING CONSUMERS' TRANSITION TO SMART GRID

A. Policymakers Should Build On Consumers' Adoption of Broadband Home Area Networks and More General Movement Towards Smarter Homes to Encourage Greater Implementation of Smart Grid Applications.

As policymakers consider strategies for transitioning from the status quo to an environment in which consumer-facing Smart Grid programs are common, they should start with the reality of how electricity is currently consumed and then build on trends and initiatives that are already at work on the consumer's side of the electricity meter that can lead to a change in consumer behavior.

Aspirations for building the Smart Grid must confront the social and economic reality that residential energy consumption historically has been made up primarily of relatively passive, uninformed purchases by consumers. Unlike loading a stove with coal or wood, electricity flows unseen to serve our needs and consumers generally have less awareness of their usage. While consumers may see on their monthly bill how much energy they used over the course of the month and what their total charges are, they generally have little information in real time about how much electricity costs nor how much they use when they turn on a lamp, nor are there well established social norms to help shape energy consumption. As a result of this historic pattern of energy consumption, there has until recently been little effective demand among consumers for Smart Grid applications like time-of-use pricing or demand-response programs.

In light of this reality, policymakers, industry, and other stakeholders should look for opportunities to encourage change in consumer attitudes and behaviors with regard to their energy use by building on existing consumer trends that are outlined here. In particular, proponents of Smart Grid technology should take advantage of the growing prevalence of broadband home networks and the now-emerging consumer demand for energy monitoring and management. More than 46 percent of U.S. households (and more than half of GenY and GenX households) already have installed a home area network, virtually all as a result of broadband connectivity.³ That number is increasing rapidly, and is up from 33 percent in 2009. *Id.* About 54 percent of installed home networks were purchased from traditional retail outlets, 17 percent from online stores and 33 percent from broadband Internet service providers.⁴ Three-fourths of the installed base of home area networks incorporates some flavor of WiFi technology, while half also use Ethernet wiring.⁵ A 2008 survey showed that as of that time, home area networks connect about 5 devices on average.⁶

Until now, the consumer decision to acquire a home area network has been driven primarily by the desire to share entertainment-related content between devices, to connect multiple devices to the Internet and to connect from anywhere in the home, and to increase the productive use of things like home printers.⁷ Increasingly, however, these home networks are being extended beyond their original entertainment and Internet connectivity uses to enable a

³ See *The State of Consumers and Technology: Benchmark 2010, US*, Sept 2010, Forrester Research, Inc.

⁴ See *2010 Connected Home Survey: Home Network Owners*, Jonathan Gaw, IDC.

⁵ *Ibid.*

⁶ See *Connected Home: Global Outlook: 2009*, Parks Associates.

⁷ *Op Cit. 2010 Connected Home Survey*, IDC.

range of “Smart Home” applications, such as security monitoring, energy management or things like keeping an inventory of items in refrigerators. By adding a bit of software and hardware, for instance, home area networks can be extended to connect with sensors on outlets, switches or electrical wires and with major appliances and heating and cooling systems, in order to enable consumer management of energy consumption. Of course, they can also provide connectivity to utility smart meters when these are installed outside the home. Indeed, Parks Associates reports that the “diffusion of broadband capability to two-thirds of American households creates a path for providing energy usage monitoring with little additional infrastructure.”⁸

The demand for energy monitoring services is still relatively nascent both because of the historical patterns concerning energy consumption and because adoption of broadband by many consumers has been relatively recent. Recent surveys, however, have found 80 percent expressed interest in learning more about how to cut their energy costs, and about one-half were interested in the possibility of buying products that would enable them to conserve energy.⁹ The tipping point for the price of home energy management systems appears to be about \$10 a month.¹⁰ Interestingly, broadband households with an interest in security report a willingness to pay for energy monitoring at about twice the rate of non-security households.¹¹

An emerging class of customers who are actively engaged in managing their energy consumption can be expected to result in increased demand for Smart Grid applications like new pricing plans and demand/response programs. And in the early stages of this transition, the

⁸ See *Home Systems: Home Security – Analysis and Forecasts 2010*, 2Q 2010 Parks Associates.

⁹ See *Digital Lifestyles: 2010 Outlook*, 2010 Parks Associates

¹⁰ See *Op Cit. Home Systems: Home Security*, Parks Associate.

¹¹ *Ibid.*

embrace of demand/response programs by even relatively small numbers of consumers can have a significant positive impact on utility operations and energy loads. Studies have demonstrated that if only a small percentage of all customers shift their energy use through such a program – typically about 5 percent of demand – then energy prices can be reduced substantially for everyone else by virtue of the shaving of peak loads.¹²

Policymakers should look for opportunities to encourage the extension of home area networks to provide energy monitoring and management solutions by looking at electrical and building codes and provisions that could create barriers to the installation of in-home sensors on electric wires, or perhaps by providing tax incentives for the deployment of home energy management systems.

Likewise, policymakers, industry, and other stakeholders also should encourage the development of the Smart Home marketplace more generally. As noted above, a critical mass of households has already installed home area networks to facilitate consumers' use of their broadband connections, primarily in the context of Internet access or to facilitate the sharing of media over different devices. Increasingly, however, these home networks will provide a basis for Smart Homes that will bring home automation, security, and energy management, health monitoring and other capabilities to the consumer marketplace. By encouraging use of the growing installed base of home networks for a wider range of Smart Home purposes, policymakers could thereby help increase demand among consumers for energy management solutions, as evidenced by the survey cited above that shows increased interest in home energy management solutions when presented as part of a package rather than as a stand alone application.

¹² Peter Fox-Penner, *SMART Power: Climate Change, the Smart Grid and the Future of Electric Utilities*, at 44 (Island Press 2010).

This broader approach so far has gotten insufficient attention in the ongoing policy dialogue around smart meters, energy usage data and privacy concerning Smart Grid implementation, and also was largely overlooked by EISA's Title XIII, which tends to focus only on a utility's grid network.

B. The Smart Grid Transition Requires Better and More Useful Information for Consumers and Education about Social Norms for Energy Use.

Successful Smart Grid implementation will require a comprehensive and coordinated education effort, not only to increase awareness of Smart Grid technology but also to sensitize consumers to issues surrounding energy consumption more generally. In fact, rather than educate about the value and benefits of a utility infrastructure called the "Smart Grid," a more effective approach would be public information campaigns to educate about social norms for energy use, similar to earlier public campaigns to educate about social norms for recycling and waste disposal.

A review of nearly sixty studies and pilot projects from around the world suggests that significant "behavior-related" energy savings opportunities are available in the residential sector – in contrast to "technology-related" savings – and that a majority of people can be motivated to change their energy-related behaviors for civic and altruistic reasons as well as for self-interested reasons such as reducing their energy bill.¹³ A 2003 study of California households that reported taking one or more conservation actions found that about 65 percent of the resulting reduction in energy demand was due to changes in behavior, such as simply turning off lights when leaving a

¹³ *Advanced Metering Initiatives and Residential Feedback Programs: A Meta-Review for Household Electricity-Saving Opportunities*, American Council for an Energy-Efficient Economy, http://www.energie2007.fr/images/upload/aceee_etude_juin_2010_advanced_metering_initiative_s.pdf, at 72 (June 2010).

room, as opposed to investments in hardware solutions or new home technology.¹⁴ And while 80 percent said their motivation was to keep their electricity costs down, 82 percent said they wanted to “avoid blackouts,” 77 percent wanted to “use energy resources as wisely as possible,” 73 percent wanted to do their part to help Californians, and 69 percent were motivated by environmental protection concerns. Interestingly, the 2003 California report found that “qualifying for a utility rebate was the least common motivation.”¹⁵

Smart home technology that provides real-time information about energy consumption and cost is an important tool for customers interested in paying greater attention to their energy use and reducing their consumption. But above, studies also suggest that even without new home technologies, important energy reductions can be realized simply by encouraging consumers to change their habits and that, importantly, such changes can be motivated by a variety of factors that include civic and altruistic motives. *Id.* Thus, a multi-pronged approach should be pursued in order to create demand for smart-grid applications on the consumer side of the electric meter. While policymakers should encourage the development of the smart-home marketplace as urged above, they also should look seriously at education about the social and civic impact of a person’s energy use to foster social norms that encourage energy efficiency.

II. ENCOURAGING UTILITIES’ TRANSITION TO SMART GRID

In addition to the steps described above to encourage consumers’ embrace of Smart Grid technology, policymakers also must focus on approaches that will better encourage electric utilities to make this shift. Many observers, including some utility CEOs, suggest utilities may lack the appropriate incentives to invest in the most cost-effective Smart Grid infrastructure and

¹⁴ *Ibid.* at 70.

¹⁵ *Ibid.* at 71.

allow that infrastructure to be used to conserve energy.¹⁶ This is because most investor-owned utilities generate revenue based on the number of kilowatt hours sold and they pass on infrastructure costs as part of their regulated rates. Many may lack effective incentives to curb energy usage or to ensure the most efficient use of infrastructure. This cost-plus, regulated pricing approach helps shape the business model and operating culture of electric utilities, while it similarly has discouraged risk-taking and innovation.

Many utilities have built a business case for deploying advanced metering infrastructure and other consumer facing smart-grid technology, even in the context of cost-plus pricing regime, by focusing on operational savings and the avoided costs that will be realized if consumers engage in demand/response programs that result in reduced need for new generation plants. Still, even with this business case there is great pressure under current business models and regulatory frameworks for investor-owned utilities to recover their costs notwithstanding the reduction in the number of kilowatt hours sold, and irrespective of whether all of the prospective consumer-side benefits are ultimately realized.

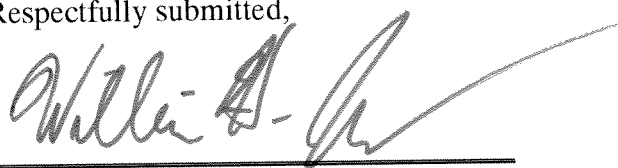
A new approach may be needed that better aligns utilities' incentives with the energy-saving and transformative benefits of the Smart Grid. The telecommunications sector provides a case study for the innovation that can be released by a shift away from the regulatory approach that is still common in the utilities sector. Indeed, investment in more efficient and advanced broadband technologies dramatically increased in response to the loosening of regulatory strictures and the movement away from traditional rate-of-return regulation. The "Smart Grid" similarly is fundamentally about innovation – innovation that drives efficiency, differentiated

¹⁶ *Op Cit*, Peter Fox-Penner, *SMART POWER*, at 51-64.

services and consumer choices. A shift in regulatory models in the context of electric utilities could also help create appropriate market-based incentives for innovation and efficiency.

While issues regarding regulatory reform, including reform to rate-base/rate-of-return price regulation, are difficult, it is essential that policymakers evaluate the incentives created by utility regulatory models as they seek to facilitate the transition to the Smart Grid. The federal government should work together with all relevant stakeholders, including state regulators, Independent System Operators, Regional Transmission Organizations, utilities, communications providers, Smart Grid vendors and others, and initiate a dialogue about the regulatory reforms that could help facilitate Smart Grid Implementation.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "William H. Johnson", is written over a horizontal line.

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