BEFORE THE
PENNSYLVANIA
PUBLIC UTILITY COMMISSION

INVESTIGATION OF CONSERVATION, ENERGY EFFICIENCY ACTIVITIES, & DSR BY ENERGY UTILITIES & RATEMAKING MECHANISMS TO PROMOTE SUCH EFFORTS	* * * * * *	Docket No. M-00061984

COMMENTS OF CURRENT GROUP, LLC

CURRENT Group, LLC ("CURRENT") hereby submits these comments in response to the Commission's Secretarial letter dated October 29, 2008 in the above-captioned proceeding.

CURRENT provides high-speed, two-way communications networks with embedded sensing that is installed on existing electric distribution networks to transform them into efficient, automated Smart Grids. These Smart Grids are monitored by a 24x7 network management system and analytic software platforms specifically designed to enhance the reliability, security and efficiency of electric distribution grids.[1]

CURRENT's Smart Grid technology is already being deployed in Boulder, Colorado with Xcel Energy and in Dallas, Texas with Oncor Electric Delivery.[2] Xcel estimates that its Smart Grid deployment can reduce its line losses by 30%.[3] Oncor has stated that it monitors its electric delivery system, analyzing it for potential problems, and

---

[1] Additional information about CURRENT is available at www.currentgroup.com.

[2] *See e.g.*, *Xcel starts construction of Boulder 'smart grid'*, Denver Business Journal (May 15, 2008), available at: http://www.bizjournals.com/denver/stories/2008/05/12/daily41.html. An overview of Xcel's Smart Grid City is available online at: http://www.xcelenergy.com/docs/SmartGridCityDesignPlan.pdf and http://www.xcelenergy.com/XLWEB/CDA/0,3080,1-1-1_15531_43141_46932-39884-0_0_0-0,00.html.

[3] *See Xcel Energy Smart Grid: A White Paper* at 5, Xcel Energy (Feb. 2008), available at: http://www.xcelenergy.com/docs/SmartGridWhitePaper.pdf.

that "[i]ssues are often resolved before consumers even realize that there was a problem."[4] The California Energy Commission has estimated that distribution grid optimization resulting from a Smart Grid could reduce distribution grid line losses by 15% or more and save 500,000 tons of CO^2 annually.[5] The benefits to ratepayers from such improvements would be substantial.

The federal Energy Independence and Security Act of 2007, enacted nearly one year ago, declared that it is the federal policy of the United States to support and facilitate Smart Grid deployments.[6] The Act directs states to evaluate the deployment of Smart Grids and authorizes more than half a billion dollars to help fund Smart Grid projects.[7] The Act also directs the States to commence proceedings to evaluate Smart Grids by this December and to complete their proceedings by December 2009.[8] Already Smart Grid legislation has been enacted into law in Maryland and Massachusetts and bills are pending in several states, including New Jersey and New York.[9] Other states have passed similar legislation or commenced or announced rulemaking proceedings on Smart Grid.[10]

In seeking a common definition of Smart Grid several central characteristics have emerged: (1) self-healing and adaptive; (2) integrated across the entire distribution grid; (3) optimizing grid operations; (4) automating distribution; (5) secure; (6) interacting

---

[4] Oncor News Release, Sept. 19, 2007, available at: http://www.oncorgroup.com/news/newsrel/detail.aspx?prid=1094.
[5] *CEC Report* at 75. A study at Hydro Quebec quantified those savings at two billion kWh. *Id*. at 75.
[6] Energy Independence and Security Act of 2007 (P.L. 110-140, H.R.6), Sec. 1301.
[7] *Id.*, Secs. 1304, 1306 & 1307.
[8] *Id.*, Sec. 1307.
[9] *See* EmPOWER Maryland Energy Efficiency Act of 2008, Sec 2, HB 374/SB 2005, 2008 Md. Laws, Ch. 131 (enacted April 8, 2008); Green Communities Act, S.2768 (enacted July 2, 2008), Sec. 85 (requiring Smart Grid Pilot Programs); Smart Grid System Compatibility Act, NJ Assembly Bill No. 2917 (Introduced June 12, 2008); Smart Grid Pilot Program Act, NJ Assembly Bill No. 2918 (Introduced June 12, 2008); NY Assembly Bill No. 10885 (Introduced May 7, 2008)(in relation to "Smart Grid Systems").
[10] *See* Ohio Senate Bill No. 221(enacted May 1, 2008); Investigation by the Indiana Utility Regulatory Commission of Smart Grid Investments, Cause No. 43580; *Draft* California Long-term Energy Efficiency Strategic Plan, August 2008, Section 8, pp. 74-77 (discussing demand-side management coordination and integration).

with and empowering consumers; and (7) predictive diagnostics.[11] The benefits of pervasive automation of points throughout the distribution network and other attributes of a Smart Grid were provided by the Electric Power Research Institute (EPRI) in testimony before Congress last year:

> [A] power system that can incorporate millions of sensors all connected through an advanced communication and data acquisition system. This system will provide real-time analysis by a distributed computing system that will enable predictive rather than reactive responses to blink-of-the-eye disruptions.
>
> The grid of the future will require an order of magnitude greater number of touch points compared to today's system. For example, where today an electric utility company might monitor and control hundreds of grid devices, in the future it will monitor and control thousands to millions of devices, all designed to provide information on the power systems' performance.
>
> This increased number and scale of touch points will force utility companies to fundamentally change how they think of and approach the grid of the future. The result will be a flexible and secure intelligent power delivery infrastructure that can meet both today's needs as well as tomorrow's consumers' needs for information to better manage their day-to-day energy demands.[12]

The U.S. Department of Energy (DOE)'s Modern Grid Initiative[13] and the California Energy Commission (CEC) have put forth similar definitions.[14]

---

[11] *See, e.g.*, presentations given at California Energy Commission workshop on Smart Grid (Apr. 29, 2008 Workshop), available at: http://www.energy.ca.gov/load_management/documents/2008-04-29_workshop/presentations/.

[12] *See* Michael W. Howard, Ph.D., P.E., Senior Vice President, R&D Group, Electric Power Research Institute, *Facilitating the Transition to a Smart Electric Grid*, Testimony Before the House Energy and Commerce Subcommittee on Energy and Air Quality (May 3, 2007), available at: http://energycommerce.house.gov/cmte_mtgs/110-eaq-hrg.050307.Howard-testimony.pdf.

[13] The DOE-sponsored Modern Grid Initiative identifies a Modern or Smart Grid as having five components: Integrated Communications, Sensing and Measurement, Advanced Components, Advanced Control Methods, and Improved Interfaces and Decision Support. It states "[o]f these five key technology areas, the implementation of integrated communications is a foundational need, required by the other key technologies and essential to the modern power grid" and that "[h]igh-speed, fully integrated, two-way communications technologies will allow much-needed real-time information and power exchange." A Systems View of the Modern Grid at B1-2 and B1-11, INTEGRATED COMMUNICATIONS, Conducted by the National Energy Technology Laboratory for the U.S. Department of Energy Office of Electricity Delivery and Energy Reliability (Feb. 2007).

[14] The *CEC Report* states that sensors are the next basic requirement for virtually all Distribution Automation applications: "communications is a foundation for virtually all the applications and consists of

Smart Grid technologies will produce significant *net savings* for rate payers. This is in contrast to the negative pricing impact on rate payers of most meter-centric solutions. For instance, based on analysis conducted by CURRENT with several leading consulting firms and utilities, a typical one million-home Smart Grid deployment will reduce consumption and peak demand and produce nearly $3 billion dollars of *net benefits* for rate payers and utilities that can be used to lower rates for consumers and reward utilities for investing in more efficient distribution networks. Further, Smart Grid applications increase the reliability, security and efficiency of the distribution grid in ways that other solutions – particularly meter-centric solutions – cannot because such other solutions do not monitor the entire grid and they lack the necessary system capacity, *i.e.*, communications bandwidth. These Smart Grid applications include, among others:

- Real-time System Optimization through Load Balancing and volt/VAR controls based upon constant monitoring and measurements along the grid;
- Distribution Equipment Automation;
- Underground Cable Fault Detection and Overhead Vegetation Management;
- Asset Management through predictive incipient equipment failure detection;
- Theft Detection based upon differences between meter-read consumption and measurements taken at the respective transformers;
- Demand Response functionality based upon real-time price changes and other conditions requiring real-time end user device communications and control.
- Coordination and management of Distributed Generation sources, including eventually plug-in hybrid electric vehicles;

---

high speed two-way communications throughout the distribution system and to individual customers." *California Energy Commission on the Value of Distribution Automation, California Energy Commission Public Interest Energy Research Final Project Report* at 51 (Apr. 2007) (*CEC Report*), available at: http://www.energy.ca.gov/2007publications/CEC-100-2007-008/CEC-100-2007-008-CTF.PDF.

Notably, a Smart Grid can achieve energy efficiency targets without requiring *any* change in consumer behavior, delivering significantly higher benefits than other solutions.[15] As a result of these unmatched value enhancements, Smart Grids also provide exponentially higher reductions in CO_2 emissions than other solutions, namely through more robust demand response capabilities and grid-oriented energy savings that are not dependent on uncertain customer response savings.[16]

A true Smart Grid connects advanced meters, smart thermostats, smart appliances, load control devices and distributed and renewable generation sources directly to the utility through a two-way, high speed communications network. This enables meters installed pursuant to newly enacted House Bill No. 2200[17] and other devices to respond to information about prices and reliability events as they change in real time. Automated in-home energy management systems continue to evolve and the most sophisticated of these systems already require a high-speed communications path. And because most consumers do not have the time or desire to monitor and respond to such information themselves, a Smart Grid enables the utility to administer more robust time-of-use, real-time pricing and renewable-sensitive programs not possible with less robust technologies.

Only Smart Grid systems enable real-time "on-demand" meter reads and communications with demand response appliances and distributed renewable energy

---

[15] See *Getting Smart*, Robert Robinson, Jr. and James C. Henderson, Electric Perspectives (Sept. /Oct. 2007), at 69.

[16] The Federal Energy Regulatory Commission report on the Assessment of Demand Response and Advanced Metering described the environmental impact of demand response as an "additional benefit" with the caveat that "the importance and perceived value of each of these (additional) benefits is subject to debate." *Assessment of Demand Response and Advanced Metering* at 11, FERC, Docket No. AD06-2-000 (Aug. 2006) ("*FERC Assessment*"). In fact, the primary greenhouse gas reductions associated with advanced or smart meter programs derive from demand response applications. Demand response, however, tends to shift consumption from peak to off-peak hours – rather than actually eliminating consumption – and generation sources used during off-peak periods are largely coal plants, which are less expensive to operate but which produce more greenhouse gas emissions than most peaker plants, which tend more toward using natural gas and renewable generation sources.

[17] *See* Section 2807(F) of Title 66, Pennsylvania House Bill No. 2200 (enacted October 15, 2008).

sources, such as roof-top solar panels or plug-in hybrid electric vehicles. Therefore with a Smart Grid, demand side management (DSM) programs can confirm in real time the precise distributed energy source availability occurring at individual residential customer levels all across the distribution grid. The communications to the customer will be received in the appropriate time frames and, equally as important, the utility will know whether the desired action, such as accessing distributed renewable energy sources or reducing demand, occurred so it can verify results and promptly take further actions as real-time developments dictate. DSM and access to distributed energy resources spread among millions of user locations are not isolated events. They require continuous monitoring of the grid and end-user facilities and further require that the utility perform necessary grid-wide adjustments in real time. Absent a Smart Grid, utilities simply cannot perform these functions satisfactorily, let alone optimally. [18]

For instance, to use demand response as a spinning generating reserve requires the demand response system to communicate load shed signals at all of the endpoints within as little as four seconds, but not more than 10 minutes. When these systems need to support distributed generation resources such as rooftop solar panels or plug-in hybrid electric vehicles they need to be able to poll these resources in the minutes and seconds before dispatch in order to assess their readiness, determine their capacity, and monitor their progress during dispatch. The demands on the communications infrastructure

[18] For example, the AMI Use Cases prepared by Southern California Edison (SCE) to determine AMI system requirements, specifically reject the use of the AMI system to manage distributed generation serving more than one customer for a number of reasons, including the need for real time communications which is not provided by the AMI system. See SCE AMI Use Case: D3 - Customer Provides Distributed Generation at 7, (Apr. 18, 2006). The report for the Commission on the Value of Distribution Automation, prepared by Energy and Environmental Economics, Inc. (E3), and EPRI Solutions, Inc., stated that the value of such distributed electric storage managed in real time (such as a battery or plug-in vehicles) would be increased by nearly 90% over a similar asset that is not connected by a Smart Grid. *California Energy Commission on the Value of Distribution Automation, California Energy Commission Public Interest Energy Research Final Project Report* at 95 (Apr. 2007) (*CEC Report*). *See also infra* note 16.

increase dramatically as there is more data to move, and that data needs to move much more quickly than narrowband metering systems can provide.

Deploying a Smart Grid can produce more savings for consumers by providing the safest, most reliable distribution network currently available. For example, the Electric Power Research Institute (EPRI) estimates that a true Smart Grid can reduce the $100 billion per year that power outages and "blink of the eye" power quality disruptions cost U.S. businesses by up to 87 percent.[19] Nationally, peak demand for electricity is forecast to rise by 19% over the next decade, while capital committed to electric generation, transmission and distribution is expected to grow by only six percent during the same period.[20] Moreover, House Bill No. 2200 requires a utility to provide and install advanced meters upon request from its customers.[21] In such a scenario, where meters would be added only upon acceptance by an end user, the cost of deploying and operating the supporting network should be borne by other applications whose benefits are not dependent on meter or DSM adoption rates.[22]

In addition, electric distribution networks are aging and facing increasing strain, and the work forces that maintain them are aging as well.[23] Existing grids are one-way systems that lack the self-healing, monitoring and diagnostic capabilities essential to meet demand growth and contemporary security challenges. A Smart Grid will take the guess

---

[19] *See* EPRI, *Electricity Sector Framework for the Future: Achieving the 21st Century Transformation* (Aug. 2003), page 42 ("*EPRI Report*"), http://www.globalregulatorynetwork.org/PDFs/ESFF_volume1.pdf. *See also*, http://www.energyfuturecoalition.org/preview.cfm?catID=57 (citing *EPRI Report*).

[20] The Brattle Group, *The Power of Five Percent: How Dynamic Pricing Can Save $35 Billion in Electricity Costs*, Discussion Paper filed with the Maryland Public Service Commission (May 16, 2007) (citing North American Electric Reliability Council, 2006 Long Term Reliability Assessment).

[21] *See* Section 2807(F) of Title 66, Pennsylvania House Bill No. 2200 (enacted October 15, 2008).

[22] *See supra* p. 4.

[23] According to a Department of Energy study in 2006, up to 50% of utility line crews expected to retire nationwide could retire in the next 5 to 10 years. *See Workforce Trends in the Electric Utility Industry*, http://www.oe.energy.gov/DocumentsandMedia/Workforce_Trends_Report_090706_FINAL.pdf.

work out of outage and restoration detection. Power crews will know exactly where and when to go to repair the distribution grid and technicians can expedite power restoration to customers through remote management of switches and other utility infrastructure. Power crews will also know in real time when and to what extent restoration has occurred, which is important because customers do not generally call to notify utilities of effective power restoration. Smart Grid-assisted outage management will reduce the occurrence and duration of outages and facilitate restoration to high priority users such as hospitals, police stations, and those whose lives depend on medical equipment.

In short, deployment of a Smart Grid is the best means of increasing the efficiency of the distribution grid, lowering the costs borne by rate payers for the distribution of electricity, enabling consumers to manage their energy consumption through demand response programs, and integrating distributed generation and renewable energy sources into the distribution grid. Smart Grid technologies comprise the robust, two-way communications network necessary for Pennsylvania fully to achieve its efficiency, conservation and renewables goals, but only to the extent such technologies are in fact deployed. As a first step in this process, CURRENT urges the Commission to consider deployment of Smart Grid technology as a change necessary to support the State's energy goals.

Respectfully submitted,

/s/ Jay Birnbaum

____

Jay Birnbaum
CURRENT Group, LLC

November 14, 2008