State of New York
Public Service Commission

CASE 94-E-0952 – In the Matter of Competitive Opportunities Regarding Electric Service

CASE 00-E-0165 – In the Matter of Competitive Metering

CASE 02-M-0514 – Proceeding on Motion of the Commission to Investigate Competitive Metering for Gas Service

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COMMENTS OF CURRENT GROUP, LLC

Pursuant to the October 10, 2007 Notice Seeking Comment, CURRENT Group, LLC ("CURRENT") files these Comments in the above-captioned proceedings to assist the Commission in establishing reasonable standards for advanced metering infrastructure ("AMI") systems.

CURRENT, a privately held company based in Germantown, Maryland and with its Network Operations Center in the Rochester, New York area, is the nation's leading provider of Broadband over Powerline- ("BPL") based Smart Grid solutions and services to electric distribution companies worldwide.[1] Thus, it has experience in, and is very knowledgeable about, AMI systems and has participated in numerous similar proceedings in other states.

These Comments are divided into two parts. First, CURRENT distinguishes "AMI only" technologies from a true Smart Grid and describes some of the additional benefits New York can

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[1] The *CURRENT*® BPL portfolio includes BPL network equipment, software solutions and *CURRENT Smart Grid*® Services, which are electric utility applications that enable real time management of the electric grid. CURRENT is also a fully integrated communications service provider offering high performance broadband Internet services to consumer and business users over existing electric power lines and in-home electric wiring. Further information about CURRENT is available at http://www.currentgroup.com.

realize by adopting a "future proof" solution that addresses the entire distribution grid, rather than relying on decades-old technologies that can be used only to communicate in a highly constrained manner with a limited number of end points. Second, CURRENT offers comments on the specific list of AMI features and functions proposed by Staff.

I. CREATING A FUTURE-PROOF "SMART GRID"

A. A Smart Grid Is More Than AMI

Although BPL has attracted attention in the past primarily as a means of providing communications services such as Internet access, the technology has come into its own for its ability to transform the century-old tools of the electric distribution grid into a Smart Grid – a network of advanced sensors capable of collecting and monitoring data from the substation through transformers, meters and other electric distribution devices along power lines, all connected through a high-speed and low-latency communications system and a distributed computing system capable of real time analysis and event prediction.

To deploy the Smart Grid, CURRENT overlays its state-of-the-art technology at points throughout the existing electric distribution network. No retrofitting or conditioning of the distribution electric grid is required. Once a *CURRENT Smart Grid* is deployed, it can communicate with points anywhere along the distribution grid as well as with virtually every electric outlet inside homes and businesses. A utility therefore can monitor and control capacitor banks, transformers, switches, substations and other critical infrastructure, manage demand response programs for end users and measure and coordinate available distributed and renewable energy sources, in addition to providing AMI/Smart meter functions (including reads to one minutes intervals, remote connect and disconnect, voltage limiting, pre-pay, and multiple pricing functions made possible by a high-speed and low-latency communications system). In addition, the system can detect potential equipment failures, stray voltage situations or underground cable faults, thus improving system reliability and safety.

CURRENT is deploying its Smart Grid in and around Dallas/Fort Worth, Texas with Oncor Electric Delivery (formerly known as TXU Electric Delivery). CURRENT's Texas system, which ultimately will reach almost two million homes and businesses, already passes over 100,000 homes and is being used to read over 60,000 advanced meters at 15-minute intervals[2] (as well as on-demand), with installation ongoing.[3] In addition, the system allows network monitoring that can detect problems before they cause power outages, safety hazards or system quality problems. In Dallas, CURRENT's technology "has already allowed Oncor to detect grid problems before they cause outages,"[4] and also provides power outage and restoration detection when outages occur. Further, CURRENT will support demand side management programs over its Smart Grid network with numerous retail electric providers in Texas.

A truly "smart" electric distribution network has three key components: (1) High performance communications capable of moving large amounts of data both "upstream" and "downstream," so that the utility can both monitor and control equipment throughout the network in real time. (2) Advanced sensing capability embedded throughout the network and

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[2] A *CURRENT Smart Grid* also can be used to read meters in intervals as short as one minute, depending on a utilities' needs and the configuration of servers used.

[3] *See*, *Oncor's 'Smart Meters' Kicking Off BPL System*, Dallas Morning News, Sept. 19, 2007 (http://www.dallasnews.com/sharedcontent/dws/bus/industries/energy/stories/dnbus091807oncor.35afb11.html)

[4] *Id*.

capable of providing real-time information about the grid's condition and operations. And (3) enterprise systems that can collect and analyze the multiple streams of data coming from the grid, integrate them with existing utility systems, and deliver actionable information to the utility in usable forms.[5] CURRENT's solutions meet all three of these critical needs, enabling utilities to monitor and control electric distribution networks in unprecedented ways, and converting robust data streams into actionable intelligence that can be integrated directly into existing utility systems.

Behind the meter, a Smart Grid turns every electrical outlet into an Internet protocol-enabled "smart socket," a transformation that enables unprecedented control, measurement and verification for demand response programs and pricing programs. In front of the meter, Smart Grid is capable of monitoring and controlling every element (transformers, capacitor banks, etc.) on the electric distribution network all the way back to the substation, as well as detecting potential problems with the wires themselves, including underground cable faults. Unlike advanced metering-only systems, a Smart Grid dramatically improves the efficiency and reliability of the entire distribution grid, which helps to greatly reduce electricity consumption and greenhouse gas emissions.

[5] The Electric Power Research Institute ("EPRI") uses a similar definition, referring to the Intelligent Grid, or Smart Grid, as a power system that can incorporate millions of sensors all connected through an advanced communication and data acquisition system. Such a 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 and is designed to supports both a changing generation mix in a carbon constrained world, and a more effective and efficient participation by consumers in managing their use of electricity. *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

The Electric Power Research Institute ("EPRI") estimates that power outages and "blink of the eye" power quality disruptions cost U.S. businesses at least $100 billion per year.[6] A Smart Grid can provide utilities with real-time actionable intelligence about their networks that can be used to prevent such costly disruptions, reducing their costs to energy users by up to 87 percent.[7] More fundamentally, a Smart Grid can reduce the total amount of power used**.** EPRI projects that Smart Grid-enabled electrical distribution could reduce electrical energy consumption by 5 percent to 10 percent and carbon dioxide emissions by 13 percent to 25 percent.[8] Managing the distribution grid in the 21st century will require utilities to monitor electricity as it passes literally millions of discrete points (substation elements, power lines, capacitor banks, transformers, meters, communicating thermostats, load control devices, smart appliances, etc.). A Smart Grid can collect such data as often as every minute, providing far more actionable information and control than systems that are capable only of making less frequent reads and of reading fewer, or fewer types of, devices. By overlaying a broadband, two-way network on the electric distribution grid, utilities can not only read meters more frequently than is possible with low-bandwidth AMI-only solutions, but also deliver real-time pricing and information about energy use to in-home displays, giving consumers better control of their bills and the means to reduce their electric consumption.

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[6] http://www.energyfuturecoalition.org/preview.cfm?catID=57 (citing EPRI estimate).

[7] *See* Electric Power Research Institute, *Electricity Sector Framework for the Future: Achieving the 21st Century Transformation* (Aug. 2003), page 42 (*"EPRI Report"*), available at: http://www.globalregulatorynetwork.org/PDFs/ESFF_volume1.pdf.

[8] *Id.*

A Smart Grid connects advanced meters, smart thermostats, smart appliances and load control devices in homes and businesses directly to the utility through a broadband communications network. This enables meters and other devices to respond to information about prices and reliability events as they change in real-time. And because most consumers do not have the time or desire to monitor and respond to such information themselves, a Smart Grid allows the utility to administer sophisticated time of use contracts not possible with more limited technologies. For example, rather than simply directing all air conditioners in a given vicinity to cycle off for some defined time period, a Smart Grid-enabled system could direct 100,000 specified air conditioning units to allow the temperatures in their premises to increase by three degrees – and then could verify, in real time, the precise level of electric demand that was shed as a result of that action.

There are other important advantages to Smart Grid. The Northeast Blackout of August 2003 and more recent large power outages resulting from storms and other causes underscore the need for Smart Grid systems. Electric distribution networks are aging and facing increasing strain. The California Energy Commission recently reported that approximately 90 percent of all customer interruptions and outages are caused by distribution problems.[9] Existing grids are one-way systems that lack the self-healing, monitoring and diagnostic capabilities essential to meet demand growth and contemporary security challenges. In the Queens, New York blackouts of August 2006, nearly 100,000 people were left without power for 10 days as the electric utility worked to detect, diagnose and respond to the extensive outage using the only methods available

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[9] California Energy Commission, 2007 Integrated Energy Policy Report, Draft Committee Report, October 2007 http://www.energy.ca.gov/2007publications/CEC-100-2007-008/CEC-100-2007-008-CTD.PDF

to it at the time. Until recently, utilities had little choice but to rely on what one New York City councilman called the "Paul Revere" method of outage detection – utility crews driving through neighborhoods making visual inspections to attempt to determine where repairs are needed. Unlike low-bandwidth AMI-only solutions, a Smart Grid senses and detects outages at a precise point or points on the grid; it does not triangulate the outages from "live" meters.

A Smart Grid will take the guess work out of outage and restoration detection. In many cases, a potential equipment failure can be detected and fixed prior to an outage. However, when outages do occur, power system maintenance crews – which themselves are aging, with as many as 40% or more retiring over the next 10 years – 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 with each network repair performed, which further saves on labor costs because customers do not generally call to notify utilities of effective power restoration. Smart Grid-assisted outage management will reduce the frequency and duration of outages and facilitate restoration to high priority users such as hospitals, police stations, National Guard facilities and those whose lives depend on medical equipment.

Smart Grids also provide communications and monitoring essential to manage and optimize a portfolio of distributed and renewable energy resources. Wind and solar power, for example, often are dependent on the time of day, time of year or highly variable weather conditions. With a Smart Grid, real-time information about the availability of renewable-generated power can be combined with real-time information about the demand in any given part of the grid. Similarly, a Smart Grid can help ensure that plug-in hybrid electric vehicles ("PHEV") are truly a clean-energy option. The ability to collect real time actionable data from thousands of distributed data points combined with Smart Grid "net metering" capability are critical to accessing and managing billing information to make distributed resources viable. Although it is estimated that 70 percent of all cars, trucks, vans and SUVs could be powered from the electric grid, the time-sensitive demand response enabled by Smart Grid and its ability to measure distributed generation sold back into the distribution grid is necessary to maximize the environmental and economic benefits of widespread PHEV adoption.[10] Automobiles can be charged during periods when generation costs are lowest (typically at night), and be used to distribute energy back into the grid at peak times, thereby saving money and mitigating the need for peaking power plants.

Smart Grid also can provide crucial support for homeland security. CURRENT's Smart Grid system can provide a direct data link to security cameras that provide real-time video monitoring of critical utility assets, such as substations, as well as non-utility critical infrastructure, such as State and local government facilities. BPL can also be used to service networked sensors designed to detect specific hazards, such as radiation or biohazard detectors – the only requirements are that such monitoring devices be served by the electric distribution network and communicate via Internet protocol.

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[10] *See*, Pacific Northwest National Laboratory Study, available at: http://www.pnl.gov/news/release.asp?id=204 (Dec. 11, 2006).

B. AMI-Only Solutions Are **Not** Incremental Steps To a Smart Grid

It is crucial that the Commission recognize that investments made today in AMI-only solutions that are solely capable of low-bandwidth connections to meters and a limited range of other devices on the customer side of the meter are not readily upgradeable to a true Smart Grid. Thus, such investments could easily become stranded costs with the adoption of new and better technology. Further, a system without the capability to communicate with embedded sensors throughout the grid and without sufficient bandwidth to carry the rich data streams generated by such sensing cannot avoid becoming stranded by evolving to offer those resources. Instead,, installing smart meters that rely on low-bandwidth solutions will generally preclude creation of a Smart Grid during the fifteen to twenty-year life of those meters. CURRENT's solution, on the other hand, offers sufficient communications bandwidth to accommodate not only AMI, demand response and other existing programs, but also to enable yet-to-be-developed technologies and capabilities offered by any provider.

Importantly, CURRENT's solution does not rely on proprietary technology, but instead communicates via Internet Protocol (IP), and thus readily integrates with existing home networking applications and devices that consumers can use to monitor and control their energy usage. In contrast, AMI-only systems based on power line carrier or cellular technologies often use proprietary standards that cannot be linked to home area networks. Such systems, moreover, permit only very limited two-way communications that will not support true time of use pricing and other innovative models, and offer only low bandwidths that will be unable to support the new applications that inevitably will be developed during the expected life of a smart meter. In addition, these systems lack the sensing throughout the grid necessary to detect problems at distribution transformers and elsewhere in the distribution network.

II. COMMENTS ON FEATURES AND FUNCTIONS PROPOSED BY STAFF

A. Recommended Changes To Proposed Features And Functions

a) CURRENT recommends that the Commission specify in requirement a) that AMI systems comply with "all ANSI C12 standards," rather than "all ANSI standards." Some ANSI standards are not applicable to AMI systems.

d) CURRENT proposes editing requirement d) as follows: "Ability to provide multiple channels of time-stamped interval data (*e.g.*, +KWh, -KWh) at ~~hourly~~ fifteen-minute or shorter time intervals." Making multiple channels of interval data available is necessary for proper usage measurements. In addition, fifteen-minute (or shorter) interval data is essential to support true time of use pricing programs.

h) CURRENT proposes editing requirement h) as follows: "Utilizes open standards-based communications protocols and platforms, e.g., ~~broadband, PLC,~~ internet protocol, ~~XML, MV-90,~~ Zigbee, DNP3, HomePlug, etc. The references proposed to be eliminated are not communications protocols, and their inclusion could create confusion. CURRENT proposes adding "HomePlug" because it is a common protocol (and is used in portions of CURRENT's systems).

j) The Commission should require not only that an AMI system be able to send “signals to customer equipment to trigger demand response functions” (requirement j), but should confirm receipt of the signal, verify 99% of equipment activation, and collect and verify 99% of demand response action voltage data in near-real-time. The Commission should specify that the system be capable of transmitting more robust price information than just a peak/off peak indicator. Near-real time data is necessary if demand response is to be used to prevent grid related problems and requires several-seconds-or-less response times.

B. Additional Recommended Features And Functions

CURRENT believes that the list of recommended features and functions proposed by the Commission is an excellent starting point, but suggests that the Commission add four additional functions to its AMI system list:

First, an AMI system should be capable of performing remote connection and disconnection of electric customers. This capability provides both an important convenience to customers who are moving or otherwise closing an account, as well as substantial savings to utilities by avoiding “truck rolls” to perform these functions.

Second, an AMI system should be capable of load-limiting for extreme load management or load shed events.

Third, an AMI system should include an Internet-based “portal” that customers can use to monitor their usage on a near-real-time basis. Ideally, such a web portal(s) would also be sufficiently robust to provide information about, and permit enrolling and dis-enrolling in, specific rate plans or demand response programs.

Finally, the Commission should require that AMI systems include the ability to support prepayment for electric service either from a smart meter or a separate device. This option is especially important for low-income customers and has the potential to greatly reduce utilities' rates of uncollectible payments.

CONCLUSION

CURRENT respectfully requests the Commission (i) to require the utilities to implement not just AMI, but also Smart Grids, as set forth in these comments, and (ii) to adopt the recommendations and changes as suggested in these comments to the proposed Features and Functions of AMI systems.

Respectfully submitted,

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