CALIFORNIA ENERGY COMMISSION

In the Matter of: Preparation of the 2008 Integrated Energy Policy Report Update and the 2009 Integrated Energy Policy Report	))))))	Docket No. 08-IEP-1

COMMENTS OF CURRENT GROUP, LLC

In its Notice of Joint Committee Workshop regarding the achievement of higher levels of renewable energy in California, the California Energy Commission (Commission) sought comment on areas of potential analysis and concern for bringing increased renewables to California. These comments address the necessity of identifying upgrades to the electric distribution grid with Smart Grid technologies as an essential and effective strategy in achieving California's renewable energy resources goals. Accordingly, CURRENT Group, LLC ("CURRENT") recommends this as an area for evaluation and analysis within the 2008 Integrated Energy Policy Report Update and CURRENT appreciates the opportunity to file these comments.

CURRENT provides high-speed, two-way communications networks with embedded sensing that can be installed on existing electric distribution networks to transform them into efficient, automated Smart Grids, monitored by a 24x7 network management system and analytic software platforms. Such enhancement to distribution grids maximizes the integration and use of renewables and reduces energy consumption, therefore reducing greenhouse gas (GHG) emissions. In fact, absent the real-time, bandwidth-intensive capabilities of a Smart Grid utilities and end users will be unable to avail themselves of the full extent of economic and environmental benefits of renewable, especially distributed renewable sources.

I. COMMENTS

In its efforts to meet the GHG reduction goals established by AB 32[1] in both the 2020 timeframe[2] and the 2050 timeframe in Executive Order S-3-05[3], the Governor and the state's energy agencies have identified a goal of achieving 33 percent of retail electricity sales from eligible renewable energy resources by 2020. Further, the IEPR Committee has stated that a goal of achieving 50 percent renewables by 2050 may be required.[4] CEC staff is correct that additional Smart Grid research is justified to ensure that deployment of technologies designed to "smarten" the grid are deployed in a cost-effective manner versus piecemeal efforts. As explained in these comments, CURRENT fully supports comprehensive and coordinated statewide Smart Grid planning and believes such an approach will avoid piecemeal and, ultimately, costly efforts to "smarten" the grid and maximize the benefits of renewable energy resources. Smart Grid implementation is an essential strategy in meeting California's present and future renewable energy (and GHG reduction) goals, and such implementation will provide necessary system controls fully to integrate renewables into the distribution grid.

A Smart Grid is a high-speed, two-way communications network with embedded sensing installed on an existing electric distribution network. Smart Grid technologies increase the reliability, security and efficiency of the distribution grid, and support the full integration of renewables into the distribution grid in ways that meter-centric, or "smart meter," solutions cannot because such meter-based systems lack the ability to

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[1] Global Warming Solutions Act of 2006 (Chapter 488, Stat. of 2006).
[2] *See* Cal. Health and Safety Code Section 38530(a) (requiring reductions in greenhouse gas emissions to 1990 levels by 2020).
[3] *See* Executive Order S-3-05 calling for reductions in greenhouse gas emissions to 80 percent below 1990 levels by 2050.
[4] *See Notice of Joint Committee Workshop - Achieving Higher Levels of Renewables in California's Electricity System, Attachment A* at p. 1, 08-IEP-1, California Energy Commission (Aug. 2008) ("*Attachment A*").

monitor the entire grid and lack the necessary bandwidth to manage utility-to-ratepayer communications in real time. Smart meter systems are typically designed to read meters once a day with limited, "narrowband" communications capabilities, and have virtually no grid sensing or monitoring capabilities beyond the meters themselves.[5] In contrast, Smart Grids connect advanced meters, smart thermostats, smart appliances, load control devices and distributed generation and renewables in homes and businesses directly to the utility. 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 inclination 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 more limited technologies. Automated in-home energy management systems continue to evolve and the most sophisticated of these systems already require a high-speed communications path.

But only Smart Grid systems enable real-time "on-demand" meter reads and communications with demand response appliances and distributed renewable energy sources such as roof-top solar panels or 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

[5] FERC defines AMI as a metering system that records customer consumption (and possibly other parameters) hourly or more frequently and that provides for daily or more frequent transmittal of measurements over a communication network to a central collection point. *Assessment of Demand Response and Advanced Metering* at 17, FERC, Docket No. AD06-2-000 (Aug. 2006) (*FERC Assessment*).

developments dictate. DSM and accessing of 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.[6]

Dispatching a generation resource requires a number of questions to be answered in real time via two-way communication and monitoring, including:

- Is the generator ready? (Or in the case of PHEV, is it even (still) there?)
- How much power can it provide? (For instance, for a solar generator, is it even providing power?)
- How long can it provide power? (For instance, the state of charge for a PHEV.)
- Once activated, can it continue to provide power? (For instance, whether the solar source continues to provide power or whether a PHEV is "disconnected" after the distributed access begins.)
- If it detects a problem and must disconnect, will it be able to reconnect? Did it disconnect due to a problem in the grid?

Answering these types of questions is critical to making renewables and distributed resources part of the overall electricity market and requires real-time

[6] 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 recent 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 capable of being 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.

interaction with the generator. This is impossible if the communications capacity installed by the utility requires tens of minutes for the flood of messages to move through the system. In fact, for an energy resource to qualify as a spinning reserve its accessibility must be measurable in only a few seconds. Simply put, system-wide control in real time is something that most smart meter systems cannot accomplish.[7]

CURRENT notes that Smart Grid technologies are already being deployed. CURRENT is supporting Smart Grid deployments in Dallas, Texas with Oncor Electric Delivery (Oncor) and in Boulder, Colorado with Xcel Energy (Xcel).[8] Xcel is the largest provider of wind power in the nation.[9] These Smart Grids enhance the reliability, security and efficiency of the electric distribution grid and are already reducing GHG emissions. The Commission itself has estimated that distribution grid optimization resulting from Smart Grid could reduce distribution grid line losses by 15% or more and save 500,000 tons of CO^2 annually.[10] Xcel estimates that its Smart Grid deployment can reduce its line losses by 30%.[11] Savings on this level are essential to helping California meet the ambitious GHG reduction goals established by AB 32.

Further, in fact, the federal Energy Independence and Security Act of 2007 recently concluded that it is the federal policy of the United States to support Smart

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[7] *See, e.g.,* SCE AMI Use Case, *supra* note 6.

[8] *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.

[9] *See Renewable Power's Growth in Colorado Presages National Debate*, Washington Post (Aug. 18, 2008), available at: http://www.washingtonpost.com/wp-dyn/content/article/2008/08/17/AR2008081702193.html?sub=AR.

[10] *CEC Report* at 75. Similarly, a study at Hydro Quebec quantified those savings at two billion kWh. *Id.* at 75.

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

Grid.[12] 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.[13] Further, Smart Grid legislation has recently been introduced in several states, including California, New Jersey and New York, and has already been enacted into law in Maryland and Massachusetts.[14] Equally significant is that members of the California Public Utilities Commission (CPUC) have stated their intention to commence a rulemaking to address Smart Grid implementation by regulated California utilities, as required by the federal legislation.[15] Further, the California Air Resources Board (CARB) recently acknowledged the critical role of a Smart Grid in supporting the integration of renewables and the reduction of GHG emissions.[16] In short, not only is Smart Grid available today, there is a growing consensus on its value and it is fast becoming the law of the land.

The longer list of Smart Grid applications that will help California improve energy efficiency and reduce distribution costs while also reaching its renewables and GHG reduction goals include, among others:

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[12] Energy Independence and Security Act of 2007 (P.L. 110-140, H.R.6), Sec. 1301.
[13] EISA-07, Secs. 1304, 1306 & 1307.
[14] *See* 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"); CA Senate Bill No. 1438 (Smart Grid Systems); 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).
[15] See, e.g. *Draft* California Long-term Energy Efficiency Strategic Plan, August 2008, Section 8, pp. 74-77 (discussing demand-side management coordination and integration).
[16] In its *Draft Scoping Plan*, CARB states that "a 'smart' and interactive grid and communication infrastructure would allow the two-way flow of energy and data needed for widespread deployment of distributed renewable generation resources, plug-in hybrids or electric vehicles, and end-use efficiency devices. Smart grids can accommodate increasing amounts of distributed generation resources located near points of consumption, which reduce overall electricity system losses and corresponding GHG emissions. Such a system would allow distributed generation to become mainstream, ...would support the use of plug-in electric vehicles as an energy storage device...[and] would in turn allow grid operators more flexibility in responding to fluctuations on the generation side, which can help alleviate the current difficulties with integrating intermittent resources such as wind." *Climate Change Draft Scoping Plan,* at C-57 (June 2008) ("*Draft Scoping Plan*").

- Coordination and management of Distributed Generation sources, including eventually plug-in hybrid electric vehicles;
- 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;
- Real-time System Optimization through Load Balancing and volt/VAR controls based upon constant monitoring and measurements along the grid; and
- Demand Response functionality based upon real-time price changes and other conditions requiring real-time end user device communications and control.

The intelligence these applications bring to the grid is essential to unlocking the full value of renewable generation.

By one estimate a true Smart Grid, which the Commission itself has recognized as including high speed two-way communications capabilities,[17] can deliver ten times the benefits of a smart meter solution.[18] As a result of these unmatched value enhancements, Smart Grids also provide exponentially higher reductions in CO^2 emissions than meter-centric solutions, namely through grid-oriented energy savings that are not dependent on uncertain customer response savings.[19]

II. **CONCLUSION**

Smart Grid technologies can create efficiencies on the distribution grid and comprise the communications network necessary for California fully to achieve its renewables goals, but only to the extent they are in fact deployed. Accordingly, as a first

[17] *See CEC Report* at 51.
[18] *See Getting Smart*, Robert Robinson, Jr. and James C. Henderson, Electric Perspectives at 69 (Sept. /Oct. 2007).
[19] 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." *FERC Assessment* at 11.

step in this process, CURRENT urges the Commission to identify deployment of Smart Grid technology as a change necessary to support higher levels of renewables within the 2008 IEPR Update and in its *2009 IEPR*.

Respectfully submitted this 28th day of August, 2008 at Sacramento, California.

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