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**BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking to Consider Smart Grid Technologies Pursuant to Federal Legislation and On The Commission's Own Motion to Actively Guide Policy in California's Development of a Smart Grid System

Rulemaking 08-12-009  
(Filed December 18, 2008)

**COMMENTS OF TENDRIL ON THE  
JOINT RULING AMENDING SCOPING MEMO AND INVITING COMMENTS**

*March 9, 2010*

Tendril Networks is pleased to provide these comments to the California Public Utility Commission. These comments are offered in response to discussion and various invitations for comments found in "Assigned Commissioner and Administrative Law Judge's Joint Ruling Amending Scoping Memo and Inviting Comments on Proposed Policies and Findings Pertaining to the Smart Grid" dated February 8, 2010.

*3.1 Use of Smart Grid Deployment Plans*

We infer from the language of SB 17 the clear legislative intent that smart grid technology be deployed in the State of California, which is highlighted by the statement that deployment plans must be consistent with Title XIII of the Energy Independence and Security Act of 2007. This title begins with the declaration that, "It is the policy of the United States to support the modernization of the Nation's electricity transmission and distribution system..."

We therefore support the Commission's proposal that Smart Grid deployment plans be used to (1) establish a baseline to monitor deployment and (2) provide a rationale that can be cited by utilities and other parties with regard to specific investments.<sup>1</sup> We further agree that the

deployment plans are unlikely to have sufficient specificity to warrant their treatment as procurement plans.

### *3.2 Standards for Review of Smart Grid Plans*

The Joint Ruling presents the policies and evaluation criteria stated in SB 17. The Joint Ruling then proposes the following criteria for evaluation of deployment plans, which are summarized as:

1. Be self-healing and resilient
2. Motivate consumers to actively participate in operations of the grid
3. Resist attack
4. Provide higher quality power that will save money wasted from outages
5. Enable electricity markets to flourish
6. Run more efficiently
7. Enable penetration of intermittent power generation sources<sup>ii</sup>

While we agree that these are all valuable criteria, we respectfully submit that they are incomplete with regard to the policies established in §8360 of SB 17 and the evaluation criteria established in §8366 of SB 17. Specifically, both the policies and the criteria of these sections include provisions that focus on (1) deployment of renewable energy technologies, (2) reduced carbon emissions and (3) technology innovation that “provide the ratepayers with new options in meeting their individual energy needs.”

Specifically, we believe the proposed criteria should be revised to more directly reflect these policies and criteria. We offer the following suggestions:

*“Motivate consumers to actively participate in operations of the grid”*

We presume that the references to dynamic pricing and “vastly increased rates for the privilege of reliable electrical service during high-demand conditions” are only examples of possible motivating factors. We do not consider this list to be an exclusive or representative list of actions that might be available to consumers. We also believe this criterion should be

explicit with regard to the real-time nature of consumer participation. We propose that this criteria might read, “Enable consumers to respond to demand signals and grid conditions.” We believe this is consistent with emerging federal policy, discussed in more detail below.

*“Provide higher quality power that will save money wasted from outages”*

Consumer savings will accrue from a variety of potential benefits. Outages are only one source of anticipated benefits. Reduced demand (overall and during peak conditions) will also result in cost savings. We propose, “Provide higher quality power and cost savings for consumers.”

*“Enable electricity markets to flourish”*

The discussion for this criterion refers only to the ability of generators to provide power to the grid. We believe that the stated goals of technology innovation established in SB 17 anticipates a broader conception of “meeting the future energy growth needs of the state with new and innovative technologies and methods” that is not adequately reflected here. We propose, “Enable and promote an open marketplace for electric generation and demand management services.”

*“Run more efficiently”*

The discussion refers only to asset utilization and maintenance. We believe that the legislative intent of SB 17 and federal policy explicitly refer to reduced carbon emissions when describing “efficiency.” Nowhere in the proposed criteria are carbon or greenhouse gas emissions addressed directly, despite the fact that these are goals of SB17, the California Global Warming Solutions Act of 2006 and energy efficiency and demand response goals established in Sections 454.5 and 454.55. We propose, “Reduce greenhouse gas emissions and improve utilization of system resources.”

*“Enable penetration of intermittent power generation sources”*

While we agree that renewable energy resources are often intermittent, we question whether integration of the intermittent sources is an objective per se. Rather, we suggest that accommodating intermittent and distributed energy sources is a needed capability in order to achieve the primary goal of integrating clean and renewable sources of electricity. We believe this is the intent of the State’s renewable portfolio standard, the Global Warming Solutions Act and other directives. We propose, “Enable penetration of clean, renewable and intermittent power generation sources.”

As we have noted earlier in this proceeding, on October 28, 2009, the Federal Energy Regulatory Commission released its report “Possible Elements of a National Action Plan on Demand Response” (Docket No. AD09-10). Of particular note in this report is that FERC comments extensively on the definition of the term “demand response.” Consistent with the Commission’s determination that consumers should be provided with “price, usage and generation source information,” the FERC report observes that consumer response can be “deployed to shape any or all parts of a customer’s load profile” and that “includes the smart integration of changeable consumption with variable generation to enable the addition of new technologies such as wind farms and roof-top solar systems to utility systems.” In fact, FERC states that, “As used in this discussion draft, the term demand response includes consumer actions that can change any part of the load profile of a utility or region, not just the period of peak usage.” The report states further the intention of FERC to seek “deployment of many innovative demand response applications that create greater consumer control over energy usage and create new cost saving opportunities for consumers.”<sup>iii</sup>

Additionally, the Federal Communications Commission has been conducting research and field hearings in order to develop the National Broadband Plan as stipulated in the American Recovery and Reinvestment Act. On February 18, 2010, the FCC released materials that included their “working recommendations.” In addressing the “national purpose” of Promoting

Energy Independence and Efficiency, the FCC offers the following key challenges and working recommendations:<sup>iv</sup>

*Challenge:* The intermittency of renewable power and the increased loads from electric vehicles will strain the current electric grid, unless we modernize the grid with broadband and advanced communications.

*Solutions:* Ensure that broadband is integrated into the smart grid by promoting and improving commercial broadband networks, better coordinating and standardizing private utility networks, and enabling partnerships with public safety networks. A smart grid can reduce greenhouse gasses from electricity generation by up to 12% by 2030.

*Challenge:* Consumers lack access to and control of their own digital energy data to understand and manage their energy use, which limits the innovation potential and energy savings of smarter homes and smarter buildings.

*Solutions:* Ensure consumers have access to and privacy of real-time and historical digital energy information through changes to state and federal policies.

We reference these emerging federal policies because we believe they are (1) directly relevant to the evaluation criteria that will be established in this proceeding and (2) support the adoption of proposed requirements for open access to information and the use of multiple communications media.

We believe that the criteria should be flexible and forward-looking. The criteria should accommodate reasonably foreseeable and anticipated federal and State policy. Therefore, and as we have stated above, we believe that any applications of smart grid technology included in the criteria should be considered representative examples and not exclusive lists.

### *3.3 Review of Subsequent Investment Plans*

We agree that SB 17 establishes the intent of providing a consistent and accessible regulatory approach for smart grid deployment. We understand that general rate cases may be appropriate venues for many aspects of cost recovery. However, we agree that for many stakeholders, including entrepreneurs and innovators, these proceedings can be difficult and burdensome venues in which to establish meaningful participation. We believe that as many issues as possible should be addressed in a single proceeding. For issues that are better suited to company-specific

proceedings or general rate cases, we suggest that smart grid issues be clearly identified and segregated in order to facilitate the participation of parties that have specific smart grid interests.

#### *3.4 Comments Sought on Uses of Smart Grid Deployment Plan*

Please see comments in preceding sections.

#### *3.5 Standards and Protocols Adopted Pursuant to §8362*

We believe that standards are critical to ensure functionality and interoperability. We further believe that the development of standards will be informed by deployment. Therefore, we favor a phased approach that is consistent with approach #3 (“adopting a “performance standard” in this proceeding...””) articulated in the Joint Ruling.

We believe this approach is consistent with the history of technology adoption and federal policy. For example, in testimony before the U.S. Senate, NIST Deputy Director Gallagher observed that, “While it is desirable to lower the risk of [smart grid] investments by having the standards in place first and making it a precondition...we want to see the innovation coming out of these projects because they will, in essence, drive some of the standards work itself.” We believe this observation is relevant because it suggests that a performance standard that allows early deployment will, in fact, inform and support the development of standards.<sup>v</sup>

#### *4. Tasks Assigned to This Phase of the Proceeding by D.09-12-049*

The central questions of the tasks assigned to this phase include (1) access to wholesale and retail price information, (2) access to usage data for authorized third parties and (3) access on a near real-time basis to usage data by consumers and/or authorized third parties.

We believe that properly assessing the needs of providing access to information requires consideration of the various kinds of information under consideration. As technology allows us to create far more granular and real-time information, it is valuable to recognize that not all information should be treated the same and different policies may facilitate the development of the market. For example, information that consumers need in order to implement effective

energy-saving strategies is different from the information the utility needs to generate an accurate billing statement.

We believe that it is useful to consider information in four broad classes, each with unique characteristics and implications relevant to this proceeding. For example, many of the current discussions regarding smart grid (including some of the discussions in this proceeding) assume that all of these information types will utilize the same communication systems, but that may not be required or advisable in order to encourage the market to develop.

The four categories we propose are:

“Actionable” Information – Real-time information needed by consumers to implement control strategies in the home. Examples include the direct signal from the meter or information about the current sources of generation. In order to be effective, it is most important that the information be timely and granular. Absolute accuracy is less critical and two-way communication is not required. Currently, the best source of this information in most cases is directly from the meter.

“Billable” Information – Historical information that is required in order to bill for services. This information must be verified and accurate. It need only be as granular as is required to match the rate plan for which billing is being provided. Currently, the best source of this information is the meter data management system. Two-way communication is not required in most cases. However, two-way communication may be required if price signals will be delivered to the customer, but it is not critical that consumption information be communicated in real time.

“Transactional” Information – Real-time or forward-scheduling information that enables market transactions or control signals to be sent, received and verified. It is important that these information flows be two-way in order to verify that the ‘transaction’ was

completed. In some, but not all, situations it will be important the communication be conducted in real time.

“Analytical” Information – Historical information that allows analysis of a time series of usage data. Granularity needs will vary depending on the depth of the analysis being conducted. For example, in order to understand how energy use varies through on a daily or weekly basis, 15’ or longer interval data may be sufficient. Because this information is being used to analyze energy usage, it is important this it is verified and accurate. Two-way communication is not required in most cases and communication does not need to occur in real time.

In all cases, we believe that is critical that the consumer have access to each class of information. However, this does not mean that they must have access in the same way or through the same systems. For example, while 15’ interval data that is available after some delay (24 hours, for example) may be appropriate for analytical purposes, it is entirely insufficient for implementing control strategies and therefore is not “actionable” information.

We offer these comments in order to provide a framework that may be useful when considering the benefits and concerns related to three types of data access proposed in this phase of the proceeding.

With regard to the proposed rules provided in Attachment B, we note that the provision that information be provided “no later than the next day of service” is inconsistent with the Commission’s stated goals and Policy Objective 1, which include multiple references to “real-time” information.<sup>vi</sup>

### *Smart Grid Texas Experience – Lessons Learned*

The Texas Public Utility Commission has addressed many implementation issues related to data access in the proceeding “Implementation Project Relating to Advanced Metering” (Project #34610). Recently, participants in the process summarized many of the “lessons learned” from

this process. The underlying documents are available on the Texas PUC website. (In particular, we note the documents contained in the section “February 23-24, 2010 - Lessons Learned & 2010 Objectives.”)<sup>vii</sup>

There are several broad conclusions that we believe are most relevant for the questions being considered by the Commission in this proceeding. These conclusions include:

1. There was not sufficient focus on interoperability (and therefore there were insufficient opportunities to conduct end-to-end testing of devices and compatibility),
2. There was not a neutral technical HAN expert to advise the development of HAN requirements (and therefore there were delays and reluctance by many parties to share information)
3. There was not a sufficient understanding, focus, or requirement for integration with national smart grid standards (and therefore concern by many parties that the implementation in Texas will remain isolated in the state.)
4. There was no standardized means of an advanced meter system communicating with an in-home device or for market participants to engage in two-way communication with the HAN devices using the AMS system.
5. There is not a clear path from system upgradeability (especially with regard to Smart Energy Profile 1.0 to Smart Energy Profile 2.0)

We offer these observations because we believe they will be relevant as California moves forward with its implementation. We strongly encourage the Commission to learn from the Texas experience as it moves forward with implementation in California.

*5.1 Should the Commission measure Smart Grid deployment using quantitative metrics? What metrics should the utilities be required to use?*

Yes. We believe that quantitative metrics are important and valuable tools to inform smart grid deployment strategies. We are in general agreement with the list of metrics proposed in Attachment C. However, we propose several additional metrics for consideration:

*Section 3*

- Total annual production of distributed generation facilities
- Carbon emissions reduced from distributed general sources

*Section 4*

- Total megawatt-hours of load shifted from peak to non-peak periods
- Total megawatt-hours of load shifted to periods of high renewable energy production
- Total capacity enabled to provide demand response capabilities
- Total greenhouse gas emissions reduced
- Carbon emissions reduced from demand response and energy-efficient resources.

*Section 6*

- Total capacity of smart consumer devices

*5.2 Are incentives needed to encourage the deployment of consumer devices that interact with the Smart Grid? Would establishment of a demarcation point between utility and consumer help or hurt such deployment? Does a physical demarcation point make sense in an electronics world?*

Incentives are a powerful driver for the deployment of consumer devices. While we do not believe they are necessary, we do believe that incentives (including direct consumer rebates) have proven highly effective in other technology deployment. (Consider, for example, the federally managed program to accelerate the transition to digital television that provided consumers with a direct rebate.)

With regard to demarcation points, we believe that these are also highly effective in regard to helping the market develop. We note, however, that it is unlikely that a *single* demarcation point will be useful. For example, if there is demarcation point at the customer's premise, but there is

not a similar demarcation point at a central facility or the utility office for data, the ability of a third-party service provider to effectively participate is severely limited (if not eliminated). We believe that multiple demarcation points may be advisable in order to anticipate multiple parties and business models.

### *5.3. Electric Vehicle-Related Issues*

We encourage the Commission to consider standards that allow flexibility for various business and deployment models for electric vehicle deployment. We further encourage the Commission, if and when adopting standards, to ensure that these standards anticipate use cases that conform to consumer expectations, including “cash” transactions (similar to vehicle refueling today), “roaming” transactions (enabling payment by or billing to parties other than the primary ratepayer account) and managed charging within a home area network. In order to encourage technology innovation and market development, a stated goal of SB 17 and other legislation, multiple business models that include consumers, utilities and third parties should be supported by any standards that are adopted.

### *5.4. Should Smart Grid proposals include storage options, or are they best considered in conjunction with transmission and/or generation projects? Should Smart Grid proposals limit storage options for consideration? If so, how?*

We see nothing in the legislation or directives that have initiated this rulemaking to suggest that storage options should be limited. We believe that consumers will benefit from storage technology, whether provided by the utility, a third party or owned directly. We see this as entirely consistent with the stated evaluation criteria for SB 17 that include providing “the ratepayers with new options in meeting their individual energy needs.”

### *5.5. What cyber security principles should Smart Grid proposals meet?*

Cyber security is a critical component of any smart grid deployment. We believe that there are multiple dimensions to questions of cyber security, data security and consumer privacy that have distinct characteristics. We propose that the Commission consider distinguishing between cyber security concerns (that may create vulnerabilities for the physical operation of the electricity

network), data security concerns (that may consumer privacy vulnerability) and the appropriate use of personal information (that may violate consumer privacy expectations).

As we have noted previously in this proceeding, on August 12, 2009, the Colorado Public Utility Commission issued an Order seeking comments in an investigation into security and privacy concerns related to smart grid. (Docket No. 09I-593EG) We believe that this investigatory proceeding may provide an additional source of information and policy frameworks for this Commission as it considers these important questions. We have included comments submitted by Tendril in this proceeding as an attachment.

*Conclusion*

Tendril appreciates the opportunity to provide these comments to the Commission. We support the Commission's continued efforts to advance the development of robust smart grid and a marketplace for energy services. Thank you for the opportunity to provide these comments. We look forward to further opportunities to provide input to the Commission.

Submitted on March 9, 2010 at Boulder, Colorado.

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<sup>i</sup> Joint Ruling, p.5-6

<sup>ii</sup> Joint Ruling, p.12-13

<sup>iii</sup> This report and supporting documents can be found on the FERC website at <http://www.ferc.gov/industries/electric/indus-act/demand-response.asp>.

<sup>iv</sup> <http://reboot.fcc.gov/open-meetings/2010/february>

<sup>v</sup> Testimony of Patrick D. Gallagher, Ph.D. Deputy Director, National Institute of Standards and Technology United States Department of Commerce, Before the Committee on Energy and Natural Resources United States Senate, March 3, 2009 (Q&A @ 73')

<sup>vi</sup> Joint Ruling, p.20

<sup>vii</sup> <http://www.puc.state.tx.us/electric/projects/34610/34610rel.cfm>

**APPENDIX A**

**COMMENTS OF TENDRIL NETWORKS, INC.**

Docket No. 09I-593EG

*In the matter of the investigation of security and privacy concerns  
regarding the deployment of smart-grid technology*

## **COMMENTS OF TENDRIL NETWORKS, INC.**

Docket No. 09I-593EG

*In the matter of the investigation of security and privacy concerns  
regarding the deployment of smart-grid technology*

Tendril Networks is pleased to provide these comments to the Colorado Public Utility Commission in response to the current investigation in Docket Number 09I-593EG. We applaud the Commission's proactive investigation into the important questions surrounding smart grid implementation and privacy that have implications for Colorado and the nation.

Tendril Networks develops solutions that enable smart energy options for today and tomorrow. Tendril's technology, products and services establish a rich, often automatic and invisible dialogue, between consumers their energy providers. The Tendril Residential Energy Ecosystem (TREE) is an open, extensible and standards-based energy management system that connects and manages "smart" consumer devices (such as thermostats and outlets), emerging "smart" appliances (such as refrigerators, washers and dryers) and an exciting new generation of "smart" consumer products including plug-in electric vehicles, smart televisions and smart phones.

As a result, the TREE solution enables smart energy options for utility consumers. It enables the possibility to understand and to manage – even automatically, but at consumer discretion and control – the energy within their home. The solution also enables utilities and system operators the ability to manage disparate home energy loads as a dynamic resource that can be deployed to implement smart grid functions such as demand response and peak load reduction.

### *General Remarks on National Policy*

Development of a "smart grid" has forcefully emerged as a national priority. Tendril offers a standards-based, secure platform that maximizes consumer discretion and consumer choice. The platform directly engages residential customers, the customer class described in the June 2009 FERC National Assessment of Demand Response Potential as representing "the most untapped potential for demand response." In March 2009, the Federal Energy Regulatory Commission issued a proposed policy statement and action plan that noted, "Ultimately, the Smart Grid will facilitate consumer transactions and allow customers to better manage their energy costs."

The Energy Independence and Security Act of 2007 established that, "It is the policy of the United States to support the modernization of the Nation's electricity transmission and distribution system to maintain a reliable and secure electricity infrastructure that can meet future demand growth..." This national policy includes, "provision to consumers of timely information and control options." This policy of smart grid development was reinforced through funding provisions of the American Recovery and Reinvestment Act of 2009.

We believe that providing information tools to the consumer is consistent with national policy. Improving system efficiencies, reducing consumer costs and mitigating environmental impacts

all depend upon the provision of detailed energy usage information directly to the consumer. Open, non-proprietary consumer access to usage information is a guiding principle for development of policies governing smart grid technologies. We also believe that such access will accelerate technology innovation and help the consumer realize additional benefits. Moreover, providing consumers with greater transparency and control over how their information is used in the smart grid environment will build consumer trust and confidence in this developing technology. Such increased consumer trust will in turn promote public adoption and acceptance of smart grid systems and solutions, which are not ends in themselves but means to achieve policy objectives of clean energy, reliable and secure energy infrastructure, and market-based options for the consumer.

### *General Remarks on Privacy Concerns*

At the same time that the smart grid is emerging as a national economic and environmental priority, it is recognized that the detailed information required for and generated by the many smart grid technologies and applications will allow far more raw and granular data regarding individual and aggregate energy usage across populations. Such a change raises obvious and non-trivial privacy concerns that we discuss in more detail in these comments.

In balancing these concerns, regulators and policy makers are tasked with the question of how to make the grid both “smart” and “wise.”

It is precisely the availability of data that underpins all robust analysis. Thus, perspectives regarding both individual and aggregate energy consumption and generation patterns that enable the grid to become “smarter” depend upon these fundamental inputs. Such data is required for achieving national and regional goals such as energy efficiency, peak load reduction, integration of intermittent renewable resources and distributed resources such as electric vehicles.

While detailed information will enable public policy goals and system operations, this new information raises many concerns regarding individual privacy and consumer protection. Tendril believes that addressing these privacy concerns early on will increase consumer trust of these new technologies. This trust is an essential component of engaging consumers in the successful transformation of the nation’s electricity systems.

As noted in the materials accompanying this proceeding, we agree that information control regimes that centralize smart grid information disclosures will likely hamper innovation. Rather, the individual consumer must be the origin of control with regard to the use and disclosure of their personal information. While utilities can achieve greater system efficiencies in matching the supply and demand of energy with more data about consumption, this does not imply consent on the part of the citizen for other secondary uses (marketing, for example). Nor does this access to detailed information imply that the utility is the sole arbiter of information use and disclosure. Ultimately, consumers must be empowered to have access to their information and to determine what personal information they share and with whom.

### *Data Access Rights and Responsibilities*

The question of ownership of personal data is common in discussions about privacy and consumer protection. However, this focus on concepts of "ownership" may inadvertently create unnecessary limitations in discourse where either the customer "owns" the information or the utility "owns" it. These rights are then perceived to be mutually exclusive. In practice, it may be more accurate and perhaps more constructive to consider overlapping rights (and accompanying responsibilities and duties) with regard to access to personal information.

For example, the utility requires access to information necessary for billing and systems operation. Accompanying this right of access is the duty to protect the information from theft or unwarranted disclosure. The customer also has the reasonable expectation that this information will be used for the intended primary purposes of utility operations and will not be used for secondary purposes without customer choice.

The consumer also has a right to access information about their individual energy usage. The policy established by the Public Utilities Commission of Texas illustrates a potential model to govern the provision of timely and actionable information directly to the consumer. At their discretion, consumers may elect to share this information directly with energy service providers or other businesses. Those businesses would be bound by similar responsibilities to protect the information and use it in accordance with the consent granted by the consumer. The Pennsylvania Public Utility Commission issued a similar policy in June 2009 establishing the fundamental right of consumers to have direct access to their usage information.

Several public policy objectives may also require disclosure of information beyond individual energy usage. For example, integration of renewable energy resources and reduction of peak load are accelerated by disclosure of real-time system information to consumers. We encourage the Commission to consider whether smart grid technologies can be leveraged to accomplish other public policy goals. For example, should consumers be provided with real-time access to information about the carbon content of the energy being delivered to them? Might consumers use that information to modify their behavior to reduce their carbon footprint?

### *Commission Questions*

In response to the specific questions posed by the Commission in the Order dated August 12, 2009, we offer the following comments:

1. *What concerns surrounding the collection and analysis of detailed electricity usage information should the Commission consider as it establishes policies governing access to and use of this information?*

For the smart grid to realize its full potential, consumers must trust that their information will be used in a manner consistent with their expectations. By earning consumer trust in how their information is used consumers will be more likely to adopt and support smart grid technology. Accordingly, we respectfully encourage the Commission, in assessing concerns about the collection and analysis of detailed electricity usage information, to consider privacy issues that impact consumer trust. In considering such privacy issues we suggest consultation of the following fair information practice principles that have

been widely accepted and adopted by government agencies and industries in the U.S. and globally.

**Access.** Access is a core fair information practice principle and one that is key to successful smart grid deployment. Access refers to an individual's ability both to access data about him or herself and to take action to ensure the accuracy and completeness of that data. Accordingly, smart grid policies should promote consumer access to detailed and actionable information about their energy usage and conditions affecting the electric system. In 2008, the Public Utilities Commission of Texas put forward a policy on advanced metering and home area network (HAN) data. In particular, we note that under this policy an advanced metering infrastructure (AMI) must provide consumers with direct, real-time access to electricity usage data, that data must be stored on the meter in a form that complies with nationally-recognized non-proprietary standards, and that AMI must be capable of communicating with other devices on the premises, such as monitoring devices, load control devices, and prepayment systems. Further, the Texas legislature established that consumers shall not be required to pay an additional fee or have to obtain special permission to view their data.

These recommendations are summarized (with supporting references) in the “Public Utility Commission Report to the Legislature on Advanced Metering (September 2008.)” This report is accessible from:

[http://www.puc.state.tx.us/electric/projects/34610/Commission\\_Report\\_on\\_Advanced\\_Metering\\_2008.pdf](http://www.puc.state.tx.us/electric/projects/34610/Commission_Report_on_Advanced_Metering_2008.pdf)

Similarly, the Pennsylvania Public Utility Commission established a policy in June 2009 regarding Smart Meter Procurement and Installation (Docket No. M-2009-2092655) in which they directed that “all covered EDCs [electric distribution companies] must provide at least the following access to their smart meters and data:

1. Non-discriminatory access for retail electric suppliers and third parties, such as EGSs [electric generation supplier], and conservation and load management service providers;
2. Open, non-proprietary two-way access for electric suppliers and third parties, such as EGSs, and conservation and load management service providers; and
3. Full electronic access to customers and their representatives to meter data upon customer consent.

These policies illustrate potential models whereby consumers have direct access to usage information in a manner that enables them to take action. Further, they can ensure the integrity and accuracy of their information and engage service providers to use information for purposes benefiting the consumer.

**Notice.** Another core principle to consider is “notice.” Consumers expect to be given notice about who is collecting their information, what information is collected about

them, what their information is used for and with whom it may be shared. With notice, consumers are empowered to make informed decisions about the use and disclosure of their personal information. In considering forms of notice, flexibility should be permitted to allow industry to employ means that do not unduly burden the consumer experience while providing a level of conspicuousness appropriate to the sensitivity of the consumer data.

**Choice.** The ability to make informed decisions compels “choice” to be another core tenet of the fair information practice principles. Choice in the privacy context means giving consumers options as to how their personal information may be used. Where information is used beyond what is necessary to provide services or it is provided to an entity other than the one that initially and dutifully collected the information, consumers expect to be given option to choose whether to allow such uses and disclosures.

**Security.** Another widely accepted principle is data security. Data controllers must be encouraged to take reasonable steps to safeguard data from loss and unauthorized access, destruction, use or disclosure. Such safeguards, however, should not be so overly stringent that consumers have unnecessary hurdles to accessing their own data. Moreover, we respectfully suggest that rather than develop regional smart grid data security standards that the Commission instead refer to NIST to develop security standards that will apply nationally to the energy sector. Regional development of security guidelines separate from NIST is likely to result in a patchwork of laws that potentially conflict and create potentially burdensome compliance obligations for industry.

**Enforcement.** Enforcement is the final core principle of privacy protection. To ensure that fair information practice principles are followed there must be a robust mechanism to enforce them. Alternative enforcement approaches should be considered, including industry self-regulation, legislation and regulatory schemes. Before considering supplementing existing regulations, laws and best practices regarding consumer privacy protections, such additions should be evaluated cautiously so as not to stifle the public benefits smart grid technology might offer in the first place.

2. *What, if any, are the trade-offs between protecting privacy and promoting innovation with regards to smart grid technology?*

We believe that protecting privacy and promoting innovation need not be mutually exclusive propositions. We believe that both innovation and privacy goals can be advanced simultaneously. Privacy concerns can be addressed in a manner that protects consumers but does not unduly hamper industry or stifle innovation. However, we observe that the pace of technology innovation (with its associated benefits) is likely outpacing the evolution of privacy norms.

With regard to privacy, the development of a smart grid infrastructure from traditional electrical systems resembles the development of social networking and “Web 2.0” business models out of former, less interactive Internet platforms. The evolution of Internet applications followed a path from the one-way provision of information to a two-way “conversation,” with consumers deriving benefits by actively providing user-

generated content rather than merely acting as passive recipients of information. Previously, individuals viewed generally static content delivered by others. Under Web 2.0, for example, individuals have become much more actively engaged by posting their own content in forms such as YouTube videos, blog journals, and Facebook postings in which they interact and collaborate with others. With the rapid development of Web 2.0 applications, online services have increasingly encouraged users to place more of their information in the hands of others and to be publicly displayed. As a result, new privacy issues and incidents have arisen for which social networking services have not always been fully prepared. These incidents have resulted in demand by regulators and consumers for more control over how private information is used. By responding to these privacy concerns, social networking services have been able to gain trust by giving users more control over their information and profiles. By building this trust, many believe consumers have become more comfortable in using and engaging with these services and the technology has, in turn, resulted in greater success of these platforms in advancing consumer-driven innovations.

Similarly, as smart grid systems and services evolve we foresee a corresponding increase in collaboration and engagement opportunities for consumers to share more information with a broader range of entities. Information will no longer flow one-way from the consumer to the utilities. Instead, utilities and consumers will be engaged in a dialogue involving consumers demanding a flow of information to themselves and to service providers with whom they engage. As with the Web 2.0 example, such interactions will likely lead to increased privacy issues and concerns in an industry that, by and large, has not yet faced these “behind-the-meter” privacy issues.

Recognizing these similarities between the Web 2.0 evolution and smart grid, there may be relevant lessons from the online environment that can guide the electric industry to proactively address privacy concerns as the smart grid evolves. By recognizing these privacy concerns early, the smart grid industry will be in an even better position to address privacy concerns and thereby earn consumer trust. This increased trust will only serve to further consumer adoption of smart grid technologies, which will in turn spawn greater innovation in this area.

3. *Should detailed electricity usage information be protected? If so, how?*

Detailed electricity usage information is private information of the consumer and should be protected accordingly. Electricity usage information can reveal data about what time of day a consumer is home, what types of appliances the consumer owns and other information that many consumers would not necessarily wish to have revealed without appropriate protections. Accordingly, this sort of consumer information is deserving of reasonable protections. Such protections should be developed with reference to the fair information practice principles described in response to Question 1.

4. *How do constitutional or statutory protections impact the use of consumers' detailed electricity usage information collected as part of smart grid initiatives? What protections should be put in place even if not covered by constitutional or statutory provisions?*

As stated in other areas of these comments, we believe that engaging consumers requires their access to and control over their individual detailed electricity usage data. Consumer

rights to possession of this information should be considered in light of the potential impact on constitutional rights that can arise when consumer information resides in the hands of a third party. Scholars have argued that constitutional protections preventing the disclosure of consumers' detailed electricity usage contained in third-party business records are limited. In contrast, information in the control and possession of the consumer rather than a third party is believed to be afforded greater protection from government searches and seizures. These potential limits on constitutional protections should also be taken into account as another factor weighing in favor of allowing consumers greater access and control of their information.

As discussed in our response to Question 1, we suggest that the policies of the Public Utilities Commission of Texas and the Pennsylvania Public Utility Commission that give consumers control to share their information directly with energy service providers or other businesses may offer useful models that give consumers control over the use and disclosure of private information.

5. *What are the necessary components of effective privacy regulation of consumer electricity usage patterns? For example, should disclosure of consumer information to third parties be on an opt-in or an opt-out basis, or should the consent-requirement depend on the nature of the party receiving the information?*

As described in response to Question 1, we believe that widely accepted fair information practice principles provide a useful inventory for the components of effective privacy regulation of consumer electricity usage patterns. Specifically regarding disclosure, we believe that the overriding principle that should guide discussions in this area is the expectation that consumers will be the ultimate locus of disclosure consent. Consumers expect to be enabled to share their information with any third party at their discretion. Consumers expect to be protected from entities sharing information with other independent third parties without some degree of notice and consent. The nature of the consent requirement (i.e., whether it is opt-in or opt-out) should depend largely on the nature of the data rather than the nature of the party receiving the information. The more sensitive the data is, the greater the consent requirement should be. For example, sensitive data such as a financial account number typically warrants affirmative opt-in to sharing. In contrast, aggregated data may warrant simple and clear notification. The nature of the party receiving the information is less relevant. Sharing with third-party agents should be permitted, however, so long as those agents agree (1) not to use the data for their own purposes or purposes beyond the scope of their service, and (2) to appropriately safeguard consumer information. Furthermore, consideration should be given to the possible need for entities to share information with government agencies or upon receipt of a subpoena or court order.

6. *How much information about consumer electricity usage do electric utilities and "edge service providers" require to facilitate more efficient network management, load forecasting, asset management, bill control, demand-side load management, efficiency consulting, energy savings contracting, etc.?*

Consumers – whether automatically or manually – must have access to near real-time information within their premises in order to execute the most effective and the most actionable energy management strategies. This information should be provided through standards-based systems. An example of such a standard is the ZigBee Smart Energy Profile. As noted earlier, we believe that the policy of the Texas PUC and the Pennsylvania PUC establish useful model protocols for consumer data access.

To be useful as a smart energy enabler, this information must be provided in near real time. Data provided with a delay of hours or days (as is commonly proposed by through Internet portals) cannot be used to implement control strategies within the home. In this context, it is important to distinguish between information that has been validated and authenticated for billing purposes, information that contains pricing signals for demand response and “pulse data” that provide consumers with raw feedback on current usage.

Additionally, electric utilities and "edge service providers" who provide energy-related services should be encouraged to minimize the amount of data they collect to only the information they need and to limit the length of time they keep data to what is necessary to provide services and in furtherance of legitimate business purposes.

7. *How do privacy regulations affect electric utilities and “edge service providers” in their efforts to provide enhanced electricity management services?*

As noted earlier, privacy considerations are a critical concern to the development of an “edge service provider” marketplace. Consumer information must be protected through the adherence to existing regulations, laws and best practices. At the same time, overly burdensome or restrictive regulation will hamper innovation in the smart grid industry and deprive consumers of the benefits of technology innovation. We believe that the appropriate strategy to address this balance is by ensuring that consumers are the locus of disclosure consent.

8. *Who “owns” customer information?*

With regard to privacy and consumer data, we believe that it may be best to consider the application of certain “uses” and “rights of access” (with attendant responsibilities and obligations) rather than ownership. In our opinion, “ownership” implies mutual exclusion of access and use that does not reflect real-world situations. (For example, either the consumer or the utility “owns” the information, but not both.)

In the case of gross energy consumption at the meter level, it is clear that both the utility and the consumer have certain rights of access that are not mutually exclusive. The utility requires access to metering and usage information in order to perform basic functions related to the generation and delivery of energy (billing, reliability, system operations, etc.). This right of access carries obligations to protect that confidential data from inappropriate disclosure or uses that are not related to the primary operation of the electric system. In this respect, utilities are custodians of information and have obligations to treat that information confidentially, responsibly and in accordance with consumer expectations.

Similarly, the consumer requires access to usage information in real time in order to manage their home energy usage and contribute to smart grid functions. Consumers also have rights to control disclosure of information for secondary uses. In light of the fair information practice principles referenced earlier, consumers should be given choice regarding use their information for secondary purposes and regarding disclosure of their information to third parties.

Smart grid technology and applications raise new questions with regard to the new level of detailed information generated by advanced metering technology. In this regard, we believe that the meter provides a useful demarcation point between where the utility has a right to access and where the consumer has a reasonable expectation of privacy.

For example, the data stream available from real-time metering information can be used to identify individual appliances and occupancy patterns of individual consumers. The ability of the utility or any third party to access or use this information does not establish a right to use this information absent consumer choice.

9. *What should be a utility's obligation to "unbundle" metering in homes and businesses?*

We believe that in order to deliver value to consumers and foster innovation, energy usage information must be freely and reasonably accessible to consumers. In our opinion, this means that consumers have the right to their energy usage information in near real-time, on their premises and without any burdensome requirements or costs. We believe that this access to information is entirely consistent with the Federal policy as promulgated in EISA that calls for the, "provision to consumers of timely information and control options." (The inclusion of "control options" in this policy suggests that information must be delivered in near real time.)

As noted earlier, both the Public Utility Commission of Texas and Pennsylvania PUC have issued policies on advanced metering and home area network (HAN) data. In particular, we highlight these policy's emphasis on delivering and storing information "in a form that complies with nationally-recognized non-proprietary standards" and that AMI "must be capable of communicating with other devices on the premises."

We recognize that "unbundling" energy usage information available from the meter raises certain questions with regard to how consumers will be protected from the proper use of that information by service providers. We agree (as noted in the materials accompanying this proceeding) that information control regimes that centralize smart grid information disclosure may limit innovation in energy services available to the consumer. Therefore, we believe that the consumer should be enabled to engage service providers at their discretion in order to implement home energy management solutions.

Tendril appreciates the opportunity to submit these comments and address the important issues surrounding smart grid implementation. We recognize that this is only the beginning of a conversation in Colorado and with relevance nationwide as smart grid technologies enter the market. We appreciate the Commission's dedication to a thoughtful dialogue and look forward to participating in further discussions as these complex issues are explored in more detail.

**CERTIFICATE OF SERVICE**

I hereby certify that I have this day served a copy of “**COMMENTS OF TENDRIL NETWORKS, INC.**” in **R.08-12-009** by electronic service, and by U.S. Mail to those parties who have not provided an electronic address:

**E-Mail Service:** sending the entire document as an attachment to all known parties of record who provided electronic mail addresses.

**U.S. Mail Service:** mailing by first-class mail with postage prepaid to all known parties of record who did not provide electronic mail addresses.

Copies were also sent via Federal Express to Commissioner Nancy Ryan and to Administrative Law Judge Timothy J. Sullivan.

Executed on **March 9, 2010** at Boulder, Colorado.

/s/ CAMERON BROOKS

Cameron Brooks



## California Public Utilities Commission

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# CALIFORNIA PUBLIC UTILITIES COMMISSION

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[TOP OF PAGE](#)  
[BACK TO INDEX OF SERVICE LISTS](#)