BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Smart Grid Interoperability Standards	)	Docket No. RM11-2-000
	)	

COMMENTS OF PACIFIC GAS AND ELECTRIC COMPANY

Pursuant to the January 13, 2011, "Supplemental Notice of Technical Conference," and February 16, 2011, "Supplemental Notice Requesting Comments," Pacific Gas and Electric Company (PG&E) hereby provides its comments on the process and "roadmap" the Commission, the National Institute of Standards and Technology (NIST), and stakeholders should follow to ensure that consensus standards and protocols are promptly adopted and implemented by electric utilities, vendors and regulators to ensure smart grid functionality and interoperability in compliance with Section 1305(d) of the Energy Independence and Security Act of 2007.

Summary of Comments

As discussed in more detail below, PG&E has identified some immediate next steps that it recommends FERC and NIST implement in this docket as a follow up to the January 31 technical conference. These steps are as follows:

1. Continue to conduct periodic public workshops consisting of FERC, NIST, NARUC and industry stakeholders to build public and stakeholder awareness of the NIST standards-setting process, including the formal process now available for updating the NIST "Catalog of Standards" and how that process applies to Smart Grid interoperability standards.

2. Use the new validation process to continue to evaluate, review and approve or disapprove the NIST Catalog of Standards, including the five Smart Grid families of standards

submitted by NIST which have not undergone this validation process. PG&E and other members of the SGIP should have an opportunity to formally review and vote on each such standard.

3. NIST, subject to consultation with FERC, should adopt a formal recommendation on how NIST Smart Grid consensus standards should be submitted and adopted by FERC as voluntary,"forward looking guidance" for industry certification programs, subject to FERC audit, but not as prescriptive regulatory mandates.

4. Ensure "open access" to all standards, by working with all Standard Setting Organizations (SSOs) to ensure that full definitions of consensus Smart Grid standards are readily available (at no or minimal charge) to all stakeholders. The full text of all Smart Grid standards should be uploaded and available on the Smart Grid Information Clearinghouse (SGIC).

5. Ensure sufficient and consistent funding for the NIST process, including the SGIP process, in order to sustain the consensus standard-setting process over the next five years, including a full lifecycle program integrated with all relevant SSOs.

PG&E's Smart Grid Experience

PG&E's comments reflect its own recent experience on Smart Grid projects, interoperability and cyber-security. PG&E is implementing Smart Grid, advanced metering and demand response technologies for its 9.5 million customer accounts. PG&E leads the nation in advanced metering infrastructure deployment, with 7.7 million advanced digital electric and gas meters installed and on track to deploy over 9.5 million meters in total by the end of 2012.

PG&E is investing $2.2 billion to install advanced metering technology—each installation includes a second generation meter with advanced functions including home area

network (HAN) support and remote connect and disconnect capabilities. PG&E is also making significant electric transmission and grid investments and upgrades, with up to $2.4 billion in additional capital-intensive, jobs-creating transmission investments over the 2009- 2011 period alone.

PG&E's SmartMeter and transmission investments are coupled with over $1.9 billion in customer energy efficiency and demand response programs it is offering customers over the same 2009- 2011 period. In addition, PG&E and other California utilities are implementing the most aggressive renewable generation deployment strategy in the country, with the commensurate need to find and employ the best technologies to integrate those renewable resources into our transmission and distribution grid. More than 45,000 PG&E customers have on-site solar photovoltaic generating systems that interconnect with PG&E's grid, and 35% of all residential PV interconnections in the US are in PG&E's service territory.

PG&E also is one of the primary target markets for the mass marketing and interconnection of a new generation of plug-in electric vehicles to thousands of retail electricity customers. As such, PG&E already is implementing new plans and operating procedures to ensure that the grid impacts of the new EVs are manageable, and that customers have the highest level of convenience and simplicity in charging their new EVs on PG&E's distribution system.

PG&E also is a participant in the comprehensive Smart Grid rulemaking initiated in California by the California Public Utilities Commission in December, 2008. Pursuant to Senate Bill 17 (Padilla) enacted by the California Legislature in 2009, the CPUC Smart Grid rulemaking will culminate in PG&E and other California utilities filing comprehensive Smart Grid deployment plans with the CPUC by July 1, 2011. These Smart Grid deployment plans will include Smart Grid "vision statements;" metrics for measuring performance of selected and

approved Smart Grid projects and investments; preliminary cost and benefit analyses of potential Smart Grid projects; a "baseline" of Smart Grid projects implemented or underway; and cybersecurity and customer privacy plans and protocols for ensuring a safe and secure Smart Grid. Following approval of the Smart Grid deployment plans, the CPUC, PG&E, other utilities and stakeholders will update and review the plans annually and file for regulatory review and approval of specific projects to implement the plans.

PG&E also has been an active and pragmatic participant in many of the industry's leading forums and standards development organizations. PG&E holds multiple leadership positions within the NIST Smart Grid Interoperability Panel (SGIP), a group of major Smart Grid stakeholders brought together by NIST to provide a central coordination point for development of national Smart Grid standards and protocols, including the initial five families of NIST Smart Grid standards submitted to FERC. Specifically, PG&E sits on the SmartGrid Architecture committee and the SmartGrid Conformance committees, as well as engaging in multiple priority action plans. PG&E chairs the UCA Open SmartGrid technical committee and multiple working group and task force leads. The OpenSG has provided multiple deliverables into the NIST SGIP PAP process. PG&E also participates and contributes to multiple industry Standards Development Organizations such as IEEE, IETF, and IEC.

As a pioneer in the deployment of advanced metering infrastructure in California and the US, including meeting the expectations of customers and policymakers in the real world regarding the privacy, security, reliability and safety of new Smart Grid technologies and customer services, PG&E brings a pragmatic and "customer focused" perspective to the implementation of Smart Grid interoperability and cybersecurity standards in order to ensure that Smart Grid projects have a high probability of success under stable and uniform standards.

PG&E's Perspective on Smart Grid Interoperability Protocols and Standards

PG&E's perspective on the next steps in implementation of Smart Grid interoperability standards under EISA is directly related to its own local experience in developing, piloting, scaling and ultimately offering new Smart Grid technologies to our customers in Northern and Central California. National smart grid deployment is complex from a technical and regulatory perspective. Some question why the utility industry is taking so long – the simple answer is that we have to "get it right." Safe, secure, reliable and cost effective power is the foundation of our national economy and quality of life. The stakes are too high to move forward without serious thought and consideration.

Bringing together the Smart Grid Interoperability Panel as part of the NIST process in the last 18 months, consisting of major stakeholders – many with different priorities and interests – has been an essential element for consensus-building, even though it has not been a perfect process. This is not unlike the experience with other significant national standard-setting processes, such as the development of wireless and Internet-related standards. The SGIP under the umbrella of NIST has made progress and all stakeholders need to build upon that success, even though the work is challenging.

The FERC January 31 Technical Conference on whether the five families of NIST smart grid standards are ready to be adopted by FERC revealed several opportunities for further progress under the SGIP and NIST process:

- NIST can and should provide a more clear, consistent, and transparent process – a fully-transparent process was not in place at the time NIST submitted the first 5 standards;
- Technical deficiencies in the submitted standards show that additional consensus review and updating of the proposed standards is needed;

- Most importantly, as Mr.George Arnold of NIST pointed out at the end of the technical conference, ***all stakeholders, including NIST, FERC, the SGIP, and others, need to be clear that "FERC adoption" of Smart Grid standards can and should be forward-looking, guidance-based and evolutionary, not prescriptive, compliance-oriented or static***; and
- The need for standards to define how Smart Grid systems interface with each other is critical to enable a Smart Grid that can be implemented reliably and scale cost-effectively. To rush technology deployments in advance of settled standards is to invite higher costs, interoperability gaps and stranded investment.

There are several contributing components and new business requirements to this standard-setting exercise that PG&E is currently grappling with "in real time" in Western electricity markets. These components include, for example, integration of new renewable resources and distributed generation; new requirements for interfacing with customers and "smart appliances" beyond PG&E's advanced metering infrastructure; new expectations of customers and regulators regarding security and privacy protections; and new requirements to integrate the distribution system with wholesale and retail demand response and ancillary grid services. The net effect of these drivers is that an ever increasing number of utility systems are being created for the first time and therefore dependent on emerging technologies and the ability to execute effectively on the development and deployment of those emerging technologies. Another result is that the number of standards is multiplying and will be constantly evolving.

In response, the utility industry, standard-setting bodies, and regulators must 1) agree on priorities for specific system functions and the related system interfaces, 2) define the set of standards that provide a common interpretation of those interfaces, 3) document the chosen

standards by creating a profile comprised of specific selections from the set of standards, and finally, 4) design and implement the tests that can be performed to verify the interoperability and compliance with the selected profile. It is also important to focus on the functional need and design the tests to validate that the need is actually met and not simply an exercise to verify that a system is in compliance with a standard. In other words, the criteria for a successful standard should be that the process tests for the intended functionality, with the adopted standard simply being a mechanism to define how the functionality is met in a consistent and interoperable manner.

Responses to FERC Questions

1. In your view, would making standards enforceable best serve the intent of Congress to facilitate development and use of interoperability standards? Please explain.

PG&E RESPONSE:

No. In PG&E's view, the question is not whether the standards should be "enforceable," it is how best can FERC and NIST encourage the development and adoption of consensus standards and guidelines that are broadly accepted industry-wide and provide open and convenient access to new technologies for the Smart Grid. Once the process for consensus standards has been widely agreed upon, including a consensus on the intended functionalities and certification programs to support those functionalities, then FERC as well as NIST and stakeholders in the industry can monitor adherence to the standards on a forward-looking basis, and take action as necessary to address performance and programmatic issues as they arise. It is important to understand that technology standards such as those released to FERC are very broad and only provide a means to implement functionality in a common, interoperable way. Making standards enforceable would not necessarily guarantee that the desired functionality is met unless

the standards are well defined, accepted, and not subject to prescriptive enforcement. PG&E agrees with the comments of Mr. George Arnold of NIST at the January 31 FERC technical conference that this forward-looking "guidelines" approach is more effective for FERC than a "rear-view mirror" compliance and prescriptive enforcement approach. Standards enforcement has more impact at the demand-side of the process i.e., when operators must procure technologies that are defined in well understood ways, as opposed to trying to enforce standards in a more artificial manner while technology development is still in process.

2. How does the determination of sufficient consensus implicate the requirement to "institute a rulemaking proceeding to adopt" standards and protocols? Please explain.

PG&E RESPONSE:

Determination of sufficient consensus must precede any rulemaking to adopt standards and protocols under EISA. The intent of EISA Section 1305(d) is *first,* to drive toward industry consensus on standards and certification programs, using the NIST umbrella, and only *second,* to consider how to embody that consensus under FERC's overall regulatory program. However, PG&E does not believe that EISA restricts FERC's ability to work collaboratively with NIST and stakeholders and in parallel with the consensus-building process, in order to assist the process. What FERC, NIST and all stakeholders should avoid is an "all or nothing" interpretation of the EISA process that results in unnecessary dividing lines or adversarial relationships. This is why PG&E supports a renewed focus by utilities and other stakeholders on the task of creating concrete implementation plans for the various certification programs and phase-in schedules that are essential to bridge the gap between "standard-setting" and pragmatic, cost-effective "implementation" of utility-administered and FERC-overseen certification programs that follow the standards.

3. What meaning should the Commission give to the phrase "as may be necessary to ensure smart-grid functionality and interoperability in interstate transmission of electric power, and regional and wholesale electricity markets?" Should the Commission evaluate for adoption only those standards that are critical for applications and that may implicate the functionality and interoperability of interstate transmission or wholesale electricity markets?

PG&E RESPONSE:

Although FERC's direct jurisdiction is limited to the interstate and wholesale electric markets, its advisory and guideline jurisdiction is broad enough to support a leadership role in development of standards that apply uniformly across the entire utility industry and are not limited to interstate transmission and wholesale electricity markets. At the same time, FERC and representatives of state utility commissions, such as the National Association of Regulatory Utility Commissioners (NARUC), should solidify their collaborative relationship and involvement in the NIST standards development process, because each individual utility and its state regulator will need to have the confidence that the uniform standards are adequate for local implementation.

As discussed above, in California, the California Public Utilities Commission (CPUC), the California Independent System Operator (CAISO), PG&E and other investor-owned utilities, vendors and stakeholders have been engaged in an open and broad rulemaking proceeding on Smart Grid issues for the last two years. This Smart Grid rulemaking has provided an opportunity for informal workshops on technical, ratemaking, policy and operating issues across a broad spectrum of the Smart Grid, including development and approval of individual utility Smart Grid Deployment Plans under a new state law, Senate Bill 17 (Padilla). PG&E expects to

continue working collaboratively with the CPUC, the CAISO and other California stakeholders and utilities in the California Smart Grid rulemaking to ensure that the goal of consistent and uniform Smart Grid standards is supported through broad collaboration between the state regulators and FERC.

4. How does the smart grid review process consider and evaluate "normative references" (i.e., standards embedded within candidate standard for adoption, needed in order to comply with the standard)?

PG&E RESPONSE:

In standards terminology, "normative" means "considered to be a prescriptive part of the standard." It characterizes that part of the standard which describes what *ought* to be done within the application of that standard. Many standards have an introduction, preface, or summary that is considered non-normative, as well as a main body that is considered normative. "Compliance" is defined as "complies with the normative sections of the standard;" thus, an object that complies with the normative sections but not the non-normative sections of a standard is still considered to be "in compliance." Normative information may sometimes be contrasted with informative information (that is, the standard's descriptive, explanatory or positive content). Informative data is supplemental information such as additional guidance, supplemental recommendations, tutorials, commentary as well as background, history, development, and relationship with other elements. Informative data is not a requirement and does not compel compliance.

Sections of standards will typically be selected as a normative part of a profile to be tested with compliance or certification sets of tests. It is important that all normative parts of that particular section of the standard are met by compliant devices. Failure to adopt the normative

parts of standards negates interoperability across separate vendor implementations of a technology. The need for a trusted, credible certification process is vital to the overall success of the standard-setting process.

5. How does the NIST process assure that a standard has undergone sufficient review of interoperability and cyber security and is ready for consideration by regulators?

PG&E RESPONSE:

While the initial five families of standards did not go through a prescriptive governance process, the maturing process to clearly vote on the inclusion of standards that is within the catalog of standards should be used for all standards, including future work on the initial five standards. The NIST SmartGrid Architecture Committee and the Cyber Security Working Group should have approval gates in the process with the mandate to assess interoperability and cyber security against the guidelines within the NIST Framework document. The initial five families of standards should be reassessed using this process.

Staff seeks comment on ways in which "sufficient consensus" may be defined and used by the Commission to fulfill the purposes of EISA with respect to the appropriate venue for determining and documenting consensus, whether individual attributes of standards require documentation of consensus, and the appropriate role of testing and certification:

1. Should the Commission rely solely on the results of the NIST process, and not conduct independent analysis with respect to consensus? If the Commission were to define consensus in this manner, what changes, if any, would be required to the currently effective NIST process?

PG&E RESPONSE:

No. As discussed above, the Commission should place itself apart from the NIST process, but should more actively collaborate and support the process in an advisory and practical role, including advising on the improvements needed to drive the process toward "up or down" approvals of consensus standards and certification programs. Also as discussed above, the NIST process should be changed in some significant ways in order to provide for more focused, pragmatic evaluation of reliability and implementation as key factors in determining if standards should be included in the catalog of standards.

2. Alternatively, should the Commission independently determine consensus? If so, how?

PG&E RESPONSE:

No, the Commission should not separate itself from the consensus-building process; it should directly collaborate and support it.

3. What benefit does documentation of key attributes of a standard (cyber security, functionality, architectural relevance, interoperability, reliability, and implementation issues) bring? Is it necessary? Are there other attributes that should be included, or are any of the attributes noted here unnecessary?

PG&E RESPONSE:

The "attributes" of a standard are the means to define a common implementation of a specific function (i.e., send "Watts used" to an in-home display on the refrigerator). The key attributes of a standard set the requirements that allow a standard to be evaluated for relevance to a specific function. For the example of the message to the in-home display, many standards may

be used but all products must implement the standards and be tested across the attributes of those standards in order to ensure interoperability. At a high level we want to define the function, define the requirements to implement that function, then use the standards to define a common way of implementing that function, and finally use the standards to define common tests to ensure interoperability and security of the function.

4. Is it appropriate for reliability and implementation issues to be reviewed by a separate panel, as some panelists commented at the technical conference, composed of utility representatives and NERC?

PG&E RESPONSE:

No, it is not necessary to establish yet another panel, as long as the existing panels are re-focused on reassessing the initial five families of standards and on the relevant implementation issues associated with the standards, such as development of certification programs, treatment of legacy systems, and reliability and operational feasibility issues. The composition of the existing panels and committees should include utilities, but need not include NERC as a formal or *ex officio* member.

5. How should testing and certification for cyber security requirements be incorporated into the adoption process?

PG&E RESPONSE:

Cyber security testing should be a required component of all compliance and certifications for Smart Grid technologies, just as other functionalities. Cyber security testing will be required across multiple layers of technologies used for particular functions. Cyber security across communication channels, protocols, and end-to-end across integrated systems should be included as part of the compliance process. Cyber security should permit the

integration of components into a system that have met lower layer component-specific compliance tests without necessarily requiring retesting at the system level. For example, a communications system that has passed encryption and authentication certification should not necessarily be required to be retested when integrated within a larger system as long as the technology components that were tested have not changed.

Several commenters made the point that the process used for the five families of standards differs from the going forward process. Given that the first five families of standards have been posted for consideration, and a number of commenters at the technical conference point to deficiencies in the process used to identify those standards as ready for consideration, staff requests comment on:

1. Whether there is a need for additional process concerning the five families of standards and if so, how, for example, the identified cyber security issues can be addressed given the NIST and FERC structures and the language of EISA.

PG&E RESPONSE:

The five families of standards should be reassessed by the NIST Catalog of Standards process. Any deficiencies in these standards should be addressed and cured within the NIST process through priority action plan working groups, with broad participation by utilities, vendors, and FERC staff on an advisory basis.

2. Whether the criteria for the Commission's evaluation should differ for interoperability and functionality, and the extent to which cyber security is an element of each.

PG&E RESPONSE:

No. The development process for standards is well-known and the Commission's evaluation process should be consistent with the development process. Functionality and interoperability are both required as part of any evaluation process during standards development. Functional requirements define the architecture. The architecture and the standards used must meet functionality requirements. Interoperability is also a requirement; the architecture that meets the functional requirements must also have sufficient coverage of testing across functions to ensure that separate implementations of the technology under test will interoperate having passed certification. Cyber security requirements must be included in the test cases that are developed to certify both functionality and interoperability.

And finally:

1. What are the key smart grid benefits that standards should enable? How can the Commission encourage the standards development process to incorporate the continual, but gradual, growth in functionality that is occurring in smart grid implementations and pilot programs?

PG&E RESPONSE:

The most important step the Commission can take on standards in order to encourage continued development and evolution of Smart Grid functionality and technologies is to support a voluntary consensus-building process that builds on the existing NIST process, rather than adopting a separate, prescriptive regulatory approach that relies on traditional concepts of compliance and enforcement. Unless FERC makes this clear as a matter of its Smart Grid policy, it is likely that the consensus development of standards will flounder over the cultural

divide between traditional electric utilities, which are by nature risk-adverse toward investments in new technologies that are subject to regulatory second-guessing, and Smart Grid vendors and technology companies, which are willing to invest risk capital if the standards for commercial application are uniform, predictable, and nationwide.

PG&E has been a pioneer in the deployment of advanced metering technologies for its 9.5 million electric and gas customers, and the one key lesson PG&E has learned is that the scaling and customer acceptance of technology takes time and a willingness on the part of regulators to accommodate the inherent risks in utility schedules and scaling. FERC, NIST and all stakeholders in this important proceeding should apply this same lesson to the Smart Grid standard-setting process.

From Standards to Guidance to Certification to Compliance: PG&E's Recommended "Roadmap" for Next Steps by FERC and NIST

PG&E has experienced and is experiencing first-hand the need for careful, results-oriented, consensus standard-setting for Smart Grid emerging technologies. As one of the first utilities in the country to deploy advanced metering infrastructure on a mass retail market scale, PG&E learned the hard-way how important it is to achieve up-front agreement not only within the utility itself, but also in its open-standards based agreements with vendors and suppliers of the new advanced metering technologies. As PG&E's customer expectations have evolved, so have its business requirements, and PG&E has performed major upgrades of its advanced metering infrastructure over the seven year course of systems implementation and deployment. Likewise, in PG&E's other "smart" technology deployments, it has learned how important it is to provide for a consensus up-front regarding the standards and protocols that will apply to emerging and new technologies before those technologies are scaled up from pilot status to

commercial deployment. Finally, we have learned that these new technologies are not susceptible to precise regulatory specifications or prescriptive functions; instead, it is important for the successful deployment of these technologies that the regulators provide for overall guidance on costs and functionality, and then allow the utility and its vendors and systems developers to scale up the systems under the overall guidance and scope of the regulatory authorization provided.

In light of PG&E's "real world" experience deploying advanced meters, ***it is essential*** that FERC and NIST define what is meant by the "adoption" of a Smart Grid standard or family of standards. There also needs to be a mutual understanding for normal cycle between promulgation of the standards and commercial availability of products or devices that qualify under the standards – typically 24 months or longer. To define Smart Grid standards, it must be understood that public utility systems of the future will become more and more integrated with sharing of information and the need to communicate across previously siloed lines of business functions. A clear example is the customer domain and the emerging need for the customer domain to interconnect and communicate directly with the utility distribution domain. The industry is clearly moving from siloed systems that tend to be vendor proprietary to an integrated "system of systems" that must speak a common language and inter-operate in a well orchestrated and reliable way. The only way to achieve such interoperability is through standards that define the common languages to be used.

The NIST process is defining an architectural framework for how the systems communicate and the standards that are relevant to that communication. The NIST process, through expert working groups such as the SGIP and its process, is the best suited to establish a consensus on the optimal standards that can provide integrated systems that can function across a

large set of public utility, vendor, and public stakeholders. Consensus does not mean 100% agreement. The industry must be careful to not put too much relevance on the lack of unanimous support for the standards process or the open, interoperable standards that emerge. It is important to acknowledge that the Smart Grid as defined in EISA cannot be achieved without an open standards-based set of systems and interoperability across those systems.

Once the concept of an interoperable and open "system of systems" is accepted and understood in the NIST and FERC process, the adoption of guiding standards can then begin.

To emphasize: ***Adoption of standards should not be defined in terms of a particular standard. Adoption of standards should identify a common way for specific functions to be defined and tested in a way that enables interoperability and conformance to a desired process/function outcome. If the utility industry simply tests to ensure that each particular utility is merely meeting the "verbatim"specifications in a particular Smart Grid standard, the Smart Grid will fail to meet the interoperability goals as defined in EISA. The entire utility industry must think in terms of the functions that are critical to the Smart Grid, not prescriptive standards that evidence those functions.***

For example, a Home Area Network (HAN) interface to a demand response thermostat must distinguish between the "standards" that govern its interoperability, and the function that it must achieve. What is important for the HAN-related NIST standard-setting process is not the standard itself, but that utility customers can purchase HAN-enabled devices at Home Depot, bring them home, and easily and securely register the devices on the HAN network and enroll in services that provide value to the customer, the utility, and policymakers. This requires an industry certification program much like what the WiFi alliance operates today and what the Zigbee alliance is developing.

Ultimately, as Mr.George Arnold pointed out at the January 31, technical conference, FERC should encourage the consensus development of industry certification programs that test and give confidence around specific Smart Grid functions. Once adopted, these consensus certification programs will simplify FERC's compliance guidance under EISA, because the tests and results of the certification process will be well known, vetted across the industry, and follow a process that can mature and continue to improve. Such a framework lends itself well to a self-certification-subject-to-audit compliance process due to the broad participation and adoption within the industry and the ability of regulatory bodies to audit and approve the certification programs.

In other words, FERC and NIST should support a "roadmap" for further steps on Smart Grid standards that moves from 1) consensus standards, to 2) industry adoption of certification programs based on those standards, to 3) guidance by FERC on how the industry should demonstrate certification, subject to audit, to 4) the final step, auditing by FERC of certification programs to demonstrate compliance. Standards provide context and a common approach for a minimum set of key functions, but not an exhaustive list of all possible functions, thus allowing innovation to continue to drive industry advancements under the standards.

PG&E also notes that adoption by industry of a consensus standard and certification program does not mean that the adopted standard is the only standard that is viable across interfaces for a specific function. It is entirely acceptable for two entirely different standards to be harmonized so that they can be used for the same function and meet interoperability targets. A good example of this is the mapping that is in process for IEC 61850 and DNP3. Both are very different standards but they can be harmonized such that both can be used in an interoperable way within a system of systems.

This proposed "roadmap" works extremely well for both industry and regulators alike. We can look to interoperability of the Internet as an example. The Internet does not exclude the use of proprietary systems to meet certain functions or to be accommodated as legacy systems that will evolve overtime. Proprietary systems on the Internet will simply not benefit from the vast economies of scale from broader industry participation in the open, industry-certified systems, and therefore the proprietary systems have greater cost and complexity to maintain and validate for compliance.

Executing and Following the "Roadmap"

Once FERC, NIST and industry stakeholders agree on the "roadmap" toward industry certification programs, the industry will actually start applying the test and certification mechanisms necessary to meet the Smart Grid interoperability goals embedded in the consensus standards. In many cases, this is no different than how technologies such as WiFi and other Internet Protocols are certified today.

The industry will define requirements based on the functions and implement them incorporating selected components of the adopted consensus standards that are relevant to the particular function being addressed. Overtime, a mature selection of industry certification programs can be mapped to specific functions in compliance with reliability, security, and functional goals. Such a process necessarily will take time and will evolve maturely at the pace of need and value to the utility industry, utility customers, and the vendors of the new Smart Grid technologies.

Conclusion

PG&E strongly supports the NIST consensus standard-setting process and the FERC's direct role in that process. PG&E's own experience with Smart Grid technologies, including its

deployment of advance metering infrastructure to 9.5 million customers in California, is that the California utilities, the CPUC, utility customers and technology suppliers and vendors have worked very cooperatively and collaboratively in addressing step-by-step the key questions that need to be answered before Smart Grid projects and investments can move forward on a scalable, cost-effective basis. PG&E recommends that NIST, FERC and all Smart Grid stakeholders adopt a similar "roadmap" for the next steps on national Smart Grid interoperability standards as recommended in these comments.

Respectfully submitted

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Dated: April 8, 2011

CERTIFICATE OF SERVICE

I hereby certify that I have this day served a copy of the foregoing document upon each person designated on the official service list in this proceeding, RM11-2-000 in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure and the additional parties listed below:

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Dated at San Francisco, California, this 8th day of April 8, 2011.

/s/
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