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Good afternoon, Chairman Wellinghoff and Commissioners, thank you for this opportunity to speak to the issue of smart grid standards recommended by the National Institute of Standards and Technology (NIST) for consideration. My name is Paul De Martini, I am the Chief Technology Officer and Vice President, Strategy for the Smart Grid Business Unit at Cisco Systems. I am also a member of the Governing Board of the NIST Smart Grid Interoperability Panel (SGIP) holding one of the at-large seats representing a broad industry perspective. Prior to joining Cisco last spring, I led Smart Grid development and standards at Southern California Edison.

The central role strong Internet Protocol (IP) based interoperability standards play in communications networks long pre-dates the Smart Grid. The broad adoption of interoperability standards has made possible competition among vendors who make the different devices that communicate across networks, devices as diverse as mobile phones, computers, and networking products. Cisco anticipates that interoperability standards can play the same role in the emerging Smart Grid, by ensuring that utilities and their customers will benefit from choices among open and IP based standards-compliant devices that together will comprise the Smart Grid.

Cisco participates regularly in standards development activities in a range of standards development organizations ("SDOs") across the IT sector and increasingly over the past few years in the power systems and energy management sectors including active participation and leadership in the SGIP, International Electrotechnical Commission (IEC), IEEE, the North American Synchrophasor Initiative (NASPI), UCAIug OpenSG, ZigBee Alliance and others. Cisco is

also currently supporting Smart Grid interoperability standards development and adoption across North America, the European Union, India, Russia, Australia, Brazil and China. On any given day, dozens of Cisco employees are attending meetings of standards development organizations or preparing technical contributions. We regularly contribute proprietary technology to standards development efforts. And we regularly implement a wide range of standards in our products to meet our customers' needs.

Today, I will address three areas, a) consensus on the five IEC standards, b) standards lifecycle and implications toward implementation and adoption and c) considerations regarding intellectual property rights in standards adoption.

Five Standards Consensus

In the three years since the passage of EISA 2007, NIST has overseen the development of one of the most sophisticated and largely voluntary organizations in the world with the primary focus of identifying relevant standards or requirements for new standards to enable a smarter grid, vetting the technical and security attributes of such standards, and achieve consensus for federal and state regulatory and public power boards to consider for adoption. The several large sessions in Phase I that drew hundreds of participants representing a broad range of stakeholder interests evolved into the Smart Grid Interoperability Panel. Today, SGIP is comprised of nearly 660 domestic and international organizations and over 1,700 individuals participating in the process. NIST's achievements in Phases I and II in standing-up the SGIP organization and associated processes are remarkable.

The five standards proposed are a good starting point to enable a 21st Century grid that is interoperable, leveraging open and IP based standards and secure. These specific standards also represent not only the broad industry consensus evaluation in Phase I, but also the rigorous long-term development within the IEC including extensive global technical peer review and approval. The strength of the SGIP process and that of the IEC and other SDOs is their processes for continuous improvement. Standards by nature are not static and will continue to evolve both in terms of refinement and to address new requirements as technology and uses change. The SDO and SGIP processes ensure that any gaps that have been identified will be

resolved in subsequent revisions. This means that consideration of these five can move forward today in the context of the standards adoption lifecycle considerations below and with the understanding that material technical gaps will be sufficiently addressed prior to implementation. Cisco supports the SGIP consensus and vetting process that resulted in these five standards being selected by as the first for regulatory consideration.

Standards Adoption Lifecycle

As challenging as the process for identification and evaluation of standards in the SGIP process, it is only one of several steps toward ultimate adoption in utility systems. The FERC, state commissions and public power boards will need to also consider the state of maturity of any specific smart grid standard. Specifically, Cisco believes that any proposed standard for utility adoption should also be assessed on the following aspects:

a) Established standard compliance and interoperability testing regimes

b) Products from multiple suppliers are "commercially available"

c) Successful reference implementations

d) Backward compatibility assessment or legacy migration considerations

Implementation of standards in products must be tested for adherence to the standard as well as interoperability and security. Such testing needs to be carried out by responsible organizations using recognized testing protocols. Products, of course, need to be commercially available for utilities to adopt. This requires technology suppliers to develop appropriate smart grid products that incorporate standards that have been tested. It is typical to expect that technology product development time to incorporate new standard including proper testing for commercial release may take between 12-24 months.

As with any new technology products on critical infrastructure like the electric system, small pilots or demonstrations are usually performed to validate the technology in an operational environment. These reference implementations are an important step in the

overall adoption cycle and reduce the potential technology risks and often provide useful information to improve the products and considerations for utility wide scale adoption.

Additionally, much of the existing technology on the US electric system is incompatible with the emergent standards, including the five proposed. Except in a few instances, like smart metering, it is uneconomic to consider wholesale (forklift) replacement of existing technology. This means legacy proprietary networks will continue to operate as long as regulators and utilities consider them useful. The objective, of course, is that new build-outs use the interoperable architecture leveraging open and IP-based standards, and all vendors are able to sell into them, resulting in cost savings and increased performance for the utility. In time, the IP-based interoperable architecture therefore dwarfs the legacy proprietary networks. Therefore, the issue of migrating from an existing technology to a new open standard or security scheme must be considered. This necessitates an assessment of potential backward compatibility of standards and/or gracefully transitioning from the existing system to the new system while ensuring the overall effectiveness of the operation of the grid is not compromised. This often requires technical solutions to effectively integrate the old with the new, which Cisco is already addressing for utility customers worldwide.

The FERC, state commissions and public power boards need to consider these lifecycle maturity and utility adoption considerations in not only which specific standards may enable a smart grid, but also assess utility proposals for implementation. Such implementation will need to be based on sufficient maturity of a standard as demonstrated in standards compliant commercially available products, effective technology transition plans to maintain reliable operations, and cost effective deployment. The use of smart grid roadmaps and architectural reference models by utilities in the regulatory process can be an effective means to have an informed discussion among the all the smart grid stakeholders, including customers, utilities and technology and services providers regarding adoption.

Intellectual Property Rights in Standards

FERC has also asked this panel to address lessons learned from industries within and outside the power sector. One lesson Cisco has learned by developing and implementing

interoperability standards in the networking products our company makes, standards like Ethernet and WiFi, is about the importance of transparency and predictability of licensing terms for patents that are necessary to implement standards.

Implementing interoperability standards may require licenses to dozens or hundreds of patents per standard. Standards development organizations have intellectual property rights policies that specify that participants will license patents essential to implement standards on reasonable and non-discriminatory ("RAND") terms. Unfortunately, there is no consensus on what licensing terms are reasonable. This leads to a situation in which businesses developing products that implement standards, have very little visibility into licensing costs and terms.

As the SGIP process continues, it's critical that participants in that process include information about IP licensing as part of their evaluation of which standards to recommend for industry adoption. Where we are considering the selection of an existing standard, knowing as much as possible about the IPR policy under which that standard was created will help industry participants make intelligent choices about which standards to select and regulators to adopt. Where SGIP recommends the creation of new standards, those standards should be developed under policies that provide participants and implementers of those standards with information about what patents will be essential to implement the standard and the terms under which licenses to those patents will be made available. Regulators need to consider the implications of the intellectual property rights within any standards under consideration for adoption.

Summary

In closing, Cisco is pleased to have been a significant contributor to the formation of the SGIP and an active participant leading to this key milestone. We believe the process has been robust and inclusive to achieve consensus. And while not always perfect, the demonstrated continuous improvement and solid governance will continue to ensure a quality outcome. So the discussion naturally shifts to how regulators and utility boards should consider adoption of standards. Cisco believes that for each standard proposed it is essential to consider the maturity of the standard in terms of successful implementation in commercially available product and cost effective and technically sound utility adoption plans. Additionally, regulatory

rulemaking should put the standards into context of a holistic smart grid architecture, recognizing that these are the initial set of standards for adoption and that the standards will evolve over time, as will policy, and regulation should anticipate the evolution of technology, business and regulatory needs.