Comments of Cisco Systems to
Office of Electricity Delivery and Energy Reliability
Department of Energy

in Response to

Request for Information:
Addressing Policy and Logistical Challenges to Smart Grid Implementation
Issued September 13, 2010
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Cisco Systems provides these Comments in response to the Request for Information ("RFI") issued by the Office of Electricity Delivery and Energy Reliability of the Department of Energy ("DOE") on September 13, 2010. The RFI seeks information across a broad range of topics, but also requests that commenters be "concise," and provide "facts and concrete recommendations that can augment the general knowledge."[1] These comments are limited to issues relating to Smart Grid policies on standards and other intellectual property ("IP") issues, which may not have been addressed by other commenters.

1. Interoperability Standards and the Smart Grid

The RFI refers to the definition of Smart Grid set forth in Title XIII of the Energy

[1] Request for Information: Addressing Policy and Logistical Challenges to Smart Grid Implementation ("RFI"), 75 Fed. Reg. 180, at 57008 (September 17, 2010).

Independence and Security Act ("EISA"),[2] in paraphrase:

> . . . the smart grid uses communications, control and information technology to optimize grid operations, integrate distributed resources including renewable resources, increase energy efficiency, deploy demand response, support electric vehicles, and integrate automated, interactive interoperable consumer devices.[3]

It is apparent from this definition and the discussion of issues set forth in the RFI that the creation of the Smart Grid will augment the power distribution capabilities of the current electricity grid by adding broadband communications capabilities. This intelligent network will be required to integrate and provide real-time, and frequently two-way, communications among a vast number of diverse network elements (such as meters, substations, and point generators) owned by multiple independent entities, public and private.

As the RFI recognizes, making the Smart Grid capable of exchanging information between these diverse network elements will require the implementation of agreed interoperability standards by generators, distribution network operators, and equipment manufacturers.[4] The importance of interoperability standards to the Smart Grid was recognized in the EISA enabling legislation, which allocates to the National Institute of Standards and Technology ("NIST") the "primary responsibility to coordinate development of a framework that includes protocols and model standards for information management to achieve interoperability of smart grid devices and systems . . . ." [5] NIST forcefully states that

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[2] The Energy Independence and Security Act (P.L. 110-140).
[3] *Id*.

[4] RFI, *supra*, at 5710:

> "How can state regulators and the federal government best work together to achieve the benefits of a smart grid? For example, what are the most appropriate roles with respect to development, adoption and application of interoperability standards . . . . "

[5] http://www.nist.gov/smartgrid/

> [i]nteroperability—the ability of diverse systems and their components to work together—is vitally important to the performance of the Smart Grid at every level. It enables integration, effective cooperation, and two-way communication among the many interconnected elements of the electric power grid.[6]

NIST has launched the Smart Grid Interoperability Standards Project, which already has involved "hundreds of people" in a"roadmapping process" that is the first phase of NIST's "three-phase plan to expedite development and promote widespread adoption of Smart Grid interoperability standards."[7]

The central role strong interoperability standards play in communications networks long pre-dates the Smart Grid. For example, the convergence of networking industry participants on the TCP/IP standard was critical to the rapid evolution of the internet. In the internet space, standards such as TCP/IP, HTML, and XML permit billions of devices to effectively and seamlessly exchange data. 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 standards-compliant devices that together will comprise the Smart Grid.

Cisco regularly participates in the development of standards that are used in the Internet, widely adopted standards such as TCP/IP, the core Internet transmission standard, as well as a plethora of routing standards that are used to direct data packets across the Internet, prioritize certain data types, and provide for secure data transmission. We arepublicly recognized as a leading innovator in the IT sector, and have a patent portfolio that has been recognized by the

[6] *Id*.

[7] *Id*.

leading electrical engineering society in the United States as the strongest in the telecommunications equipment industry.[8] Cisco participates regularly in standards development activities in a range of standards development organizations ("SDOs") across the IT sector, as well as numerous consortia and special interest groups formed by companies to create standards for use in particular areas. On any given day, dozens of Cisco employees are attending meetings of standards development organizations or preparing technical contributions. We havemade significant technical contributions to standards such as Ethernet (IEEE 802.3), WiFi (IEEE 802.11), broadband over cable (DOCSIS and PacketCable), security, and voice over internet protocol. We regularly contribute proprietary technology to standards development efforts. And we regularly implement a wide range of standards in our products.

2. Intellectual Property Rights and Interoperability Standards

(a) OMB A-119 Mandates RAND or Royalty-Free Licensing Commitments for Essential Patents

The rules of standards development organizations ("SDOs") typically require that entities and individuals participating in standards development disclose the existence of patents and published patent applications they own that implementers of the resulting standard would necessarily infringe. Requiring that these "essential patents" be disclosed permits the participants to make informed decisions about whether to incorporate proprietary technology into the standard they are working together to create.

In addition to requiring that participants in standards development identify patents and patent applications that implementers will need to license to implement the resulting standard, the rules of SDOs also typically require that patents essential to implementation of the standards

[8] *See* http://spectrum.ieee.org/static/patentsurvey2008.

be available for licensing on terms that maximize the availability of licenses, commonly on a royalty-free basis, or on reasonable and non-discriminatory ("RAND") terms.

The availability of licenses to essential patents on royalty-free or RAND terms was recognized by the Office of Management and Budget in its 1995 Circular A-119 as a tenet that voluntary consensus-based standards development organizations *must* use in creating standards that the federal government would adopt.[9] As OMB observed, the "voluntary consensus standards" that federal agencies were required, absent exceptional circumstances, to adopt, were standards created under intellectual property rights policies that:

> include provisions requiring that owners of relevant intellectual property have agreed to make that intellectual property available on a non-discriminatory, royalty-free or reasonable royalty basis to all interested parties.[10]

Thus, the requirement that patents essential to implementing Smart Grid standards must be available on royalty-free or RAND terms is not only good policy, it is mandatory federal policy.

(b) The Limits of RAND

OMB A-119's mandate that patents essential to implement interoperability standards adopted by the federal government be available on royalty-free or RAND terms reflects the fact that standards that are created without the assurance that licenses to patents that are essential to implement those standards expose implementers to the risk of hold-up by owners of those

[9] Office of Management and Budget Circular A-119, Paragraph 6 (available at http://www.whitehouse.gov/omb/circulars_a119/). OMB Circular A-119 was revised in 1998, but the requirement to use voluntary consensus standards, and the definition of voluntary consensus standards as including standards for which commitments to license essential intellectual property rights under royalty-free or RAND terms was not disturbed.

The federal policy favoring the adoption of voluntary consensus standards announced in OMB Circular A-119 implements the National Technology and Transfer Act of 1995 ("NTTAA"), Pub. L. No. 104-113, which also requires NIST, through the OMB, to report annually all agencies that fail to abide by the policy, and explain the reasons for such departures. Id., § 12(d)(1).

[10] *Id.*, at Paragraph 4.

patents. That risk of hold-up can discourage adoption of standards, and can expose implementers of standards to the payment of unreasonable royalties.

Unfortunately, however, a requirement that patents essential to implementing Smart Grid standards must be available on royalty-free or RAND terms, while necessary to ensuring interoperability, may not be sufficient, without more, to accomplish that goal. In Cisco's experience responding to assertions of patents claimed to be essential to implement standards, because there is no consensus between owners of essential patents and implementers of essential patents over the meaning of RAND, the requirement that essential patents be made available for license on RAND terms has, in the fifteen years since the adoption of OMB Circular A-119, proven insufficient to permit implementers of standards to predict licensing costs. Indeed, disputes over whether particular licensing terms are or are not compliant with RAND have become increasingly numerous in recent years, and have led to patent, antitrust, and breach of contract litigation.[11]

The context in which these disputes arise is that once a standard is widely implemented, owners of patents that are required to implement those standards may come to enjoy very strong bargaining positions relative to implementers of the standards. Unlike other patents, for which implementers may be able to identify non-infringing alternatives, it may be impossible for implementers to design around patents the use of which is required for compliance with a standard. And not complying with a standard may effectively eliminate the value of a product that is being purchased precisely because it will communicate with other devices across a network such as a cellular telephone network, an Ethernet network, or a Smart Grid. The

[11] *E.g.*, *Broadcom Corp. v. Qualcomm, Inc.*, 501 F.3d 297 (3d Cir. 2007); *Research in Motion Ltd. v. Motorola Inc.*, 644 F.Supp. 2d 788 (N.D. Tex. 2008); *Ericsson, Inc. v. Samsung Electronics Co., Ltd.*, Civ. A. No. 06-63 (E.D. Tex. Apr. 20, 2007); *Apple Inc. v. Nokia Corp.*, C.A. No. 09-1002 (D. Del., *filed* February 24, 2010); *Microsoft Corp. v. Motorola Inc.*, No. 2:10-cv-01823 (W.D. Wash., *filed* Nov. 9, 2010).

requirement to comply with a standard will be particularly strong for Smart Grid, given the potential federal mandate to comply with Smart Grid interoperability standards and the prohibitive costs associated with switching a Smart Grid from one set of standards to another. Owners of patents essential to Smart Grid standards therefore will have the incentive and ability to take aggressive positions as to what licensing terms are "reasonable." [12]

The limits of RAND in offering implementers of standards the ability to predict licensing costs and other terms may be particularly severe for Smart Grid standards and the companies – makers of Smart Grid devices and the utilities that purchase them – that implement those standards. Such devices are likely to be complex, with numerous features, for example to read status, report that status over the Smart Grid, read responses, and change states. Complex devices often implement numerous standards.[13] Indeed, a survey of available standards undertaken by NIST earlier this year identified no fewer than 25 standards that NIST has identified as required for the creation of Smart Grid, with an additional 50 standards requiring further review.[14]

Companies involved in the development of Smart Grid products may discover that implementing *any one* of these standards may require that the implementer have licenses to dozens or hundreds of patents. That prediction is neither speculative nor fanciful; today we see that level of complexity in such common consumer devices as "smart phones" which commonly

[12] An analogous controversy in a set of government-mandated standards – relating to the ATSC standard mandated by the Federal Communications Commission for high definition television in the United States – recently has been fought out before the FCC. See, Petition for Rulemaking and Request for Declaratory Ruling Filed by the Coalition United to Terminate Financial Abuses for the Television Transition, LLC, MB Docket No. 09-23.

[13] For an illustrative example, see Brad Biddle, Andrew White, and Sean Woods, *How Many Standards in a Laptop? (And Other Empirical Questions)* (September 10, 2010) (identifying 251 interoperability standards implemented in a laptop computer). Available at SSRN: http://ssrn.com/abstract=1619440.

[14] NIST Special Publication 1108, "NIST Framework and Roadmap for SmartGrid Interoperability Standards, Release 1.0" (January 2010), Tables 4-1 and 4-2. Available at http://www.nist.gov/public_affairs/releases/upload/smartgrid_interoperability_final.pdf.

incorporate multiple patented technologies, including memory, multiple long-range radio frequency protocols (such as GSM, GPRS, EDGE, and UMTS), WiFi, and multiple other communications protocols (such as Bluetooth and USB).

The suite of Smart Grid standards – at least in most cases[15] – will incorporate existing standards developed under the rules of various SDOs, most of which operate using intellectual property rights policies that permit participants to commit to license patents on RAND terms. Unfortunately, there is no consensus, either within those intellectual property rights policies or more generally, on what limits a RAND commitment imposes on the discretion of a licensor to seek what the market will bear. In particular:

- There is no agreement on whether the "reasonableness" prong of RAND should be determined in relation to the entire value of the device (or service) which uses the patented technology, or instead only with respect to that portion of the device's value created by the technology at issue.

- There is no agreement as to whether reasonableness should be determined with respect to the inventive contribution that a particular patent makes to a standard, *i.e.*, the degree to which a patented technology is central to the standard, or alternatively is a feature whose exclusion from the standard would not cause a significant diminution of the value of the standard.

- And there is no agreement as to whether reasonableness should be determined with respect to the inventive contribution that a particular patent makes to a standard in relation to other alternative technologies that were available at the time the decision was made to include a particular patented technology in a standard.

The lack of agreement regarding what a "reasonable" royalty is prevents accurate estimation of future licensing expenses and therefore interferes with the ability of business people to make informed decisions about how to price their products. Faced with that uncertainty, business people may be concerned about implementing the interoperability standards on which the successful adoption of Smart Grid depends.

[15] There may also be standards specifically developed for Smart Grid interoperability, and we include below specific recommendations for patents that are essential to implement such standards.

That concern will be exacerbated by the fact that, given the liquid market for patents, Smart Grid essential patents will be – like patents that are claimed to be essential to implement other pervasive standards routinely are –transferred to entities that believe they can derive the most value from monetizing them through licensing to companies offering Smart Grid devices and services. In today's patent climate, many of these transferees will be non-practicing entities, entities which do not themselves develop Smart Grid devices or services, but instead seek to derive revenue primarily from patent licensing. Because such entities will not be offering services or devices, they will have no need to take licenses themselves, and therefore will not be subject to market constraints that would normally limit prices charged by a company as a licensor when that company will be back in the same licensing market as a licensee. Such entities have nothing to lose by taking an expansive view of what royalties are reasonable.

Beyond the question of who will come to own patents that are essential to implement Smart Grid standards, there is also the question of who those patents will be asserted against. To take advantage of damages theories that base royalties on the value of recurring services provided to customers rather than the much smaller amount of revenue derived from equipment sales, patent holders may seek to assert patents against publicly- and privately-owned utilities that install devices that implement Smart Grid standards throughout their networks.[16]

Another risk – and another dynamic which can adversely affect widespread implementation of Smart Grid standards – is the possible availability of injunctive relief to patent owners alleging infringement of an essential patent by a company implementing the standard. Because licensing negotiations most commonly occur after a potential licensee has made

[16] Indeed, one major investor-owned utility, Florida Power and Light, has already been accused of infringing Smart Grid-related patents in a complaint filed by Sipco. *Sipco LLC v. Florida Power & Light Co.*, 1:2009cv22209 (S.D. Fla., *filed* July 27, 2009).

significant and potentially unrecoverable investments in the development, marketing, and sale of standard-compliant services or products, the threat of an injunction is a threat to cause serious business disruption. Thus, a licensor whose licensing terms would not survive an objective test of reasonableness nevertheless can extract unreasonable terms because it has significant additional leverage[17] arising from its ability to disrupt the business of a potential licensee who refuses to agree.[18]

3. A Way Forward for Smart Grid Standards

The risks identified above are both significant and real, and have the potential to delay the development of Smart Grid standards, as well as to delay the development and robustness of the Smart Grid itself. To avoid that outcome, the various federal agencies involved in the creation of the Smart Grid and the standards on which it will be based can and should address these risks as early as possible. Clear declarations of federal policy and requirements will ensure that all potential Smart Grid participants will have ample notice of the ground rules, and that the largest number of participants will be attracted to invest the time and other resources necessary to make the Smart Grid a success.

Specifically, we propose the following:

a) At a minimum, and consistent with the mandates contained in the NTTAA and OMB Circular A-119A, the Department of Energy, the Federal Energy Regulatory Commission, NIST, and other federal government entities (collectively, "USG") involved in the selection of Smart Grid standards and the creation of new standards should adhere to the requirement that all patents essential to any interoperability standard incorporated by reference into a Smart Grid standard and owned by a

[17] This degree of leverage is over and above the market power leverage stemming from the incorporation of the patented technology into the standard. For an extended discussion of this point, see Carl Shapiro, *Injunctions, Hold-Up, and Patent Royalties* (August 2010), available at http://faculty.haas.berkeley.edu/shapiro/royalties.pdf.

[18] This additional leverage would be moderated by a requirement that patent owners cannot obtain an injunction against a potential licensor until after an objective third party, for example a court, has determined that the licensor has offered, and the prospective licensee has refused to take, a license to the patent on terms that are compliant with the licensor's obligations under the SDO's IP policy. See further discussion below.

participant in the creation of that standard must be made available for license under RAND or royalty-free terms.

b) With respect to standards developed under existing IPR policies that permit RAND licensing, the agencies of the USG involved in the development of Smart Grid should express the view that courts called upon to determine whether licensing terms comply with the RAND obligation should evaluate reasonableness:

   i) not in relation to the value of the entire device in which the patented technology is incorporated, but rather only with respect to that portion of the device's value comprised of the technology at issue,

   ii) based on the degree to which the patent is central to the standard, or alternatively is a feature whose exclusion from the standard would not result in a significant diminution of the value of the standard.,

   iii) based on the contribution that a particular patented technology makes to a standard in relation to other alternative technologies that were available at the time, recognizing that where there were alternative technologies available at the time, the technology chosen for incorporation has less value than it would have had it been the only available technology choice.

c) With respect to standards to be developed for the Smart Grid, the USG should express the view that IP policies should require that participants disclose any patent or patent application that they believe may be essential to implement a Smart Grid standard that is being developed. In addition, the USG should either/both encourage participants to make up-front disclosure of their not-to-exceed licensing terms[19] or limit participants that seek a reasonable royalty to licensing terms that reflect the inventive contribution the patented technology made relative to substitutes available at the time the standard was being developed.

d) With respect to standards to be developed for the Smart Grid, participants should voluntarily agree, both for themselves and on behalf of any successor in interest to

[19] The requirement that participants in standards development announce not-to-exceed licensing terms for patents they own that may become essential to implement a standard during the development of that standard has been recognized by US antitrust enforcement agencies to be pro-competitive. See Letter, Thomas O. Barnett to Robert A. Skitol (October 30, 2006) (Business Review Letter issued to VITA, a standards development organization that adopted a rule requiring participants in VITA standards development to state the most restrictive terms on which they would license patents they owned that became essential to implement VITA standards). As the Antitrust Division noted, "VITA's proposed patent policy is an attempt to preserve competition and thereby to avoid unreasonable patent licensing terms that might threaten the success of future standards and to avoid disputes over licensing terms that can delay adoption and implementation after standards are set." *Id.* at 10.

For the perspectives of the Antitrust Division and the Federal Trade Commission on the adoption by standards development organizations of rules permitting, encouraging, or requiring disclosure of licensing terms by participants in standards development, see U.S. Dep't of Justice and Fed. Trade Comm'n, ANTITRUST ENFORCEMENT AND INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION (2007) at 53-55 (available at http://www.justice.gov/atr/public/hearings/ip/222655.pdf)..

patents they own that are essential to implement a Smart Grid standard (when used in a Smart Grid application), not to seek to enjoin use of their patents until a prospective licensee has first refused a licensing offer that has been objectively determined to be reasonable.

e) With respect to standards to be developed for the Smart Grid, participants should voluntarily agree that

   i) with respect to patents or claims that the patent owner identified to the SDO as essential or at any time has claimed to be essential, patent owners will transfer patents only subject to an obligation (binding on the transferee) to comply with the SDO's licensing obligations applicable to the transferor, and

   ii) with respect to any other patents or claims, patent owners will notify any transferee of any essential patents of the transferor's commitment to grant licenses only on reasonable terms (as defined above) and of the transferor's agreement not to seek to enjoin any prospective licensee of a patent essential to implement a Smart Grid standard (and used for a Smart Grid application) until that licensee has first refused a licensing offer that has been objectively determined to be reasonable.

Cisco is proud to be part of an industry that has flourished in large measure because of the constructive role interoperability standards have played in the advancement of networking and the technology industry generally. We have also seen disputes regarding licensing terms frustrate the attainment of the goals that motivate our company's participation in standards development. As a company that is investing in Smart Grid, we believe that the adoption of the principles identified above will meaningfully advance the adoption of Smart Grid standards, and the development of products that implement those standards.