BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

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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 SIGMA DESIGNS, INC. PERTAINING TO THE PROPOSED POLICIES AND FINDINGS CONCERNING THE SMART GRID

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INTRODUCTION

Pursuant to the *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* ("Joint Ruling") issued February 8, 2010, Sigma Designs, Inc. respectfully submits these comments on issues identified in the Joint Ruling.

For your reference, Sigma Designs is a Milpitas, CA-based semiconductor company with deep expertise in smart energy, home connectivity and media processing. The company is active in many standards organizations including both ITU and IEEE and is active in the HomePNA, HomePlug, HomeGrid, and Z-Wave special interest groups.

Sigma's Z-Wave technology is the most popular Home Area Network (HAN) technology with over 8 million Energy Management and HAN devices in the field and over 350 interoperable, smart-ready devices – more than any other solution by far. These devices can be purchased in over 6,000 retail locations globally.

In addition, Sigma is a leading provider of Home Entertainment Networking (HEN) chipsets and is actively selling HomePNA (ITU standard G.9954), HomePlug and G.hn (ITU standard G.9960/G.9961). As a leading patent-holder in powerline communications, a company with over 13 million home network chips shipped, over 70 global service providers deploying its technology and over 140 engineers dedicated to home networking, Sigma is also an expert in home networking-related technologies.

We use this unique know-how to shape the enclosed suggestions.

COMMENTS

I: Set the Demarcation at the Edge of the Residence

Sigma Designs strongly encourages the California Public Utility Commission to follow the example set by the telecommunications industry wherein the utility is responsible for devices outside of the customer's premises and not responsible for devices inside the home (as outlined in 5.2). This "Demarcation Model" has proven to be highly effective. It has allowed for an exemplary level of compatibility and interoperability, fostered tremendous innovation, and enabled very low prices for consumers.

There are several reasons why separating the utility-owned infrastructure and the consumer-owned (Consumer Premises Equipment – CPE) infrastructure is good for utilities, ratepayers, and industry – all working toward the nationwide goal of better energy management.

There are seven reasons why this model benefits everyone involved:

1. **Enables Innovation.** Consumers are not uniform. Their needs, preferences and capabilities differ from user to user, region to region and home to home. By separating the consumer's home network (either home area network or home entertainment network) from the utility's network, industry will be better able to address each consumer's needs and situation. The network outside the home will be uniform. Within the home, it will be flexible enough to meet private needs, preferences, and budgets. This outside/inside demarcation point will foster competition and lead to greater choice and lower costs for ratepayers.

2. **Improves Performance.** Industry moves fast and consumer device lifecycles are 5-6 times faster than utility/meter lifecycles. In communications semiconductor sectors, each lifecycle tends to result in a doubling of price performance. Therefore, over the life of a single meter, the communications price/performance of consumer devices will have improved 30-60 times if left to normal market forces that are unencumbered by utility lifecycles.
3. **Mitigates Privacy Issues.** By segregating the aggregated, accumulated data collected by the smart meter from the disaggregated usage/behavior data generated by consumer-owned devices, the CPUC can avoid concerns about privacy and objections to outsider control of consumer-owned devices. Furthermore, this avoids legal issues about the jurisdiction of the CPUC dictating behavior of consumer-owned devices versus utility-owned devices.
4. **Increases Flexibility.** Each home is unique. There are structural/construction differences and technical variances across consumer-owned and utility-owned devices. The consumer will benefit from the innovation of industry to build unique solutions to meet these variances. For example, in some homes, wireless technology is perfect. In other homes, it doesn't work. In some homes, electrical interference makes some communications protocols more viable than others. By separating the distribution (including access) side from the consumer-side, the CPUC will allow for better-tailored solutions inside the home at lower prices for a broader number of California citizens.
5. **Simplifies the Grid.** Home networks are laden with traffic. The grid doesn't need to be. By separating the two networks, the CPUC can ensure only grid-relevant information is shared to the grid and utilities. This will ensure greater reliability and keep costs for managing and communicating this large amount of data in check.
6. **Clarifies Responsibility.** Home energy management services will be offered by a wide range of companies including telephone companies, cable companies, Internet service providers, alarm companies, retailers, device makers and electric utilities. Since consumers will purchase Smart Grid-enabled devices from a broad range of sources (including retailers), it will be difficult for the user to identify

who is responsible for ensuring uptime and performance of the network. By creating a demarcation at the edge of the house, the CPUC will protect the utility companies from being seen as responsible for the reliability of home area and home entertainment networks installed and managed by others. For example, imagine the challenges electric utilities would face if they had to provide technical support to ensure reliable performance of customer's WiFi networks.

7. **Improves Security.** Home area networks and home entertainment networks are often connected to the public Internet. Special care needs to be given to ensure that consumer's access to public networks does not compromise the Smart Grid. By establishing a demarcation between the consumer and utility devices, it is more likely that some form of "airlock" can be created to ensure the Smart Grid isn't compromised by hackers.

II: Resist Mandating Communications Protocols

Sigma Designs strongly encourages the California PUC to resist mandating specific communications protocols. There are several reasons why we believe it is not in the public interest for the CPUC to mandate specific standards or protocols at the PHYSICAL or MAC layer.

1. **Ensures Best-of-Breed Technology.** Technology lifecycles are faster than regulatory lifecycles. In the communications industry, price performance doubles every 18-24 months. Regulatory lifecycles are of similar length (or often longer). As a result, the utility will, at best be suggesting standards that are already obsolete by the time the regulation is put into place. By not setting specific protocols, the CPUC will continue to foster the innovation it desires in the Smart Grid arena.
2. **Gains Economies of Scale.** New standards are always emerging. Today, for example, both the ITU (International Telecommunication Union) and the IEEE (Institute of Electrical and Electronic Engineers) are establishing Smart Grid standards for global deployment. Neither of these organizations has finalized its

standard. Selecting a preferred protocol and restricting these future, global standards will reduce the ability for California ratepayers to benefit from efficiencies created by the global marketplace. Moreover, as these standards processes are continual (there will always be new standards), it is structurally impractical for the CPUC to determine a given standard is "the" standard the CPUC should select.

3. **Avoids Unnecessary Restrictions.** Industry is creative and flexible. The marketplace determines what consumers want and what companies need better than regulators. It is relatively easy to bridge between one technology to another. Therefore, specifying narrowly-defined protocols isn't necessary to achieve interoperability and the desired functions of the Smart Grid. For example, Sigma Designs already has solutions that bridge between Ethernet and HomePNA, Ethernet and HomePlug AV, Z-Wave to WiFi, and Z-Wave to ZigBee. In practice, what this means is that a home area network running Z-Wave can talk to a Smart Meter running ZigBee (or vice versa). It is relatively inexpensive to achieve and doesn't require regulation to accomplish.
4. **Reduces the Chances for Coexistence Problems.** Communications standards defined for the Smart Grid can impact performance of other communications technologies including telephony, Internet access and pay TV distribution. The CPUC is a regulator, not a comprehensive interoperability testing laboratory. By avoiding mandates, the CPUC will reduce the potential for inadvertently prescribing standards that interfere with other current or planned networks.
5. **Improves Cost Efficiency.** In addition to the cost benefits of global efficiencies and state-of-the-art standards stated above, there are other financial considerations. The CPUC is not as intimately aware of the subtleties of costing communications solutions. These subtleties include optimizing bandwidth, managing memory and defining error correction methods. Each of these (and more) can dramatically alter the price of a given technology. The CPUC is not well equipped to understand these choices nor is it able to make a "reasonable" judgment in regards to the optimal cost or value of a specific protocol. The market is. Service providers have the technical expertise and financial incentives to make

the optimization decision. Therefore, by avoiding specifying a single standard, the CPUC allows industry to choose the best technologies for their needs and those of the consumers.

6. **Increased Choice Increases Adoption**. The CPUC has defined the adoption rate as an important component of its responsibility. Limiting customer choice by standardizing on a single outdated protocol will reduce customer choice and demand. For example, if a consumer has an existing home area network (which millions do) and the CPUC requires them to replace this network with a network that matches the recommended protocol selected by the CPUC, the customer will be resistant to change. Yet, if the customer is allowed to use the technology they already have and simply add some mechanism to accept demand response signals, adoption could be much faster.
7. **Avoids Confusion**. The standards business is often messy and consumers can be left confused about what to buy. For example, HomePlug is not a single standard, but many incompatible standards. HomePlug 1.0, HomePlug Command and Control and HomePlug AV are all incompatible with one another. ZigBee has seven different flavors and most devices cannot interoperate with each other (even though the radio itself is uniform). How does the CPUC educate the consumer on which flavor of the standard to adopt? It is better for the CPUC to let the market sort this out.
8. **Ensures Greater Real-World Coexistence**. Many companies are contemplating entering the home energy management space – including pay TV service providers. These service providers already have home entertainment networks that can be leveraged to support Smart Grid communications within the home. They know the communications protocols they intend to use and they know what communications protocols will coexist or will kill their existing networks. If given the freedom to choose the communications protocol that best fits their needs, they are naturally very likely to choose those that will have the smallest negative impact on existing services deployed now and those to be deployed in the future.

III. Keep the Consumer at the Center to Ensure Faster Adoption

The challenge for the California PUC is to fairly balance the needs of the utilities and ratepayers while working towards the shared goal of smart energy management. The utilities desire the ability to better manage demand, and consumers desire better control over their consumption and payment. Yet today, the CPUC may be overly favoring the needs of utilities to the detriment of ratepayers. One example of this is the proposed CPUC mandates regarding consumer device behavior. Sigma Designs therefore recommends the CPUC resist mandating the behavior of consumer-owned (CPE) devices.

To increase the rate and pace of consumer compliance with the Smart Grid initiatives, the CPUC is advised to recognize:

1. Consumers are concerned about the CPUC mandating consumer devices automatically response without consumer control.
2. Consumers are fearful of outsider control over access to and use of devices within the consumer's possession. This especially true if the consumer cannot override such actions.
3. Consumers object to the automatic, unauthorized collection of device usage data which they consider private and solely their property.
4. Consumers want to remain in full control over what home appliances and devices they can use at any given period of time – even when a peak demand event occurs.

For example, during a peal load period, a consumer may be willing to pay a higher electrical fee in order to keep their air conditioner running in order to protect an aging family member whose health could be compromised if the utility shut off the air conditioner.

The question is can the CPUC deliver the demand response capability it desires without requiring consumers to abdicate control over their environments. Our belief is yes. Consumers want feedback and when they get effective feedback they tend to behave appropriately. For example, Prius car owners have been proven to drive differently than non-hybrid car owners. They receive better feedback about the implications of their behavior on their energy consumption and tend to drive in ways that reduce their costs. Homeowners are no different. They desire better feedback about consumption and rates. Consumption occurs inside the residence and therefore can be collected and presented to consumers from within the residence. It is unnecessary to share that information with the utility or transmitted it across the smart grid. Today, solutions are being developed that allow for ratepayers to see their energy consumption on their television set, on web portals and elsewhere. Consumers who see their actual use can and will adjust their behavior accordingly.

Moreover, as rate data is shared with consumers, they will be better able to see the cause and effect of their actions on their bill. Again, this data does not require automated real-time interaction between every consumer appliance and the smart grid (as is being proposed by the CPUC). Many consumers have wired and cellular networks that have established communications links to third parties including ISPs, telcos, alarm companies, device makers and pay TV service providers. It is possible for utilities to partner with these entities to deliver rate data to the consumer over these mechanisms and allow the consumer's applications to overlay their consumption data and rate data – all without having to disclose anything to the utility company or flow through the smart meter.

Utilities want to see changes in demand when they send a demand response signal to consumers. This is a reasonable objective. Yet, this requirement does not need to be so granular as to require each consumer appliance to speak directly to the utility. Today, Smart Meters aggregate the total energy demand for each given residential entity. Within a given period of time, the utilities today can determine the cumulative energy demand from that entity and determine to what degree that entity has shed power based upon the

utility's request. Thus, there doesn't appear to be any public interest in identifying or choosing which device within the home sheds the power – only that the total power was shed sufficiently. The ability to know the total load that was shed is already available with existing smart meters and any additional functionality will result in substantially higher costs across the entire system.

SUMMARY

Sigma Designs thanks the California Public Utility Commission for the opportunity to share our broad experience developing powerline and wireless network technologies for use in home energy management and entertainment networking. We encourage the commission to let the market decide what technologies are best suited for the home. The Internet is an excellent model of where light regulation combined with enormous potential has led to tremendous innovation and superior outcomes for consumers.

We encourage the CPUC to set the demarcation of the Smart Grid at the edge of the home, resist mandating specific protocols that will instantly be obsolete and expensive, and avoid the temptation to regulate all the way to the consumer's devices.

Thank you for your time and consideration of our comments.

Respectively submitted,

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PROOF OF SERVICE

I hereby certify that I have served a copy of COMMENTS OF SIGMA DESIGNS INC. PERTAINING TO PROPOSED POLICIES AND FINDINGS CONCERNING THE SMART GRID upon all known parties of record on the Service List for this proceeding. All parties have been served by email or first class mail, in accordance with Commission Rules.

Executed on April 7, 2010, Milpitas, CA.

/s/ Michael Weissman

Michael Weissman

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