November 14, 2005

Arthur H. Rosenfeld
Jackalyne Pfannenstiel
California Energy Commission
Office of the Commissioners
1516 Ninth Street
Sacramento, California 95814

Honorable Commissioners:

In response to your letters of February 25th and November 1st, 2005 to the OpenAMI Task Force we submit the following:

The OpenAMI Task Force is an industry-wide organization, comprised of utility, vendor, and individual members, whose primary mission is to foster enhanced functionality, lower costs and rapid customer adoption of advanced metering networks and demand response solutions.

By following well established technical specification development processes, the OpenAMI Task Force is creating a set of documents that will define open, standards-based information/data models, reference designs, component level interface definitions, security specifications, and interoperability specifications/guidelines for advanced metering networks and demand response solutions (AMI Systems).

At this stage of the specification development process, we have defined a recommended set of design principles and a minimum set of network and application level domains including the common interface boundaries for advanced metering networks and demand response solutions.

In response to the guidance you provided in your letter with respect to products, we recommend that you consider our "Design Principles" and "Domains & Interface Boundaries" specifications and their suitability to your stated requirements. We believe that there needs to be a common set of technical interoperability specifications available for use in AMI System implementations, and that a common network security infrastructure, based on leading open security standards, be available for use in all AMI Systems. We have attached both documents to this letter for your review and consideration with these two points in mind.

Presently, we are in the process of defining a set of use cases that will characterize how various utilities may implement AMI Systems. These AMI Use Cases, which describe the specific usage scenario's key functional requirements, serve as a basis for defining the various use case actors and their functional level interfaces, data elements and transactions. Identifying these common interfaces is crucial for defining interoperability specifications, and for identifying related security system components and services. Interoperability specifications lead to technology innovation, process improvements, lower component level costs, and rational upgrade paths.

We see our work as being a vehicle to bring, solicit, and entertain various opinions and views from the cadre of AMI stakeholders who are part of OpenAMI, and to gain majority agreement among these parties on the core requirements, interoperability specifications, and security issues and technical specifications for AMI Systems.

It is our view and charter that the use of open standards and enabling technologies is the basis to deliver services valuable to consumers, and to achieve operational benefits for utilities while enabling all to participate effectively in the current competitive market place.

OpenAMI is a volunteer organization with dedicated members representing key interested stakeholders including utilities with their requirements, vendors with their technologies and solutions, and customers with their information and control needs. We are working diligently to better articulate requirements for advanced metering and demand response solutions, validate potential new utility service offerings, and define advanced metering and utility networking specifications for distribution automation, grid reliability, and utility networking cyber security.

All utilities have significant investments in existing systems. Implementing a full deployment of advanced metering and demand response often entails significant business process, system and network level reengineering and is a major undertaking. By defining specific AMI System implementation standards, identifying component level interoperability, and using a leading open standards-based security infrastructure, utilities can begin building the foundation for deploying advanced metering and demand response.

Component level and vendor choice is a key requirement. In general, AMI implementations will be expected to collect information from the meter and other utility assets at the customer site, send control signals to consumer and utility devices, and present information relevant to the customer's energy management decisions. However, AMI Systems should permit utilities to make choices among different system level features and to deploy heterogeneous advanced networks.

Just as importantly, customers should have choices in the advanced metering and demand response system functionality that they are willing to contract for, including the timeliness and type of access to their usage data, rate and billing options, and other energy services. Utilities, vendors, and customers want to have the ability to quickly incorporate new technologies as they become cost effective, including various data delivery and presentation vehicles. One size does not fit all, the AMI reference design and interface standards must provide for these types of choices.

Security is a crucial element of AMI systems. OpenAMI is addressing some of the following questions and issues: How can we make solutions resilient to cyber attack? How do we assure ourselves we can quickly, forensically, diagnose an initiated attack? What standards and products will interoperate in this complex environment so that we can quantify our risk and response?

The real value of OpenAMI is to provide open standards-based specifications and guideline documents that can be used to fulfill the policy requirements outlined by regulators and the interoperability and security requirements defined by utilities.

In summary, as the utilities design and implement AMI Systems to achieve their specific goals and objectives, we believe that OpenAMI can help promote system interoperability and define a robust, scalable and open common security infrastructure for advanced metering and demand response. OpenAMI still has work to do to define our recommended specification documents for these systems, and we will continue our work to aggressively move the industry toward this goal.

Thank you for reaching out to us for our collective input and we welcome the opportunity to be of service to you.

Sincerely,

Ray Bell
Co-Chair OpenAMI

Kerry Evans
Co-Chair OpenAMI

Chris King
Co-Chair OpenAMI

Attachments

Advanced Metering Infrastructure with Demand Response, Design Principles, Version 1.0, March 1, 2005, OpenAMI Task Force

Advanced Metering Infrastructure with Demand Response, Minimum Domains & Interface Boundaries, Version 1.0, March 18, 2005, OpenAMI Task Force

Membership Position Record on Reply Letter Contents (Name/Company, Position & Comment)

Attachment #1

Advanced Metering Infrastructure with Demand Response

Design Principles[1]

Version 1.0, March 1, 2005

I. **Shareability:** Infrastructure's use of shared resources which offer economies of scale, minimize duplicative efforts, and if appropriately organized encourage the introduction of competing innovative solutions.

II. **Ubiquity:** Users can readily take advantage of the infrastructure and what it provides.

III. **Integrity:** The infrastructure operates at a high level of availability, performance and reliability.

IV. **Ease of use:** There are logical and consistent (preferably intuitive) rules and procedures for the infrastructure's use and management.

V. **Cost effectiveness:** The value provided is consistent with capital and operational cost.

VI. **Standards:** The elements of the infrastructure and the ways in which they interrelate are clearly defined, published, useful, open and stable over time.

VII. **Openness:** The infrastructure is available to all qualified entities on a nondiscriminatory basis.

VIII. **Security:** The infrastructure is protected against unauthorized access, interference with normal operation; it consistently implements information privacy and other security policies.

The OpenAMI Task Force recommends that these Design Principles may be used in evaluating Advanced Metering Infrastructures with Demand Response systems.

[1] *The OpenAMI Task Force having reviewed and discussed the broad system design principles, as developed in the CEC/PIER process and recorded in the CIEE/CEC Demand Response Demand Response Reference Design Report, dated 06/15/04, endorses and adopts the following Design Principles.*

Attachment #2

ADVANCED METERING INFRASTRUCTURE WITH DEMAND RESPONSE

MINIMUM DOMAINS & INTERFACE BOUNDARIES

Version 1.0

OpenAMI Task Force

March 18, 2005

November 14, 2005
Attachment #2

INTRODUCTION

The purpose of this document is to provide a high-level definition of the minimum set of Domains and Interface Boundaries within an advanced metering infrastructure with demand response.

The process to move from these high-level definitions to more detailed technical specifications is the development of AMI/DR Use Cases that explicitly characterize how various utilities may implement advanced metering infrastructures and demand response systems. The AMI/DR Use Cases, which express the end-to-end (utility to consumer) services or products that interact, are used to define the detailed functional level interfaces required in advanced metering infrastructures and demand response systems.

The AMI/DR Use Cases will produce a superset of detailed functional level interfaces. The technical definitions of these interfaces are the most critical aspect in defining the interoperability of systems. It is expected that the future AMI/DR Reference Design development work will refine the interfaces towards open standards that enable the ultimate goal of interoperability.

MINIMUM DOMAINS:

- Retail Energy User or their Agents
- Customer Premise Systems & Equipment (i.e., Smart TStat, RTUs, Sensors, Control & Actuators)
- Regulators (e.g., Power System Regulatory Oversight, Security & System Infrastructure Oversight)
- Independent System Operator (ISO)
- Load Serving Entities / Energy Service Providers (LSEs, ESPs)
- Utility Distribution Companies (IOUs, Munis, Co-Ops, Public Power, etc.)
- Utility Generation Provider (e.g., IOUs, Munis, Co-Ops, Public Power, etc.)
- Meter Service Companies (e.g., MSPs, MDMAs)
- Market Bid Generation Provider (e.g., IPPs, IOUs bid into market)
- Distributed Energy Resources (e.g., Pomerado Hospital, Qualcomm)
- AMI System
  - AMI Meter / AMI Service Point
  - AMI Network
  - UDC AMI System

DOMAIN — CORE APPLICATIONS:

Retail Energy User or their Agent

- Building Energy Management
- Appliance Control
- Load Control (shed / generate)

Utility Distribution Companies

- Billing
- CRM/CIS
- Distribution Operations
- Planning & Forecasting
- DER Operations
- Field Automation
- Metering
  - Meter Reading
  - Meter Lifecycle Management
  - Meter Read Data Warehouse
    - Data Collection & Processing
    - Data Retrieval & Publishing
    - Data Storage & Archive

Distributed Energy Resources

- Billing
- DER Operations

Regulators

- Oversight
- Compliance
- Rate Validation
- Security and System Analysis & Audit

CAISO

- Grid Management
- Price Calculation
- Dispatch
- Market Operations
- Emergency Control
- Planning & Forecasting

LSE / ESP

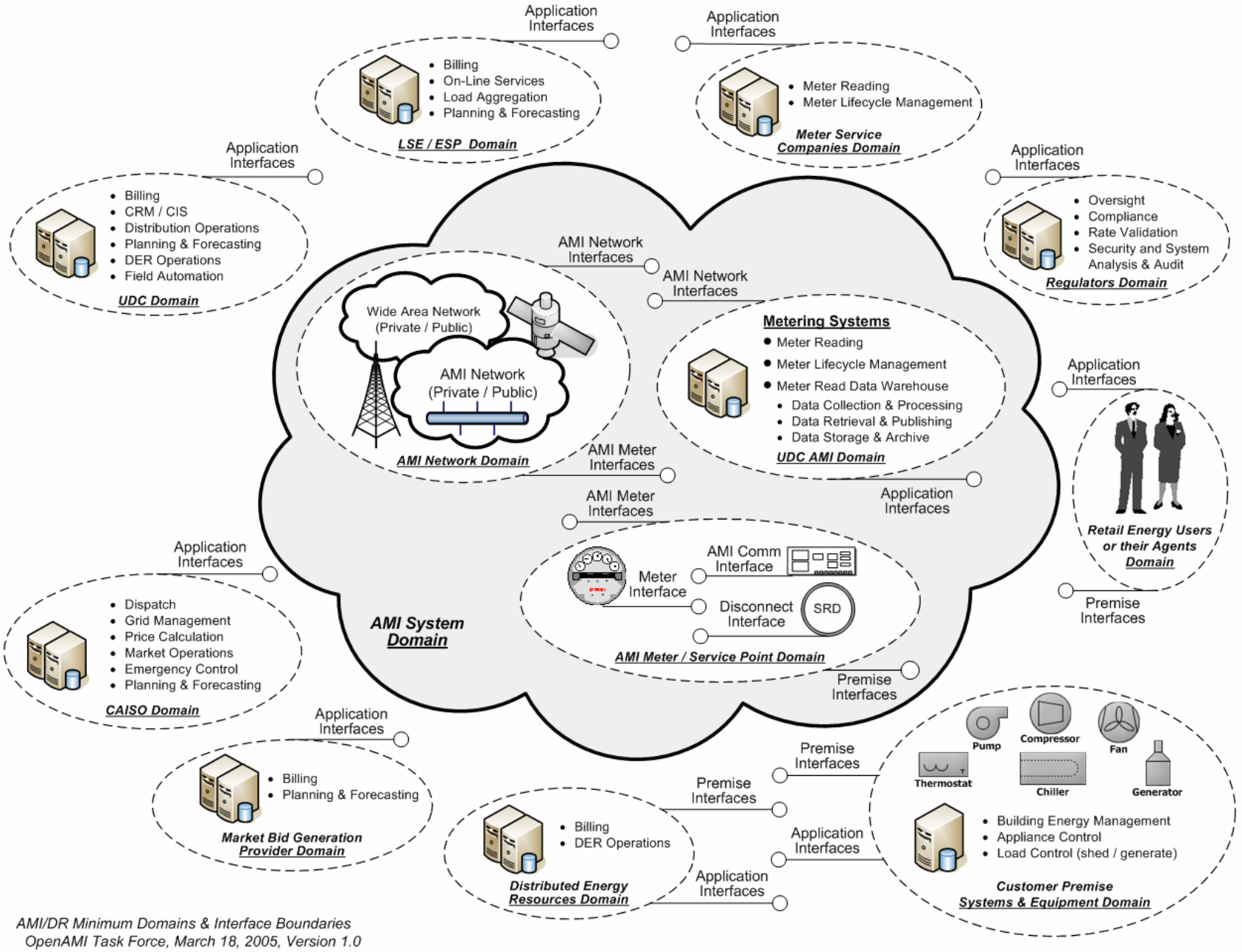
- Planning & Forecasting
- Load aggregation
- Billing
- On-line Services

Market Bid Generation Provider

- Billing
- Planning & Forecasting

Meter Service Companies

- Meter Reading
- Meter Lifecycle Management



AMI/DR Minimum Domains & Interface Boundaries
OpenAMI Task Force, March 18, 2005, Version 1.0

Attachment #3
Membership Position Record on OpenAMI Reply Letter Contents

Name/Company	Position on Contents	Comment
Kerry Evans, GE Energy	Agree with Contents	
Roger Levy, Levy Associates	Disagree with Contents	This letter serves no constructive purpose. Instead of fostering industry consensus and the advancement of technology, OpenAMI has succeeded in dividing the industry, with most utilities and major vendors on one side and a small group of vocal activists and emerging vendors on the other.
Chris King, eMeter	Disagree with Contents	I reluctantly vote against because 1) the majority of utilities voted against the content and 2) AMI is deeply divided and would become more so.
Robert Block, 3D Business Tools	Agree with Contents	
Gregory Ehlers, Invensys Controls	Agree with Contents	Debates over metering and demand side management features and functions have exposed differences of opinion that mask or dilute concerns over “open standards based” versus “proprietary and closed” solutions. Pushing this process to completion too quickly can result in misunderstandings generated by a lack of clarity in key areas. This could result in rework of installed systems or abandonment of the CEC’s Reference Design stated objectives.
Ward Camp, DCSI	Disagree with Contents	1) AMI is deeply divided. 2) Some of the most vocal drivers of this process ignore the IOU and other solution provider positions and especially cost/benefit concerns
Terry Mohn, San Diego Gas & Electric	Agree with Contents	This letter correctly describes the industry engaged in building standards and interfaces that may suit the utility customers. It is unfortunate OpenAMI couldn't completely articulate responses on all the commissioner's inquiries. However, we are encouraged by the progress OpenAMI has attained thus far.

Name/Company	Position on Contents	Comment
Mark McGranaghan, EPRI Solutions	Agree with Contents	The letter correctly states the current status of the OpenAMI efforts at working towards definition of minimum requirements for advanced metering infrastructures that will allow interoperability at different levels of the system and assure that systems achieve required levels of security and functionality.
Ray Bell, Silver Spring Networks	Agree with Contents	I do not believe that OpenAMI is "deeply divided", that its members' opinions were "ignored" nor that a "majority of its utility members voted against the contents of this reply letter" -- the records of the reply letter drafting are available online, and interested parties are encouraged to review them.
Gina Chung, Good Company Associates	Disagree with Contents	
Tom Tamarkin, USCL Corporation	Agree with Contents	OpenAMI is fully cognizant of the needs and wishes of the utilities in California. Although there may be an appearance of “deep division” in the group, this is only natural given the transformation in both technology and the ability to deliver new cost effective services, functionality, and products to both the consumer and utility, which simply were not cost effective in the infancy of AMR. OpenAMI should move rapidly on the technical work associated with the completion of the use cases and information and data models. I believe the CEC appreciates this work and will encourage progress on 21st century solutions consistent with the business needs of utilities and the consumer’s needs to better manage utility related expenses.
Prakash Menon, Convansys	Agree with Contents	
John Brett, Tantalus Systems	Disagree with Contents	A consensus was far from being achieved in the effort to draft this letter.
Ray Presgrave, California Integration Coordinators	Agree with Contents	I believe that to resist change is a natural reaction. I think that once trial beta testing of the system begins, and adjustments are made all parties will observe the benefits.

Name/Company	Position on Contents	Comment
Peter Roan, Peter Roan Holdings Pty	Agree with Contents	
Joe Hughes, EPRI	Agree with Contents	The letter identifies some of the key strategic issues for an open systems based user group
Paul DeMartini, Southern California Edison	Agree with Contents	The letter and preceding debate is a reflection of the industry, including vendors, utilities and consultants, in the midst of an evolution in the thinking about how AMI systems could/should interoperate and be secure. The timing of the letter certainly brought the differences in thought to the forefront, but this is an opportunity to more clearly discuss these perspectives in a constructive forum that is a goal of OpenAMI.
Patti Harper-Slaboszewicz, UtiliPoint International	Disagree with Contents	
David Herchko, Sensus Metering Systems	Disagree with Contents	
Dave Watson, Lawrence Berkeley National Lab	Agree with Contents	Two issues of utmost importance to minimize great financial risk to the ratepayers of CA: 1) Security/privacy 2) Remote upgradeability. Without “strong” encryption of meter data, odds are high that the following will occur within several years of deployment: The meter message format will be “cracked” and the decryption solution will be posted on the Internet. The occupancy schedules of millions of homes will become public, some will be burglarized. A class action lawsuit will required an upgrade of all meters to IT industry standards of strong encryption. Without remote upgradeability, physical replacement of all meters will be required. OpenAMI is a forum to define strong encryption and other important system attributes.
John Boosey, Indianapolis Power & Light Co.	Agree with Contents	

Name/Company	Position on Contents	Comment
Marc Keyes, Itron	Disagree with Contents	
Martin Metzger, TXU Electric Delivery	Disagree with Contents	TXU Electric Delivery believes that the requirements framework already established in California's demand response proceedings will allow each utility to proceed in a way to meet its individual requirements. We've observed that this letter is supported by less than 15% of the approximately 140 member organizations listed on the OpenAMI web site, and the number opposing was nearly as significant. We are disappointed that this letter is being delivered against our recommendation, and without the participation of even a simple majority of the membership.
Jeff Francetic, Landis+Gyr	Disagree with Contents	
Vicki Trees, Hunt Technologies	Abstain from Commenting	
Garry January, Elster Electricity	Disagree with Contents	
David Lentsch, Comverge	Disagree with Contents	
Conrad Eustis, Portland General Electric	Disagree with Contents	Portland General Electric disagrees with this letter to Policy makers for two reasons. 1) It does not provide useful feedback. Simply saying that standards are a good thing [very true] and we're working on them is not a letter that should be sent. PGE believes that the functional requirements created earlier provide sufficient direction, in the absence of standards, to move forward with AMI implementation, now, if utilities are prudent during implementation using existing 2-way AMI products. The benefits of demand response will be captured through two, largely independent, enabling technologies. First is the ability to process usage history (e.g. with interval data) after the occurrence of a high marginal price period that is not known in advance. The second enabling technology is a means to convey, in near real time, price information

		[control signals are a short term solution] to customers, and more importantly, electric-consuming appliances. Today's 2-way AMI solutions completely satisfy the first enabling technology, and they enable the second. However, without standards about how a utility or ESP will convey price to appliances that OEM's will build into their appliances, the cost-effective capture of demand response will be slow in arriving. PGE's second reason for disagreement on this letter is that a letter to policy makers must clarify the second enabling technology and should recommend seeking support from other States and Federal policy makers. A robust standard that can be adopted by the white goods OEMs is a daunting effort that will require the combined effort of both standards groups and policy makers. By implementing today's AMI solutions utilities can implement CPP programs and start the multi-year process of educating consumers about how they should operate their appliances during critical peak periods. But consumer control of appliances and the occasional opportunity to cost effectively add an automated control device to existing appliances will only capture a small fraction of the demand response possible when the second enabling technology arrives.