0 What: Standard Energy Usage Information (11.1.1)

0.1 Abstract:

Customers will benefit from energy usage information that enables them to make better decisions about energy use and take other actions consistent with the goals of Section 1301 of EISA. In particular, consumers could make better decisions about emerging energy conservation/efficiency applications, including whether to change DR plans, or to take specific actions now in anticipation of future DR events. Distributed energy resources (DER), including energy storage, make timely information more important; bidirectional energy flows will make it critical. Unfortunately, today there is limited provision to share energy (electricity and gas) usage information directly with the residential, commercial, and industrial consumer. There are two dimensions to energy usage that include information/data and the dialogue/interaction where all interactions are based on the same representation of data. There are two different audiences for the data, which include humans and machines. The data is limited to energy consumption and does not include firmware configuration management. Additionally, there are no provisions that would make it possible for consumers to delegate access to their meter information to third parties for value-added services. Energy sales and purchases, including the non-price attributes of that energy, are the basic components of transactional aspects of the Smart Grid. A common, shared understanding of each transaction is essential to realizing he anticipated benefits of the Smart Grid. This information is fundamental to innovation in the use and management of energy in the industrial, commercial building, and residential sectors. This PAP addresses the definition and standardization of this information.

0.2 Description:

Shared responsibility for balancing energy production and consumption requires shared access to information about energy markets and actual use. Price is a common abstraction for market conditions, including abundance, scarcity, and quality. Energy qualities include reliability, power quality and source (hydro-electric, wind, solar, coal …).

Sharing present information with the energy consumer makes energy use real in a way that after-the-fact billing never can. Customer-focused energy management is hindered by limited access to information and this, in turn, by the lack of information standards. National information standards will create worthwhile markets and automation of energy-use decisions. This automation will be a platform for innovation in energy use.

In the near future, energy source may be as important as energy price in influencing consumption decisions in some scenarios. Consumers may wish to make decisions based upon the energy source or to qualify for carbon credits. As these markets develop, the variability of product availability will increase, the complexity of decision-making will increase, and the value of products that personalize, visualize, and automate responsive energy use will grow.

The official recorder of market transactions is the meter. Information about consumption of energy can be provided from the meter, but is also available at other points such as energy delivery systems, such as the utility or aggregating service provider, and consumer devices[1].

[1] All communications with the meter must be limited or constrained to preclude any inappropriate interactions or effects on the underlying systems.

Well defined information models are essential to establish the basis for services and behaviors based on the content of these models.

It is anticipated that initial uses of this information model will come from the utility service provider to the consumer via the worldwide web, or public Internet, and approaches to accessing information directly from meters. However, as the Smart Grid develops, new opportunities will leverage real-time information on energy use and energy pricing. A robust model of such information should be invariant and scalable and extensible to the mechanism and timing of acquisition. Hence, this plan envisions development of such a flexible model as can be exposed via the communications standards in place in the home, business, distribution system, and enterprise.

Hence, this plan envisions development of such a flexible model as can be exposed via the communications standards in place in the residential, commercial, and industrial, distribution system, and enterprise.

This effort will overlap with and support information standards for load curtailment, load shaping, and energy market operations.

0.3 Objectives:

- Develop a summary of information needs for various means of customer information access about metering and billing.
- Develop short term plans for near-term customer access to usage data based upon today's installed meters.
- Develop composite information model that can be easily transformed without loss for transport via standards in OASIS, IEC61970/61968, IEC61850, ANSI C12.19/22, AHRAE 135, and ZigBee.
- Development and implement a plan to expedite harmonized standards development and adoption within the associated standards bodies.

0.4 Why:

Attempts at encouraging consumers of electricity to conserve are greatly assisted by providing feedback as to actual energy use. Energy consumers will more accurately respond to curtailment signals if they can track actual energy use while testing scenarios in advance. Consumers may need to observe actual usage at intervals shorter than are maintained within provider billing systems. Premises-based distributed energy resources will require transparent common metrics on both sides of the meter.

Today, curtailment and peak prices are computed and presented a limited number of times each year. As the proportion of alternative energy sources on the grid rises, and as more energy comes from intermittent sources, the desirable frequency and scale of these events will increase. New electric loads, such as electric vehicles, will increase the need for and benefits of coordinating electricity use and introduce new load characteristics and timing.

Shared access to live energy transactions, both usage and price, is an enabler of many aspects of the Smart Grid. A common information exchange model for usage, price, and other energy information would enable consumers, building-based systems, and third parties to collaborate with energy suppliers.

The Smart Grid anticipates new business models that will increase the importance of sharing energy usage information. Premises-based, distributed energy resources may change the net flow of energy from moment to moment. Retail resale of energy may be part of future green leases and plug-in electric vehicle (PEV) support.

There are many competing standards efforts already under way in this area. ANSI C12.19 (2008) has a new "decade"[2] that supports pricing information at the meter. The OASIS Energy Interoperability TC looks to build upon the California Energy Commission (CEC) OpenADR specification to create data and communications models for the interoperable exchange of dynamic price, reliability, and emergency signals as well as informationon on market participation and load predictability and generation. IEC 61850-7-420 has pricing and consumption models for use in distributed energy resources (DER). Without coordination, there will be multiple dissimilar standards and limited interoperability. Incompatible data models can result in information loss when translated or mapped between standard representations. Additionally, duplicative complexity will add to costs borne by consumers and providers of energy management services. Limited interoperability will hinder the development of markets impede innovation.

0.5 Where:

The energy transaction is the informational hand-off within and between adjacent domains in the Smart Grid, just as the meter is the hand-off within and between domains. Shared energy-transaction information is essential to interactions between:

- Distribution and the industrial, commercial, and home premise;
- The service provider and industrial, commercial, and home premises;
- Distributed energy resources and all other domains; and
- Plug-in electric vehicles.

0.6 Who:

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Stakeholder Leads

[2] ANSI C12.19 groups information available from the meter into "decades" of tables of detail on an individual subject area such as measurements, load profile, pricing, etc…

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0.7 How/When:

Task	Responsible	Date	Notes
OBJECTIVE 1: Develop a summary of information needs for various means of customer information access about metering and billing. Develop requirements as quickly as possible, then reach out to SDOs to vet them and look for harmonization.	UCAIug – OpenSG, Smart Grid Enterprise (Chris Knudsen)	October, 2009	6 months for requirements with UCAIug, map models (ADR, SEP) against CIM. OpenSG has done a lot of this. SGEnterprise is the lead group within OpenSG for consistent usage of information across different domains. All documents are open and free, but there is a membership/participation fee. Participation fee is $200 individual, $5k corporate. High vendor/utility participation ratio. October release is first complete draft of requirements. Requirements are close to complete and there is a document available for comment now. Issued under “Creative Commons License” (royalty free)
Reach out to ANSI C12, IEC (61850), ZigBee, and OASIS SDOs to get them formally involved in the existing UCAIug process as members of the “Tiger Team”	UCAIug – OpenSG, Smart Grid Enterprise	Immediate	Already have IEC, Zigbee, and some OASIS members that are part of the UCAIug. Need to get affirmative involvement of PAP target SDOs – OASIS, IEC 61850, IEC 61968, ANSI C12.19, ZigBee SEP 2
Have meeting in October with all the different stakeholders	NIST	October, 2009	NIST meeting to check on progress of this effort against PAP10.
Develop a statement of support for	UCAIug – OpenSG, Smart	Immediate	

extending their process to incorporate inclusion of additional stakeholders into their existing process.	Grid Enterprise		
OBJECTIVE 2: Develop short term plans for near-term customer access to usage data based upon today's installed meters.	UCAIug	January, 2010	Work to be done such that at least minimal definitions are stable at this date.
Manage under same ground rules as Objective 1 tasks.	UCAIug		
OBJECTIVE 3: Develop composite information model that can be easily transformed without loss for transport via standards in OASIS, IEC61970/61968, IEC61850, ANSI C12.19/22, AHRAE 135, and ZigBee SEP 2	UCAIug - OpenSG	January, 2010	There is some homework that needs to be done. 61850 being looked at to be put in UML. Don't have the details of this right now. The extended CIM is being developed with the WSDLs by January.
Manage under same ground rules as Objective 1 tasks.	UCAIug		
OBJECTIVE 4: Development and implement a plan to expedite harmonized standards development and adoption within the associated standards bodies.	TBD		Need to wait on this until requirements are defined and it has been discussed within the PAP10 group.
For each SDO and the PAP stakeholders, UCAIug will provide a	UCAIug	October, 2009	

proposed plan for conveying the result of Objective 3 to the SDOs – CIM, 61850, OASIS, ANSI C12.19, ZigBee SEP 2			