The Importance of the AEIC Guidelines v2.0

A whitepaper outlining the need for effective procurement, deployment and the operational requirements using the Standards, ANSI C12.18, ANSI C12.19, ANSI C12.21 & ANSI C12.22 and their use by adopting the AEIC Guidelines.

October 8, 2007

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The AEIC Implementation and Performance Guidelines, v2.0, is a Utility-generated framework and testing criteria for vendors and utilities who desire to implement Standards-based AMI (StandardAMI) as the choice for Advanced Metering Infrastructure (AMI) solutions.

Advanced metering is a metering system that records customer consumption [and possibly other parameters] hourly or more frequently and provides for daily or more frequent transmittal of measurements over a communication network to a central collection point[1]. AMI includes the communications hardware and software and associated systems and data management software that creates a network between advanced meters and utility business systems. This allows the collection and distribution of information to the utility, while also making it available to the utility's customers and other parties such as competitive retail providers[2].

StandardAMI leverages Standards to cost-effectively and rapidly deploy and operate AMI with existing infrastructure, while leveraging investments already made in the AMR network. StandardAMI is not a compromise. It offers the makings of interoperable end-to-end solutions to the utility. StandardAMI begins with Standard Meter Data Management services (MDM) and links through bi-directional (and uni-directional) Standard networks to reach Standard end-point-devices, which communicate using Standard Communication Modules (SCM). It is not "just about the meter."

A complete solution cannot and should not be implemented strictly based on a single Standard. This is because Standards are written piece-wise to fashion a comprehensive solution through collaboration among Standards. For that reason the industry utilizes (or should utilize) a suite of Standards as the means for addressing the totality of present and future AMI needs.

A suite of Standards, that address the specific needs of the utility industry, has been developed over the past 30 years. These Standards are traditionally collectively referred to as the "Utility Industry End Device Data Tables", thus giving the misleading impression that a solution can be provided through the deployment of one Standard that embodies Tables' technology in the meter (End Device). Furthermore, this has mistakenly led some to believe that interoperability among meters can be achieved simply by specifying values and extents of elements within Tables[3]. The reality is that ANSI C12.19 is the data model and it prescribes a collection of elements of information that may be stored in meters, relays, communication modules and data management systems. These are communicated, on the AMR side, using ANSI C12.22 (and/or ANSI C12.21 and/or ANSI C12.18) to address the totality of AMI requirements. Other specifications such as those provided by the World Wide Web Consortium (W3C) may collaborate with these Standards to provide interfaces to MDMs and Customer Information Systems (CIS).

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[1] U.S. Federal Energy Regulatory Commission (FERC).
[2] North American Electric Reliability Corporation (NERC).
[3] This is the underlying assumption placed into the AEIC Guidelines for Implementation of ANSI C12.19-1997. "Utility Industry End Device Data Tables", Version 1.0, 1998.

Looking back at history one cannot fail to observe the fact that our industry has gone through a number of cycles of interoperability[4].

1872 – 1934 No interoperability (62 Years).
1935 – 1975 interoperability – because of meter forms standards (40 Years).
1976 – 2007 Not interchangeable – because of the use of electronics and communication (31+ Years).
2008 – Interchangeable – When purchasing criteria will be made using Standards as a core requirements together with Implementation Guidelines as validation constraints.

Over the past 30 years, concluding in 2008, an ANSI/IEEE/MC suite of Standards are to be jointly published. It is important to note that the ANSI Standards are identical to the IEEE Standards (and to the Measurement Canada Specifications) because of the mutual memorandums of understanding (MOUs) that exist among the three organizations. These Standards are shown below:

ANSI	IEEE	MC	Standard Name	Draft/Revision
C12.18	P1701	MC1218	Protocol Specification for ANSI Type 2 Optical Port	R2006
C12.19	P1377	MC1219	Utility Industry End Device Data Tables	R2008
C12.21	P1702	MC1221	Protocol Specification for Telephone MODEM Communication	R2006
C12.22	P1703	MC1222	Protocol Specification for Interfacing to Data Communication Networks	D2008

However, Standards alone cannot provide for significant reduction in the proprietary elements found in most deployed systems. The use of Standards needs to be more central to the industry strategies and procurements. Significant industry knowledge has been embedded in the Standards over the last thirty years with no interchangeability. Standards are a product of consensus and compromise among stake holders with differing objectives. "*Without the utility pull there was no impetus for the vendors to comply. Having a standard is only half of the battle*"[5]. Communications, operations, security policies and technical infrastructure are requirements that need to be implemented consistently. The revised AEIC Guidelines v2.0 is an improved tool for reaching the goal of interoperability.

The AEIC Guidelines writers and the AEIC / EEI utility alliance members should recognize the fact (if not already) that utilities can realize significant capital cost savings through the competitive procurement of intelligent equipment using Standards and Open Systems, and through the avoidance of single vendor "lock-in"[6]. Version 2.0 of the AEIC guidelines provides a tool to utilities who desire to provide the impetus to vendors who need to produce Standards-base compliant solutions. The guidelines aim to[7]:

1. Reduce the complexity of meter reading through the reduction of variations in the implementation and interpretation of the ANSI C12.19 Tables and associated suite of Standards.
2. Establish a user's expectation for "best practices" for implementers of the Standards.
3. Provide definite interpretation, from a user's perspective, for terms and items that are missing, vaguely defined, or optionally supported by the Standards.
4. Provide implementation guidelines for the uniform definition, display, transportation and interpretation of legal unit of measure.
5. Provide performance guidelines and metrics for the efficient definition, display, transportation and interpretation of metering values.
6. Minimize the use of vendor specific and proprietary extensions, such as manufacturer tables.
7. Establish pass/fail testing and acceptance criteria for StandardAMI technologies.

[4] Autovation 2007, UtiliMetrics, Panel Discussion on Emerging Standards, Session 3H, Richard D. Tucker, Reno.
[5] Minutes of UtilityAMI Meeting, April 25, 2006.
[6] EPRI / CEC Technical Advisory Meeting, February 2006.
[7] Draft AEIC Implementation and Performance Guidelines for Implementation and Use of IEEE 1377/ANSI C12.19/MC12.19 Devices and Related Accessories, Version 2.0, December 4, 2006.

From a technical perspective it has been established that these Standards are mature, complete and able to address the rich set of StandardAMI requirements. Using them effectively will address the totality of your requirements starting with the MDMs all the way to end-point metering. These Standards contain the foundation and span needed to deliver the broadest set of AMI services including[8]: Demand Response, Time-based Pricing, Load Control, Remote Disconnect, Quality of Service, Reliability, Communication Security, Secured Audits, Secured Event Logs and calculation that are secured, validated and traceable to the source.

If you have any questions or comments, please feel free to contact any of the following:

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[8] Autovation 2007, UtiliMetrics, Pre-Symposium Course #10, "The Details of How ANSI/IEEE/MC Standards Address the Totality of Utility Industry Needs".