Advanced Metering: Overview

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What is Advanced Metering?

• Definition:
  – Advanced metering is a metering system that records customer consumption hourly or more frequently and that provides for daily or more frequent transmittal of measurements over a communication network to a central collection point

• Also known as Advanced Metering Infrastructure (AMI)
What is Advanced Metering?

- Advanced metering requires a fixed network that enables two-way data transfer.
- Communication technologies include:
  - Power-line carrier
  - Wireless
  - Broadband Over Powerlines
- Differs from Automated Metering Reading (AMR) because of the use of fixed networks and increased functionality:
  - AMR is typically one-way (meter reading)
  - AMR technologies include drive-by systems
FERC Staff Demand Response Reports

- Required by EPAct 2005 Section 1252(e)(3)
- 2006 FERC staff report issued August 2006
- 2007 FERC staff report issued September 2007
- Future staff reports:
  - Comprehensive reports every even year reports (e.g. 2008) that will include survey results
  - Informational reports every odd year based largely on publicly available information

Reports available at

Advanced Metering Penetration
By Region

Nationwide ~6%
Advanced Metering Penetration
By Ownership

Cooperative: 12.9%
Investor Owned: 5.7%
Municipal Marketing Authority: 2.0%
Municipal: 1.3%
Political Subdivision: 1.3%
Power Marketer: 0.5%
Federal: 0.4%
CSP: 0.3%
State: 0.1%
ISO: 0.0%
Advanced Metering Penetration
Top Ten States

Mainly Cooperatives
Advanced Metering Developments

- Interest and investment in advanced metering continues to gain momentum
- AMI functionality is increasing
  - Remote connect/disconnect and home-area network connectivity have been added to lists of specification in recent RFPs
- State activity increased
  - PURPA 1252(b)
  - AMI initiatives underway at several states
- Number of meters planned or installed increased nearly three-fold from 2005 to 2006
Advanced Metering Market Activity
Actual and Projected

Source: UtiliPoint International
Functions Provided by AMI

- ability to provide time-stamped interval data for each customer, at least hourly, but often as short an interval as 15 or 30 minutes,
- option of remote disconnect/connect for some or all meters,
- ability to remotely upgrade meter firmware
- ability to send messages to equipment in or around customer home to support demand response,
- positive notification of outage and restoration (promising both significant cost savings and customer service benefits),
- capability to remotely read meters on-demand,
- voltage flagging capability if voltage is outside of range configurable by utility,
- voltage interval reading capability at same interval as meter readings,
- tamper flagging capability,
- memory to store specified number of days of readings on meters (anywhere from 7 to 45 days, depending on the utility),
- support for some form of prepay metering,
- daily register reading of meters, often at midnight,
- inclusion of data warehousing systems -- seen as increasingly necessary to store large volumes of data gleaned from AMI and meter data management systems (MDM),
- tight integration with MDM into overall operations management systems -- with links to accounting, billing, reporting, outage management, and other operations systems, and
- ability to extend AMI and smart grids to multiple in-home appliances connected together as part of a home-area network (HAN).
Uses of AMI

- Enhanced Customer Service
- Tamper
- Load forecasting
- Power Quality Monitoring
- Outage Management
- Price Responsive Demand Response
- Remotely change metering parameters
- Asset Management
- Premise device/load control
- Reduce losses
- Remote connect/disconnect
- Other
- Pricing event notice
- Water/gas meter reads
- Pre-Pay Metering
Advanced Metering
Issues and Challenges

- Technical Obsolescence Concerns
- Deployment Decisions
- Interoperability and Open Standards
Implications for Demand Response

• Low advanced metering penetration presents a barrier to greater expansion of price responsive demand response
  – Particularly amongst mass market customers
  – Complicates measurement and wholesale settlement

• Benefits associated with demand response can improve advanced metering cost-effectiveness

• AMI implementation can also assist energy efficiency
  – Information on usage in near real-time provides valuable feedback that can encourage efficient consumption
  – If combined with time-based rates, peak consumption can be reduced – thereby reducing the need for new peaking capacity
State AMI Activity

• EPACT 1252 Proceedings Status Summary (as of July 2007)
  – States with Open EPACT 1252 Proceedings 27
  – States with Closed EPACT 1252 Proceedings 12
  – States Deciding to Adopt EPACT 1252 2
  – States Deciding not to Adopt EPACT 1252 11
  – States Deferring Decision to Adopt EPACT 1252 4
Questions?

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