

Regulator Guide to AMI and MDM

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What is AMI MDM?

- **AMI MDM is a forum for utilities, regulators, ISOs, consumer advocacy groups, vendors and consultants to discuss meter data management successes, problems, issues, interfaces and best practices.**
- **Current membership includes 41 voting members (including 13 regulatory members and 22 utility members), and 39 advisory members.**
- **AMI MDM has established a goal to provide assistance to regulators with useful and impartial information on Advanced Metering and Meter Data Management.**

AMI MDM Thanks Its Dedicated Sponsors!



Presentation Outline

- **EPACT 2005**
- **Description of AMI and MDM**
- **Why the sustained interest in AMI and MDM?**
- **Benefits of AMI and MDM**
- **Should regulators define AMI and MDM?**
 - ▲ **If not, then what should they do?**
- **Benefits → Requirements → Business model**

EPACT 2005 requirement*

- **State regulators are to conduct an investigation to consider whether their state should adopt one or both of the following standards:**
 - ▲ **Provide all retail electric customers with advanced metering (AMI)**
 - ▲ **Provide all electric retail electric customers with option of taking service under time-based rates**
- *Slides at end of presentation provide specific EPACT references**

What doesn't EPACT 2005 do?

- **It doesn't define advanced metering**
 - ▲ AMI MDM provides a description of advanced metering that may be useful
 - ▲ State regulators will need framework for considering advanced metering before issuing a decision
- **It doesn't specify how time-based rates should be designed**
- **It doesn't specify who should pay for advanced metering**
- **It doesn't address Meter Data Management (MDM).**
 - ▲ AMI MDM suggests that MDM should be considered along with advanced metering

AMI/MDM

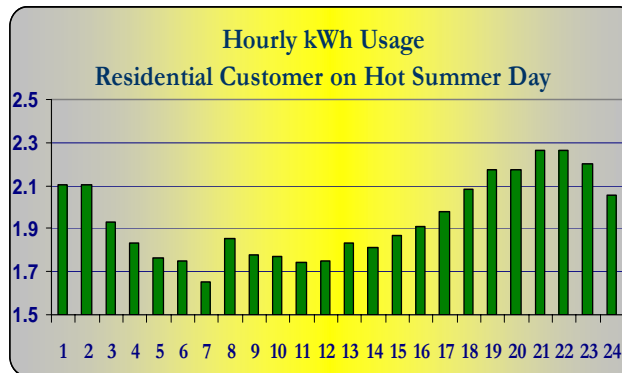
Description of AMI

**Advanced metering infrastructure (AMI)
is:**

**“A communication network and meters
providing interval usage (at least hourly)
and collected at least daily.”**

Key features:

- Provides hourly meter readings to utility every day on reliable basis
- May provide notification of outages
- May allow utility to read meter at any time



Key benefits:

- Lower costs
- Improves customer services
- Supports efficient operations
- Supports flexible pricing plans

AMI/MDM

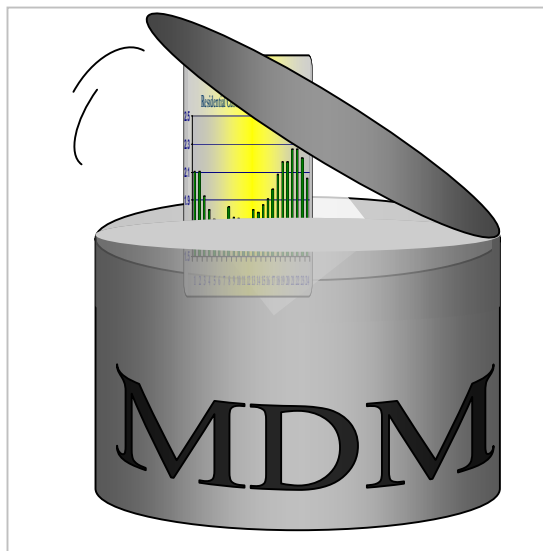
Description for MDM

Meter data management (MDM) is:

“A system to manage large volumes of data supplied by a variety of meter data collection methods.”

Key features:

- Persistent storage of meter data
- Interfaces to AMI/AMR networks
- Capable of validation and editing
- Interfaces to billing, outage management, other key systems



Key benefits:

- Provides different applications access to data
- Allows different applications to receive the same data in different ways.
- Buffers key utility systems from change
- Supports large rollouts

Why is there interest in AMI and MDM?

- **Utilities can achieve significant savings and improvements in customer service with AMI and MDM**
- **Commodity prices continue to rise –**
 - ▲ Time based rates and more effective information provide customers with tools to manage their bill
 - ▲ Supports price responsive demand response programs
- **Utilities can use AMI and MDM to recover from outages more quickly**
- **Utilities are learning how to use the additional information provided by AMI and MDM -- not just to read meters more efficiently -- but to change how they operate.**

Benefits to customers of AMI & MDM

Meter Reading and Customer Service

- **Meter Reading**
 - ▲ **Fewer Estimates – very hard to get right for residential customers**
 - **PPL (a large utility in Pennsylvania) reduced estimated bills from 4-6% per month to less than 1%**
 - ▲ **Utilities rarely needs to access property**
- **Customer Service**
 - ▲ **Easier to start/stop service**
 - **Use network to read meter any time**
 - ▲ **Customer service reps have more information to discuss billing problems**
 - ▲ **Customer bill date choice**
 - ▲ **Same billing period for multiple accounts**

Benefits to customers

Outages

- ▲ **Fewer outages and shorter outages when they do occur**
- ▲ **Utilities can detect outage without customer having to call**
- ▲ **Outages detected and extent determined faster**
 - **Utilities will be able to map extent of outage faster**
 - **Utilities will be able to provide better estimates of outage duration to customers**
- ▲ **Utilities can verify power has been restored to all customers in area before crews move on to next location**
 - **Utilities do not need to call customers (at 4 am) to verify power has been restored**

Benefits to customers

Rate designs, Demand Response, EMS, Lower costs

- **Retail rate options**
 - ▲ Greater flexibility in rate designs
 - ▲ Prepayment support
- **Increased opportunities for participation in demand response**
- **Information feed to energy management system (EMS) for larger customers**
- **Lower costs**
 - ▲ Lower line losses and theft
 - ▲ More efficient utility operations
 - ▲ Lower energy generation and/or procurement costs

Benefits to utilities

Extend from meter reading to operations

- **Meter Reading**
 - ▲ **Fewer estimates**
 - ▲ **Labor savings/lower costs for on-cycle reads and special reads**
- **Outage management**
 - ▲ **Restoration and detection**
 - ▲ **Single no-outage calls -- PG&E (large California utility) has estimated it makes 48,000 unnecessary truck rolls annually, and will save \$4.3 million each year with AMI for this benefit alone.**
- **Financial**
- **Load research**
- **Load forecasting**
- **Asset management**
 - ▲ **Transformer sizing – Ameren UE (large utility in Missouri) has saved \$2 million annually by reducing inventory costs and properly sizing transformers**
- **Value added services**
- **Data outputs**
- **Operations**

Benefits to regulators of AMI & MDM

- **Fewer complaints resulting from**
 - ▲ **Estimated bills**
 - ▲ **Incorrect bills**
 - ▲ **Waiting to start/stop service**
 - ▲ **Outages**
 - ▲ **Finding power out for extended time at vacation homes**
 - ▲ **Transformer failure leading to repeated outages**
 - ▲ **Utility handling of high bill inquiries**
 - **Interval data can help customer service reps explain how much energy was used as well as when it was used.**
 - **Can relate customer usage to weather, for example**
- **More accurate outage statistics**
- **Ability to support time-based rates**
 - ▲ **Provides additional options in face of rising commodity costs**

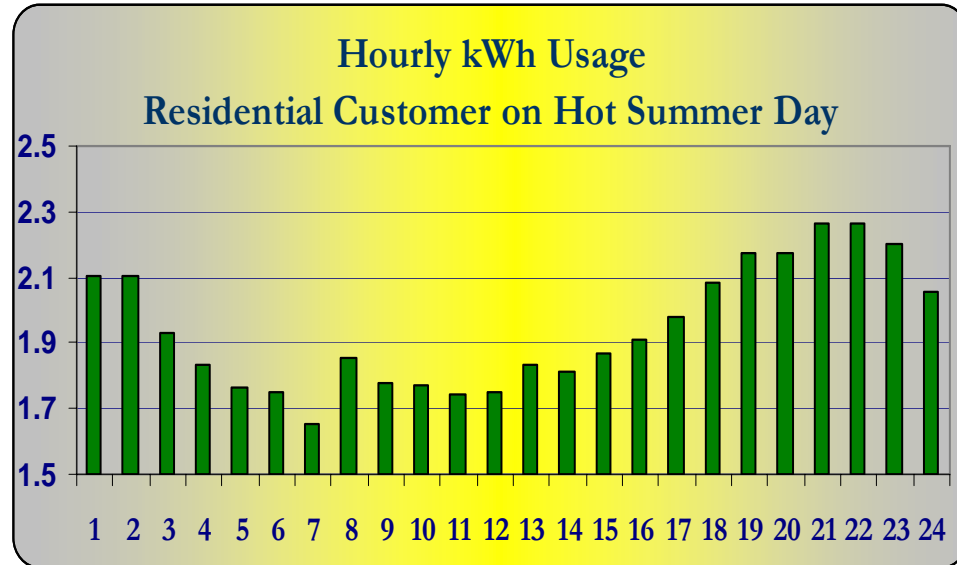
Benefits of interval data

In Customer Service

Interval data provides a wealth of information to customer service reps working with customers.

This is a profile of a hot summer day in July for an average residential customer in Pepco DC territory.

How can the consumer service rep help the customer using this profile?



1. Customer service rep may point out that Increased usage is likely to due to A/C usage. Customer could potentially save energy by raising thermostat 1 or 2 degrees.
2. If no one is home until 6 pm, more could be saved by installing smart thermostat.

Transformer Sizing

Interval data at all endpoints allows utilities to add up loads on distribution transformers, and to look for:

- **Transformers carrying loads above ratings at peak loads**
- **Percentage of hours transformers carry loads above ratings**

How does this save money and improve customer service?

- **Utilities can proactively replace transformers that are too small and are likely to fail on hot summer afternoons or cold winter mornings**
 - ▲ **Fewer outages**
 - ▲ **Replacement occurs as part of normal work schedules rather than emergency repairs**
- **Utilities can defer upgrading transformers unnecessarily**
 - ▲ **Utilities will know when loads are approaching limits**
- **Better manage stock and inventory of transformers**
- **Similar benefits apply to all distribution equipment from the distribution transformers all the way back to the substations**

Should regulators define AMI for utilities?

No!



Source: USA Today

What should regulators do?

- ▲ Start with benefits and business drivers
- ▲ Functional requirements for AMI and MDM will be based on benefits and business drivers
- ▲ If regulators and/or consumer advocates want a certain benefit, then include the benefit in the benefit list
- ▲ Allow utility to select best system(s) to meet the functional requirements

Regulators should communicate to utilities what benefits regulators are looking for

- **Example:**
 - ▲ If regulators want customer service reps to be able to obtain an on-demand read of the customer meter while customer is on the phone, then
 - ▲ AMI MDM framework will provide requirements of AMI and MDM to support the on-demand read
- If an on-demand read is not selected as a benefit, then the requirements needed only for the functional requirements for AMI and MDM
- Utilities can use the AMI MDM list of requirements as a guide for the development of their RFPs for AMI and MDM

On-Demand Read Requirements Provided by AMI MDM

- **AMI functional requirements:**
 - ▲ **AMI system must support on-demand reads, and return read to MDM system within **X** minutes of receiving the on-demand read request**

On-Demand Read Requirements Provided by AMI MDM

- **MDM functional requirements:**
 - ▲ **MDM system must support on-demand read request from Customer Information System (CIS)**
 - ▲ **Interface between MDM and CIS must be two-way**
 - ▲ **MDM must determine which AMI system (if any) to task with on-demand read request, forward on-demand read request to AMI system, keep CIS informed of progress of on-demand read, and forward on-demand read response to CIS when received**
 - **If on-demand read unavailable, provide most recent available read to CIS**
 - **Forward work request to fix network problem, if appropriate**
 - **If utility already aware of problem or meter is not connected to AMI network, then there is no need to forward work request**
 - **Follow-up on work request as configured by utility**

Benefits Drive Requirements

- **Benefits drives requirements**
- **Allows for flexibility across states and utilities**
 - ▲ **Not all utilities will have the same business drivers**
 - ▲ **For example, electric and water utilities will have different needs than electric and gas utilities**
 - ▲ **Utilities with college campuses or other areas where people frequently move may derive greater benefits from AMI than the average utility**
 - ▲ **Utilities serving owners of vacation properties may focus on outage detection more than utilities serving mainly urban populations**
 - ▲ **Regulators may have different ideas of how best to offer demand response opportunities to customers**
 - **Some regulators may support direct load control whereas others may focus more on price responsive demand response**

AMI MDM Framework Useful

- Provides understanding of roles of AMI and MDM
- Utilities/customers aren't paying for functionality they don't need
- Utilities and regulators will be aware of what is required to achieve any particular benefit
- Utilities have choice of AMI and MDM systems that meet their needs
- Requirements for AMI and MDM easily adapted to technology improvements and changes
- Benefits and business drivers can be added, modified or further delineated, to adapt to differences across utilities and to changes in AMI and MDM offerings, or utility needs

Benefits → Requirements → Business case

Step 1

- **Step 1 - Evaluate whether monies should be directed toward building a business case:**
 - ▲ **Identify benefits and business drivers**
 - ▲ **Use AMI MDM model to generate list of requirements linked to selected benefits and business drivers**
 - ▲ **Estimate costs of AMI and MDM systems satisfying requirements**
 - ▲ **Estimate value of benefits**

Benefits → Requirements → Business case

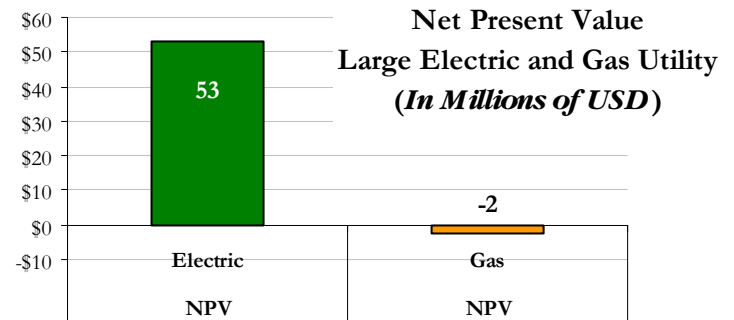
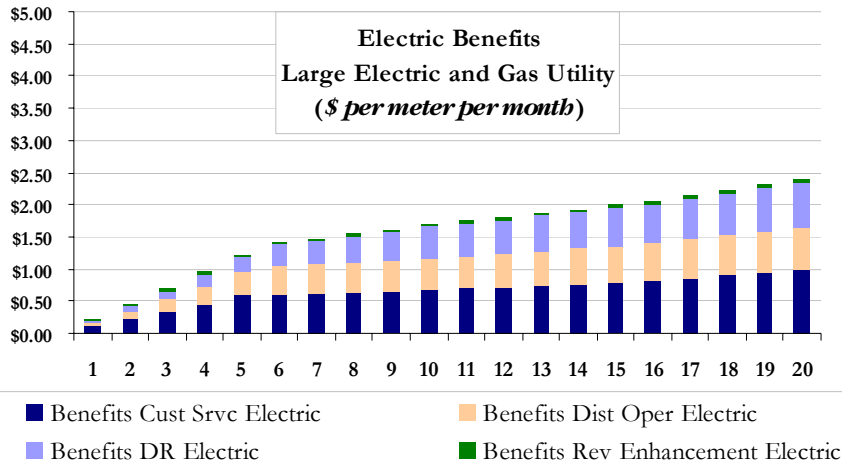
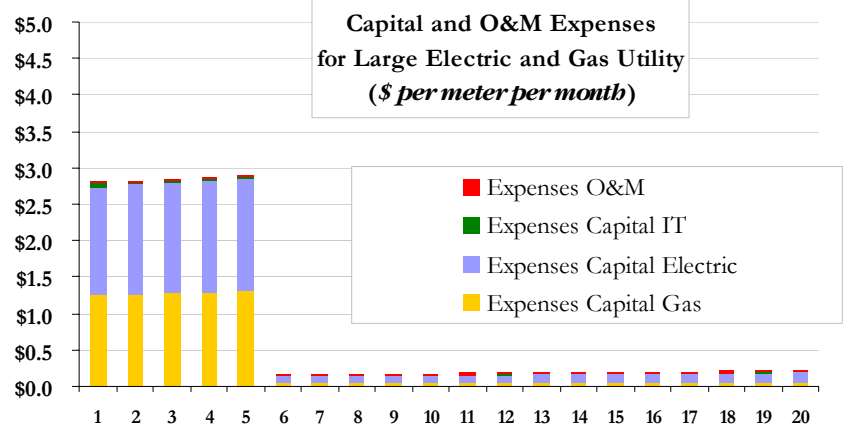
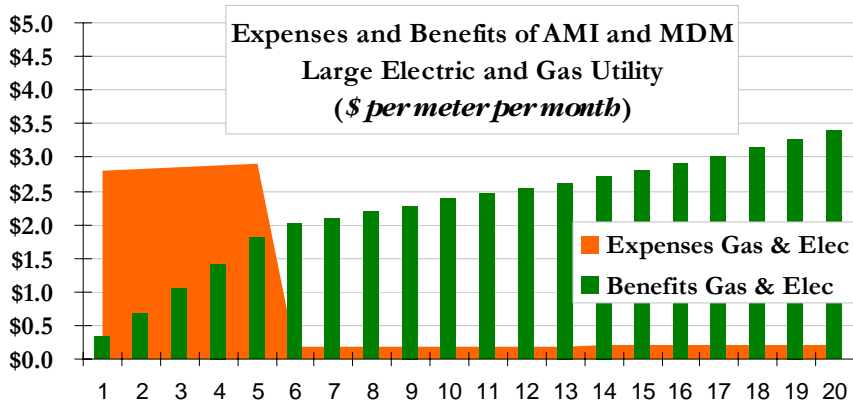
Step 2

- **Step 2 – Use model to assess initial business case for AMI and MDM**
 - ▲ McKinsey & Company has developed a “simple” business case model that is available at no charge at: www.xxx.com
 - ▲ The model is intended to assist utilities and public utility commissions (PUCs) in conducting a preliminary value assessment for the installation of AMI and MDM by providing an illustrative example model.

Preparing to use McKinsey & Company model

- **Model user will be responsible for supplying the estimated costs**
 - ▲ **Model is built to accommodate different types of AMI and MDM systems and allows for different ownership options**
 - ▲ **Model allows user to specify how the AMI system will be rolled out, and how MDM will be implemented**
- **Model user will be responsible for supplying the value of benefits**
 - ▲ **Model contains common benefits with default values**
 - ▲ **The default values are included to provide users with a framework for calculating the benefits**
- **Individual users should adapt their own approach to fit the unique organizational, operational, and financial considerations of their own situation**

McKinsey & Company model will allow users to generate charts of key financials*



*** Charts shown are illustrative, and will vary depending on how user configures the model.**

Purpose of McKinsey & Company model

- **The model is intended to provide a first look at AMI and MDM, and whether states or utilities should pursue further investigation. The model does not include:**
 - ▲ **Regional level financial analysis**
 - ▲ **Financial statement analysis**
 - ▲ **Regulatory financial analysis**
 - ▲ **Risk analysis**
 - ▲ **Investment portfolio analysis**
- **The model is useful for providing a consistent and impartial model for responding to EPACT 2005 across states and utility service territories. This model provides an option for regulators, utilities, and consumer advocates to discuss AMI and MDM across a broad range of costs and benefits/business drivers.**

AMI MDM Summary

- ***Benefits drive requirements***
 - ***Not all utilities/states/regions will select the same benefits, reflecting their different needs***
 - ***AMI MDM will provide model to link requirements to selected benefits/business drivers***
 - ***www.amimdm.com***
- ***Initial high-level business case model***
 - ***McKinsey & Company model allows utilities/regulators/consumer advocates to review initial business case for AMI***
 - ***Available at www.xxx.com***

EPACT 2005 Requirements

- **National Metering Standard** – Utilities must offer time-based rates within 18 months of enactment (August 8, 2005), or for large customers, capacity credits, along with a suitable meter to any customer requesting such rate, or demonstrate why compliance cannot be achieved
- **Competitive Retailers** – Customers of competitive retailers are entitled to receive the same
- **State Review** – States have 18 months to determine whether these requirements are appropriate

Role of State Investigations

- Responsibility is with the state regulatory agencies
- State investigation focuses on whether all customers served by regulated utilities should be provided with advanced metering to enhance their ability to participate in demand response
- Managing boards of non-regulated utilities subject to PURPA are also required to conduct investigations to consider adoption of the standards
- State investigations would cover whether *all* customers should have advanced metering, but utilities still responsible for providing metering to support time-based rates for any customer who requests service on a time-based rate

EPACT 2005 References to AMI

- “The time-based rate...shall enable the electric consumer to manage energy use and cost through advanced metering and communications technology...Each electric utility...shall provide...a time-based meter capable of enabling the utility and customer to offer and receive such rate, respectively.” (Sec. 1252)
- “time based meters and communications devices...which enable...customers to participate in time-based pricing rate schedules and other demand response programs” (Sec. 1252)
- “advanced meters or advanced metering devices that provide data at least daily and that measure at least hourly consumption of electricity” (Sec. 103)

Contacts and Questions



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