AMI DEPLOYMENTS AND ASSET MANAGEMENT READINESS

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Over the past 5 years or so, I have been speaking with many utility customers about experiences, challenges, and lessons learned from their AMI (Advanced Metering Infrastructure) deployment initiatives. The information presented below is representative of nearly one dozen utilities of varying sizes across the United States and Canada.

One of the main objectives of any AMI smart meter initiative is to provide customers with increased visibility, insight, control, and convenience. The AMI smart meter initiative fundamentally transforms the relationship a utility has with its customers by enabling them to become more self-aware of their energy usage in a more precise and granular manner than ever before. AMI provides customers with the information necessary to better manage their energy usage, control costs and ultimately the environment.
The assets involved in this endeavor expand well beyond meters. Your organization’s view of assets under management, and how best to manage and control them, will be paramount to the on-going realization of your investment. Metering technology has evolved rapidly over the last three decades or so, and most organizations have already embarked on their AMI deployments. Successful AMI deployments require a great deal of time, effort, planning, and resources from the utility to ensure a successful implementation. Sophisticated asset tracking is essential for the initial implementation and continued success of an AMI deployment. In a rapidly changing industry, your current asset tracking system must expand beyond the scope of more traditional meter attributes like amps/volts/phases, Kh/Kt…. AMI requires an expansion of these attributes to include a variety of new data points including program ID, various firmware versions (metrology, register, AMI module, and HAN), MAC address, ESN.....

The asset management system will need to continue to track the meters (Electric, Gas, and Water) from cradle to grave as well as all the network communication devices, additional sensors, dual protocol (ERT/AMI) communications and any other AMI related equipment.

Methane sensors are just one example of the new generation of devices enabled by AMI that a utility company may incorporate into their operations. Some utility companies are also adding street light sensors to their asset tracking systems. Most of these new asset types will need special handling and require additional testing to ensure they are operating at their optimal levels. Some may also have batteries that need to be tracked and replaced. Similarly, the AMI smart meters and communication devices require enhanced functional testing that goes well beyond the traditional standard accuracy test. Communication verification, remote service switch operation/position, and radio on/off are just a sample of the functional checks that are being coupled to the more traditional accuracy testing requirements. Your ability to record the steps taken and results for accuracy and functional testing will be required.
Preparing for the Work Ahead

The ability for the organization to deliver an AMI as a cohesive unit will require constant focus and direction from leadership. Naturally your external partners, like the meter installation vendor, will be one of the many hinge-pins. How will that vendor get notified that they will be receiving a drop-shipment from the utility or manufacturer? Even more important is to ensure they do not release quarantined meters into the field until after acceptance qualification levels have been successfully met. Most organizations also had to revisit their RMAs (return merchandise authorization) and rejected shipment process. From an IT perspective the follow highlights were called out

- Evaluate current company systems to determine the degree to which they are AMI ready. AMI devices are more technically advanced than legacy meters and have many additional parameters that are useful to track including program ID, firmware version(s), minutes on battery and replacement date.
- Determine which existing systems will need to be updated or replaced. Also determine if/how new systems will be integrated with existing systems or other new systems. Determine the sequence in which systems will be modified or added.
- Determine the system of record for the various data elements associated with AMI, billing, meter/network equipment deployment, asset management and inventory control.
• Consider that during and after implementation that your company will become more of a communications company with hundreds if not thousands of network communication devices that need to be monitored and maintained.

Delivering and Measuring Value

Before field deployment can take place it’s best to have a comprehensive understanding regarding what is currently in the field. You should already know the size and type of the electric and gas meters at each premise. Having this information will assist in helping field installers understand what equipment they need to load on their trucks each day. This also helps determine what needs to be ordered from each supplier. Make sure there is a mechanism to monitor stock levels and understand the relationship between that stock level, ‘burn rate’ and lead time for delivery to establish re-order points to be sure there are no interruptions in the deployment due to lack of equipment. Be sure to include time required for the AQL process before meters or other devices can be released to the field for installation. Your asset management system is critical in this area.

Negotiate with the meter installation vendor (MIV) up front to set limitations regarding the types of meters they can and can’t replace (CT / PT rated?, self-contained? etc…). A process needs to be put in place that allows utility field forces to address the various meters that cannot or will not be replaced by the MIV. That process and the timing of those replacements must be closely managed.
There also needs to be a detailed process for no access and opt out locations. When / if contracting out meter installations and retrofits, be certain to describe in detail what the vendor needs to do for conditions where they can’t install meters due to physical or other site issues and have a detailed plan for how these will be addressed. Don’t simply indicate in the RFP that a vendor needs to try access 5 times before returning the job to your company and believe that’s adequate. Include in the RFP that your company will use a QA process that randomly checks jobs returned by the MIV to be sure they are valid and also that there will be penalties for jobs returned in error. Have a plan in place to handle the large number of retired devices that will be coming back from the field. A refurbishment process could be considered for some devices and that may provide some financial benefit to the organization. Your asset management system should have efficient procedures that not only manage the retired and refurbished devices but also support mass retirement of these devices. When removing old mechanical meters make sure your MIV takes special care as these meters are susceptible to damage if not stored or transported correctly. Accuracy failures on retirement meters due to damage in shipment may be difficult to explain to your regulatory agency.

**Communications/Network Devices**

More art than science, placement of network communication devices is key to AMI system performance. Consider that the network characteristics may change with the season or when bushes or trees grow or get their leaves. Don’t be naive…. the technology selected may not be able to communicate with all meters in a cost effective manner and more than one method or technology may be
needed to communicate with EVERY meter. Cost will dictate on a meter by meter basis when an alternate communication technology may make sense.

When contracting with hardware providers consider placing an upper limit on network devices that your company will pay for. There could be a tendency during the RFP response process for the hardware provider to understate the quantity of network equipment necessary for your application to lower overall project cost. When selecting the winning vendor be sure to account for such practices. You may want to indicate that your utility will only pay for up to 10% additional devices to achieve the agreed to reading goals. Anything above that quantity is the full responsibility of the equipment vendor... hardware, installation and maintenance.

- Consider a program for backup battery replacement in network devices. This is not a short term issue, but eventually you will need to replace the battery. Your asset management system should be able to notify users when the batteries are approaching swap out date. Some systems can actually generate work orders when devices are approaching maintenance/compliance dates.
- Consider that much like computer equipment, network devices may need to be physically updated-refreshed during the term of the project. Be sure to include the cost and the effort involved for such a refresh in your AMI model.
- Be prepared for siting problems and issues. Opt out customers may object to network communication devices mounted too close to their homes. Have a Q and A booklet and/or outreach program that discusses the AMI technology characteristics and explain the effects of potential RF from meters and other communication devices.

One mistake to avoid if at all possible is installing a robust asset management system AFTER AMI deployment has begun. As an example, if the legacy system had no provisions for multiple firmware versions, then these versions would need to be tracked and recorded separately (spreadsheet) and then migrated to the new system when it has been installed. A better approach is to implement the new asset management system BEFORE AMI deployment begins so that all important parameters, attributes, and characteristics will have a home in the new database.
Realizing your investment

ISO 55000:2014 is an international standard covering the management of assets of any kind. It enables organizations to achieve their desired balance of cost risk and performance. Through effective control and governance, the realization of the investments made in your assets can be attained. ISO 55000 provides an ideal framework for the identification, understanding and integration of the many technical standards, codes, guidelines and best practices that affect the organization assets. I strongly advise that you read this document and decide how you are going to leverage the principles and good business practice they are recommending. Choosing the right asset and inventory management system for your organization will greatly assist in the overall management of AMI implementation and in the process help to meet the financial goals of the organization.

Biography

Paul Fratellone is the Director of Software Products for TESCO. His professional career began in the mid 1980s and has spanned multiple industries and domains. Paul’s perspective and passion are clearly rooted in ensuring teams provide value to the business and ultimately to end users. Knowing what is important to the customer is how Paul has quantitatively articulated the cost-risk-benefit equation of quality and performance.

If you have any questions, or are interested to learn more or schedule a demo, you can reach Paul directly at paul.fratellone@tescometering.com or 267-588-1418.