Strategic Metering

An Oracle White Paper
February 2008

Advanced Metering Infrastructure (AMI) helps utilities respond to a variety of emerging customer and community needs. But utilities may miss many of its benefits if they regard AMI as primarily an evolutionary step in consumption measurement.

AMI is, in fact, a data revolution with implications for virtually every utility department and function.

Utilities that permit metering or billing departments to control AMI design almost invariably discover that initial investments fail to provide optimal return on investment. In fact, without strategic executive leadership and involvement of all departments, utilities embarking on AMI risk near-term revenue loss, less-than-optimal service delivery, and long-term excessive IT costs that customers and communities may not tolerate.

ORACLE

Utilities realize an appropriate return on an Advanced Metering investment only when they view it from the top down—examining the potential benefits to all departments and all classes of customer.

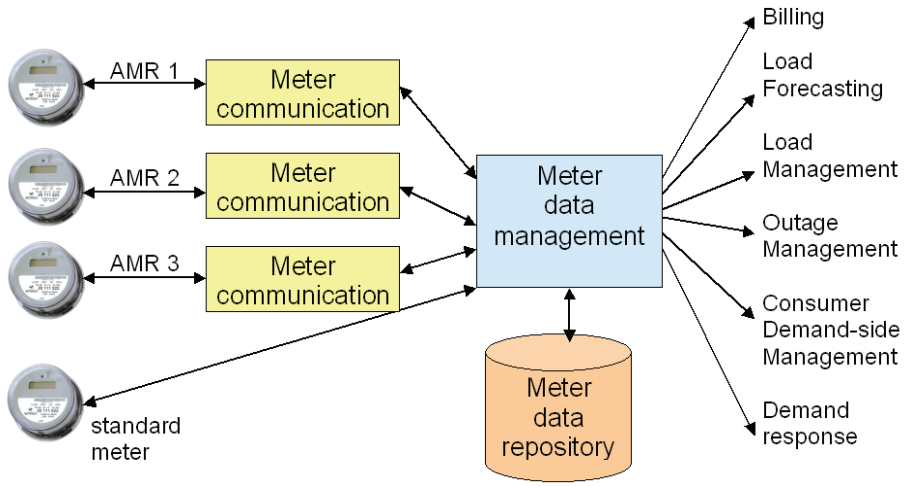
TRADITIONAL UTILITY METERING

Metering consumption of gas, water, and electricity has long been an important but routine utility function. It discourages waste and spreads system costs appropriately across the customer base.

The advent of Automated Meter Reading (AMR)[1] permitted utilities to automate meter reading. While helpful in reducing metering costs and speeding the meter-to-cash process, AMR is fundamentally a hardware-and-communications solution centered, appropriately, in the "meter shop."

ADVANCED METERING INFRASTRUCTURE

Today's approach to metering is evolving rapidly from AMR to Advanced Metering Infrastructure (AMI)[2]



AMI facilitates the movement of meter data across the organization.

[1] An alternative to human meter readers that permits utilities to receive reads from meters via radio frequency, satellite, or other forms of telecommunication.

[2] While there as yet no precise AMI definition, most agree that it involves:

- Two-way communication between the utility and the meter.
- Measurement that goes beyond a single consolidated quarterly or monthly consumption total. This paper focuses on use of AMI to collect interval-metering data.

The name itself appears to classify AMI as merely the next step in metering evolution.

It is not.

AMI can and should change the way most utility departments operate and the results of those operations.

AMI is a fundamentally different approach to utility operations. It can provide data quantity and quality that profoundly change utility revenue, customer interaction, and service delivery. It can revolutionize the way departments collaborate to complete essential business processes.

AMI DECISION-MAKING

Many utilities today have not yet recognized the strategic potential of AMI and the changes it will almost certainly bring. Lulled by its name, they have in many cases permitted initial consideration of AMI to occur in metering departments that historically have handled meters and AMR.

In some cases, metering managers prove to be outstanding strategists who recognize the revolutionary nature of AMI. They escalate discussions to include colleagues and executives across the utility.

Customers, investors, public officials, and other stakeholders understandably object to limited AMI initiatives that fail to extract full benefits from heavy investments in new technologies.

When that does not occur—when AMI remains a metering rather than an executive issue—utilities risk losing many of AMI's financial and customers service benefits. They risk spending considerable sums on AMI approaches that must, in relatively short order, be decommissioned and replaced—approaches that reduce profits and garner stakeholder ire.

Executive guidance can ensure that business cases include benefits across the utility, presented in realistic terms. While lower-level teams may have information that permits only focus on Day One system deliverables, executives are positioned to point out the contributions AMI may make to long-term utility goals. Including Day Two and Day Three benefits in business plans makes them far stronger. Executives may also be privy to information indicating that some Day One benefits cannot be realized in a short timeframe—or possibly ever. Sharing this type of information with lower-level teams can help them shape realistic proposals and avoid spending time developing elaborate scenarios based on incorrect assumptions.

STRATEGIC METERING REVOLUTIONIZES UTILITY REVENUE AND SERVICE POTENTIAL

Strategically evaluated and deployed, AMI can deliver a wide variety of benefits to utilities.

The Financial Revolution

- Significantly speed cash flow and associated earnings on revenue.

  AMI permits utilities to read meters and send the data directly to the billing application. Bills go out immediately, cutting days off the meter-to-cash cycle.

Using AMI to enhance revenue can speed investment in vital infrastructure repairs and extensions.

AMI offers a particularly high return on investment in processing final bills. Customers can request disconnects as the moving van pulls away. AMI polls the meter and gives the customer the amount of the final bill. On-line or credit-card payments turn final-bill collections from a matter of weeks to a matter of seconds.

- Reduce bad debt.

  AMI helps prevent bad debt by facilitating the use of prepayment meters. It also reduces the size of overdue bills by enabling remote disconnects; there's no need to wait for crew availability.

The Cost Revolution

- Slash the cost to connect and disconnect customers.

  AMI can virtually eliminate the costs of field crews and vehicles previously required to change service from the old to the new residents of a metered property.

- Reduce contact center costs.

  AMI provides customer representatives with the solid information they need to resolve high-bill complaints during the first call. It also dramatically reduces the calls associated with estimated bills. Some utilities have reported a 40 percent call reduction that can translate into a near-term end to overtime and a longer-term reduction in staff.

- Lower insurance and legal costs.

  Field crew insurance costs are high. They are even higher for those subject to stress and injury while disconnecting customers with past-due bills.

  Remote disconnects lower these costs. They also reduce medical leave, disability pay, and compensation claims. Remote disconnects also significantly cut the number of days employees and lawyers spend on perpetrator prosecutions and attempts to recoup damages.

- Cut the costs of managing vegetation.

  AMI can pinpoint blink-outs, reducing the cost of unnecessary tree trimming.

Including potential cost reductions from every department helps solidify the AMI business case.

- Reduce grid-related capital expenses

  With AMI, network managers can analyze and improve block-by-block power flows. Distribution planners can better size transformers. Engineers can identify and resolve bottlenecks and other inefficiencies.

  Results include increased throughput and reductions in grid over-building.

- Shave supply costs.

  Supply managers use interval data to fine-tune supply portfolios. More closely matching procurement and delivery reduces supply costs.

- Cut fuel costs.

  Many utility service calls are "false alarms." Checking meter status before dispatching crews prevents many unnecessary "truck rolls."

- Reduce theft.

  AMI can identify illegal attempts to reconnect meters or to use energy and water in supposedly vacant premises. It can also detect theft by comparing flows through a valve or transformer with billed consumption.

The Compliance Revolution

- Ensure contract compliance.

  Gas utilities can use one-hour interval meters to monitor compliance from interruptible ("non-core") customers and levy fines against contract violators.

- Ensure regulatory compliance.

  Water companies use AMI to ensure customers are complying with temporary use restrictions.

Customers are far more willing to comply with regulations when they know that AMI will monitor and report violations.

The Service Revolution

- Identify outages more quickly.

  AMI helps utilities pinpoint outages and nested outage locations. It also permits utilities to ensure outage resolution at every meter location.

- Size outages more accurately.

  AMI lets utilities dispatch crews that have the skills needed, in appropriate numbers.

- Provide updates on outage location and expected duration.

  AMI helps call centers inform customers about the timing of service restoration. It also facilitates display of outage maps for customer and public-service use.

- Detect voltage fluctuations.

  AMI meters o gather and report voltage data. Customer satisfaction rises with rapid resolution of voltage issues.

- Permit customer outreach

By monitoring consumption over time, utilities can identify customers with unusually high monthly or weekly charges and contact them before they receive a bill that might otherwise surprise and dismay them.

Some customers, of course, will be expecting a high bill because of unusual circumstances. For those who are not, the utility caller may recommend ways to conserve or suggest bill-payment alternatives like budgets.

Monitoring and notification—which may be restricted to only those customers who authorize it—help customers find and reduce causes of over-consumption immediately; there's no waiting for bills in the mail before they even understand there is a problem. Utilities benefit not just through improved customer relations but also through limiting the size of bills from customers who might struggle to pay them.

- Help business analyze consumption.

  There is no end to the ways AMI helps both small and large businesses control energy costs. Multi-premise customers, for instance, appreciate having all meters read on the same day so that they can more easily compare consumption at various sites. AMI can help customers in competitive regions choose suppliers with particularly suitable pricing. The process of implementing AMI frequently uncovers electrical problems that can be resolved through maintenance—without the problems of fires of accidents.

The New-Business Revolution

Some utilities offer services outside commodity delivery. For these, AMI offers options to further enhance return on investment.

- Monitoring properties.

  Landlords reduce costs of vacant properties when utilities notify them of unexpected energy or water consumption. Utilities can perform similar services for owners of vacation properties or the adult children of aging parents.

- Monitoring equipment.

  Power-use patterns can reveal a need for equipment maintenance. AMI permits utilities to alert owners or managers to a need for maintenance or replacement.

- Facilitating home and small-business networks.

  AMI can provide a gateway to equipment networks that automate control or permit owners remote equipment access. AMI also facilitates net metering, offering some utilities a path toward involvement in small-scale solar or wind generation.

The Environmental Revolution

Concern about climate change and supply shortages provide powerful incentives for AMI-based conservation programs.

Many AMI benefits listed above have obvious environmental benefits. When AMI lowers a utility's fuel consumption or slows grid expansion, cleaner air and preserved landscape result.

AMI also facilitates conservation through:

- Leak detection.

  When interval reads identify premises where water or gas consumption never drops to zero, leaks are the obvious culprit.

- Demand response / critical peak pricing.

  Demand response encourages more complete use of existing base power. Used with critical peak pricing, it also reduces peak usage, lowering needs for new generators and transmission corridors.

- Load control.

  With the consent of the owner, AMI permits utilities or other third parties to reduce energy use inside a home or office under defined circumstances.

AMI DESIGN CONSIDERATIONS

AMI design must respond to every department's data needs.

The heart of an AMI system is data.

The only way to get maximum value from AMI is to assess, at the outset:

- If and how every organization within the utility can use AMI data.
- The best ways to process that data.
- How and in what form to move that data from meter to utility organization.
- How various departments can benefit from modifying business processes to take advantage of AMI. Field crews can use AMI to check meter function. Credit and collections departments will want to take advantage of AMI theft-detection and remote disconnect features.

Assessment prevents under-designed AMI that delivers only a subset of potential benefits. It reduces the risk that future unplanned expansions will entail excessive costs and long-term inefficiencies.

Problems in Bottom-Up Design

Utilities that begin with a limited vision of AMI's potential—a residential demand response program, for instance—typically discover that their initial design has:

- Destroyed the ability to use data for new purposes.

  A common error in AMI design involves use of meters that process raw data and report only consolidated figures.

The attraction of such meters is obvious. They solve one of the most difficult issues in AMI: the sudden and staggering increase in the quantity of data utilities must handle.[3]

Unfortunately, preprocessing can destroy the value of the data for many other purposes, including grid analysis and portfolio refinement.

AMI is costly. Failure to plan increases that cost exponentially.

- Failed to provide for the long-term data storage vital to customer, portfolio, and grid analysis.

  Far too many utilities have embarked on AMI by storing data in the billing system and then purging it after 90 days. Data worth millions of dollars simply evaporates.

- Assigned tasks to applications unable to perform them efficiently

  Bottom-up AMI planning may, for instance, use the billing system to store interval data. But even billing systems that can handle the volume are unlikely to store it in ways most useful to outage or mobile workforce applications. Fewer still can provide portfolios and grid analysts with prompt and efficient data access. And the struggle to do so may significantly slow bill processing, placing a utility's financial integrity at risk.

- Launched the utility on a series of unplanned, overlapping, and costly application replacements.

  A utility focused on demand response may select a meter data management system that preprocesses and stores the data for the billing system. There is no guarantee, however, will be the best choice for other needs such as supplying data to the mobile workforce or outage system. To respond to emerging needs, utilities may face a choice between two costly alternatives: customize the current application and create new integrations or replace the system.

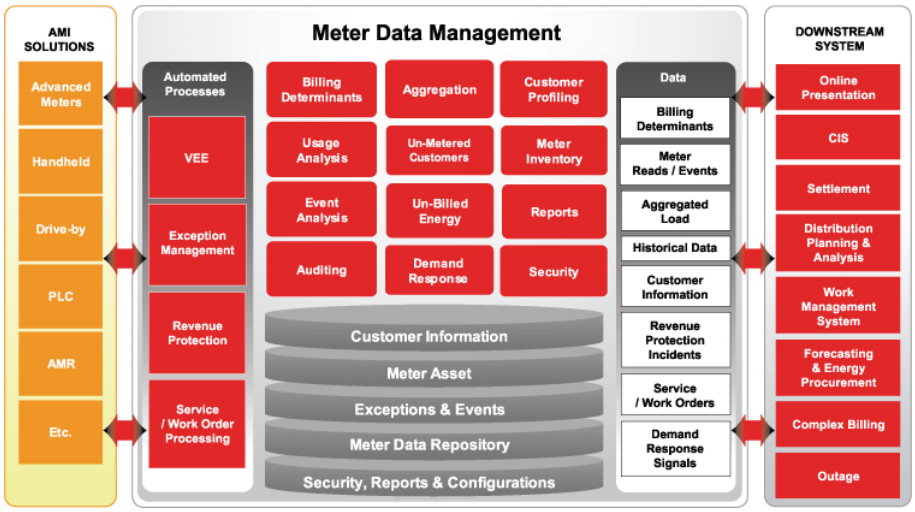
Best Practices in Top-Down Design

Most successful AMI designs revolve around a meter data management system with flexible communications and data processing functions and full integration to other applications.

The litany of problems above can be readily avoided through top-down planning that:

- Brings all parties to the table for initial discussions and agreements.
- Provides for collection and storage of all customer data.
- Ensures equal access to data by all departments. Most utilities will ultimately choose a separate meter data management (MDM) application for this purpose.

[3] Hourly interval reads, for instance, mean at least 720 records per customer per month rather than just one.



Meter Data Management typically encompasses a number of related functions.

- Chooses an MDM that, at a minimum, uses industry standards for easy integration with other applications. Far better are MDMs pre-integrated with other mission-critical applications whose vendors agree to maintain those integrations—at no or low cost—throughout future application upgrades.
- Examines and plans replacements for current applications in light of emerging customer, regulatory, community, financial, and environmental demands.

CONCLUSION

Utility missions are changing. Yesterday, they focused on delivery of reasonably priced energy and water. Tomorrow, they will encompass both supplies and the services that facilitate sustainable use.

Complicating this mission revolution are such challenges as growing populations, escalating commodity costs, and rising standards of living that increase per-capita demand.

Few utilities can hope to address these changes with the legacy applications and data design structures currently in place. AMI is a future certainty. But the pressure to keep costs low continues.

Long-term, strategic technology planning, led from the top, is the only way to control the cost of change. When CEOs lead initiatives like AMI, the results help ease all stakeholders into emerging energy and water realities.

Strategic Metering
Febuary 2008

Oracle Corporation
World Headquarters
500 Oracle Parkway
Redwood Shores, CA 94065
U.S.A.

Worldwide Inquiries:
Phone: +1.650.506.7000
Fax: +1.650.506.7200
oracle.com