Advanced Metering Infrastructure Special Report

A PLANNING GUIDE FOR AMI

How to manage the metering selection process.

By Ivo Steklac and Andrew Trump

Selection of an advanced metering infrastructure (AMI) system is a complex process. It requires a competent team with a wide range of expertise and skills including business process, project management, finance, and information technology (IT). To navigate the challenging landscape of customers, regulators, and executive management, the team also needs adept marketing and political skills. The selection process takes considerable time, goes through distinct phases, and is subject to outside influences that will interrupt progress.

Furthermore, selection strategies range widely depending on company needs. Some utilities may issue a narrow solicitation for a specific technology, whereas other utilities may look more broadly at a full turnkey AMI solution that includes installation, system integration, project management, and a variety of contracting options. In any event, the selection process must address the following success factors to avoid the risks of poor choices, ruined budgets, and failed implementation:

- Formulate an effective AMI strategy;
- Include the right skill sets on the AMI team;
- Rigorously identify AMI benefits;
- Create a business case framework;
- Collect and consolidate AMI requirements;
- Evaluate business-structure options;
- Establish vendor selection criteria; and
- Consider a pilot or field test.

Formulate an Effective AMI Strategy

AMI is sufficiently complex that it requires a well-defined strategy to maintain executive, internal, and external stakeholder support. A well-defined strategy provides the "rules of the game" so that all participants—players, referees, and spectators—readily understand what is allowed, how the game can be won, and when the players are in or out of bounds.

Companies must be prepared both to wade into a thicket of complex issues that can touch nearly all areas of the utility operations, and to identify early on the team's biases. These often include an inordinate emphasis on technology, the casual treatment of the benefits case, and the creation of technical requirements directly from a list of benefits (versus carefully mapping benefits to functional requirements).

It is important to assemble a skilled, cross-functional team with a strong leader, a clear team charter, and unwavering executive sponsorship. Recognize that there are distinct phases of this process including strategy, benefits quantification, business process and technology gaps identification, requirements development, solicitation and evaluation, and contract negotiations.

Not to mention, prepare a plan and budget, identify the contingencies, and then work to meet the plan within these parameters. Of critical importance (and often overlooked) are strong methodologies for project, quality, and risk management, as well as techniques and tools to design the process and keep it on track, on budget, and on time.

The Right Skill Sets on the AMI Team

AMI can affect, and be affected by, almost every operational area of the utility business. This broad reach needs the stewardship and guidance of a cross functional team of business and technology experts.

The recommended cross-functional AMI team is composed of five to six people at the core, with other subject matter experts engaged as the project progress throughout its phases. Table 1 summarizes the resource expertise required by project phase. Most subject matter experts are *ad hoc* resources that remain in their "day jobs" while also handling the needs of the AMI initiative. Careful scheduling of *ad hoc* resource availability is paramount to ensuring a smooth process. Yet, be prepared for internal and external influences to affect priorities and work demands; plan for the inevitable with contingencies.

What is the role of consultants? On the positive side, augmenting your team with outside experience can accelerate the process greatly, keep the team up to date on market and technology developments, share experiences from other utilities, provide a proven evaluation and price solicitation methodology, and bring specific subject matter expertise to the table. On the negative side, this experience, methodology, and expertise is not free. What's more, outside consultants may be unfamiliar with your company's internal practices, and may bring their own biases based on past projects. If you choose not to use consultants, create a way for the team to get current (and stay current) on evolving industry and technology developments and trends, and feed this learning back into the project.

Rigorously Identify AMI Benefits

Recognize that AMI can lead you in many directions—into your customer's home-or premise-via load control and demand response in one direction, and further into the distribution network with smart grid in the other. This complexity can overwhelm the process and lead to confusion, delays, and even project abandonment. Tangible, quantifiable benefits are the means by which the AMI team can explain how, and by how much, the AMI system will benefit the organization, and what problems the AMI system will solve. It also is the language and the primary means by which AMI requirements are developed, debated, and defended throughout the selection process and beyond.

One strategy is to engage the multi-disciplinary AMI team to identify, quantify, and benchmark potential AMI benefits.

Recognize too that some "soft" benefits may be important, but difficult to quantify, such as environment impacts. Use a consultant with prior experience, gather information from regulatory proceedings, and exchange information with non-competitive utilities. Use visioning to develop views of what AMI could bring. Focus on the potential benefits that align with the formulated strategy and deliver the highest value.

TABLE 1 REQUIRED SKILL SETS BY AMI PROJECT STAGE

Source: Enspiria

Resources	AMI Project Stage						
	Strategy & Vision	AMI Benefits	Business & Technology Gap Assessment	AMI Requirements	Solicitation & Evaluation	Business Case	Regulatory
Executive sponsors	X					X	X
Core team	X	X	X	X	X	X	X
Benefit/Business Area SMEs*		X	X				
IT			X	X	X	X	X
Supply/purchasing				X	X		
Technical SMEs*				X	X		X
Legal					X		X
Finance						X	X
Risk						X	X
Business process owners						X	
Regulatory							X
Public Relations							X

* Subject Matter Experts (SMEs)
- Benefit/Business Areas SMEs for the key benefits and business areas to be assessed
- Technical SMEs for metering, communications, distribution engineering & operations, etc.

Create a Business-Case Framework

The business case development process is not neat, clean, or linear. It is a difficult process requiring that an eventual strong internal consensus emerge among team members about a multitude of frequently competing objectives and issues.

The business-case framework becomes a flexible document that contains all the relevant evaluation information. The benefits assessment is included, and, done rigorously, will recognize differences between strategic and operational benefits and will take into account the beneficiaries: utility shareholders, rate payers, and society. Create a "to-be," AMI-enabled vision of your business. Use this vision to identify business and technology gaps with respect to today's "as-is" organization. These gaps help hone the benefits, but also provide the basis for the internal and external costs of AMI.

Develop a preliminary total cost of ownership (TCO) estimate that addresses the business and technology gaps, and that is tied to specific benefits "capture." Compare benefits and costs using common project valuation financial evaluation criteria; compare the results to published information; and fine tune the analysis as additional information is gained through subsequent stages of the AMI selection process.

Understanding costs and benefits, and the key levers that can swing the business case, is essential to guiding the solicitation and selection process to success—even if only estimates or placeholders are used initially. Equally important is the identification of risks, and assessing the potential impacts and mitigation strategies/contingencies that must be employed.

The ideal AMI solution should be one that optimizes benefits, TCO, and risk, according an acceptable profile for the utility (*see Fig. 1*).

Collect and Consolidate AMI Requirements

The AMI solution requirements become a mechanism not only to solicit the vendor community for solutions and pricing. They also provide a disciplined way to memorialize the functional, performance, technical, commercial, and system requirements that the company requires to deliver the AMI benefits.

Enspiria recommends a highly disciplined, top-down functional decomposition approach to requirements gathering and development. To achieve each identified and quantified AMI benefit, the utility must understand:

- In which business process(es) does the benefit accrue;
- What data is required from the AMI system, and at what levels of availability, accuracy, and reliability;
- Into which operational systems must the AMI data be incident; and
- What transformations—or aggregations with other operational data, if any—are required for operational use and benefit accrual.

This level of decomposition is key to defining functional and performance requirements for AMI meters, the AMI communications network, AMI data collection, and AMI data management (such as via a Meter Data Management System or MDMS), and integration with operational systems. Enspiria recommends the technology be solicited for along the follow-

ing lines: AMI technology (potentially including home area and smart grid elements), field installation, and MDMS. Often we recommend various business and contracting options as an "overlay" to these underlying solicitations.

Evaluate Business Structure Options

A complete AMI solution is composed of a significant number of assets including meters, communications infrastructure, a data collection system, and a meter data-management system. As such, there are numerous business and contracting options to consider.

To explore business structure options, it is important to look at variations that can be created by dividing asset ownership and asset operations and maintenance. Today there is building national and state regulatory support for rate-based AMI systems. Therefore, there is a strong desire for utilities to own, and rate-recover, all AMI assets. However, the operations and maintenance of these assets may not necessarily follow. While most utilities today operate and maintain their meter plants, a lower number operate and maintain large-scale communications systems. Thus it may be an option to outsource the O&M of the AMI communications infrastructure. Another option and potential risk mitigation strategy may be to outsource the operations and maintenance of the AMI system during deployment. Often termed "design, build, run, transfer," this option places the onus of deployment, and operations and maintenance, of an AMI system into the hands of a third party until implementation is complete and a formal acceptance and transfer occurs.

Similarly, the utility must decide what elements of the AMI solution it wishes to procure. Obvious elements include all the dedicated products that form the AMI solution, and their installation and deployment. Options typically come in terms of systems integration and program support services such as program management, deployment, operations, or prime services. A utility's desire, willingness, or need to procure these will depend greatly on internal capabilities, resource availability, the scope of the AMI program as well as past experiences, and existing business structures (*e.g.*, outsourced IT department). Program scope, especially the addition of demand-response programs and smart-grid capabilities, will expand the skills and capabilities required, and the potential need for additional assistance.

Finally, as the utility considers these options, it is critical that it does so with an eye to the future, and the future demands and capabilities of the utility work force during the next 20 years.

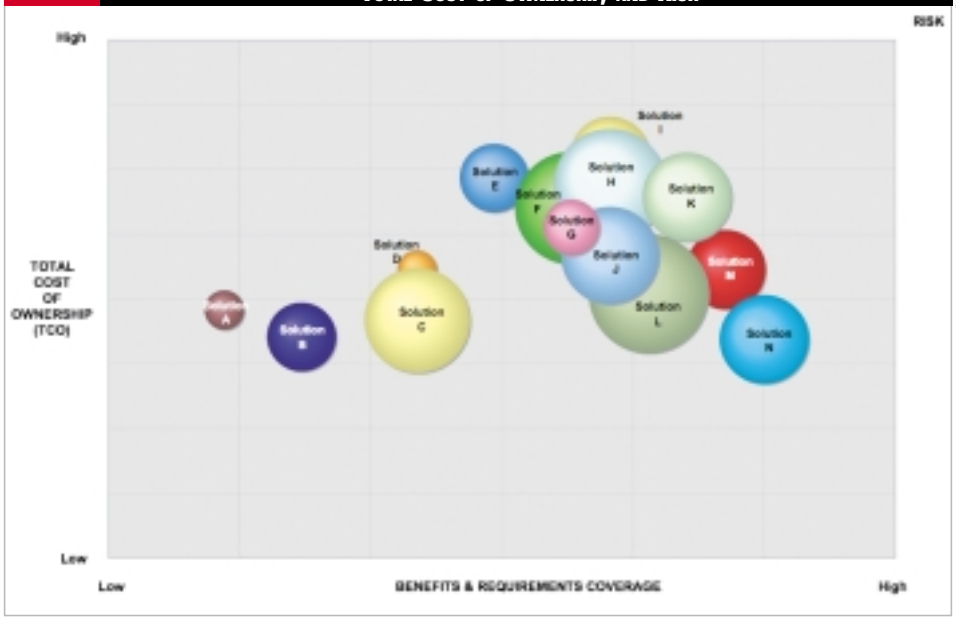
Establish Vendor Selection Criteria

Clear, concise, and undisputable vendor evaluation and selection criteria provide for uncontested choices and lower risk during the negotiation process. Equally important, broad ownership of the selection criteria—and resultant AMI selection—is important to solution acceptance and adoption.

Also, one should prioritize requirements based on maximizing benefits and avoiding costs. Identify "must-have" requirements, and select based on these. Be prudent, be reasonable, and be selective in the identification of critical requirements. A hundred is too many; 25 likely is too few. Assemble a cross-functional team to develop and vet the selection criteria. Gather evaluation information from different venues including vendor meetings; competitive solicitation or rapid sourcing; and demos, benchmarks, and site visits. Include qualitative and quantitative risk assessments at each stage and factor appropriately.

As the evaluation proceeds, be sure to isolate functional and performance evaluation from cost

Fig. 1 **Sample Assessment: Benefits and Requirements Coverage, Total Cost of Ownership, and Risk**



evaluation to avoid premature biases to develop. Perception of low or high cost relative to other vendors can influence how technology and risk evaluation factors are weighed. Total cost of ownership is the only valid comparison, and developing the TCO requires diligent review of all elements of a vendor's proposal.

Procurement should follow a process of iterative vendor selection. Initial information collection and vendor meetings, prior to solicitation, provide background and capabilities enabling a first order selection to take place. A detailed assessment of the benefits-driven AMI requirements, implementation costs, and identified risks should be used to further down-select potential vendors, retaining those vendors that provide the highest benefits coverage and lowest risk. Finally, a formal solicitation is sent to the remaining viable vendors. An alternative approach is a rapid sourcing process if the number of viable vendors is on the order of two or three. Solicitations and scopes are developed based on the detailed AMI solution requirements and the utility's preferred implementation time frames. Pricing is solicited to provide all external elements of the developed TCO model, across all desired business structure options.

Perception of low or high cost relative to other vendors can influence how technology and risk evaluation factors are weighed. Total cost of ownership is the only valid comparison, and developing the TCO requires diligent review of all elements of a vendor's proposal.

Consider a Pilot or Field Test

AMI is evolving rapidly from a technology perspective, and even more rapidly from a perspective of needs or requirements. We're not talking creeping elegance here. We're talking about accelerated elegance. Three years ago AMI was a term most had trouble distinguishing from AMR (automated meter reading). We dreamed of having hourly interval data. Today legislation requires 15-minute interval data, and policy contemplates 10-minute intervals or better. It is easy to build requirements and specifications. It is not so easy to design, build, and operate systems that deliver these capabilities. In fact, since the term AMI has come into existence, we have yet to see implementations exceeding even 0.5 million end-points that can deliver on the AMI promise.

A formal pilot, field test, or phase zero deployment can alleviate, or at least bound, concerns and risks of over-specification and under-delivery. The key word here is "formal." All too often, the pilot or field test is an unstructured activity executed primarily to get comfortable with, or play with the technologies, and not designed to validate functionality and performance. Formal activities are designed to verify the most critical aspects of a potential deployment, including functionality and performance tied to the major expected benefits, major cost drivers, and most difficult deployment scenarios, whether tied to density, geography and topography, or in-situ problems. Furthermore, formal pilot or test activities should be extended to stress-test the technology to ascertain its limits beyond the requirements.

Business-process testing and benefits validation are more difficult and require a significantly more substantive investment to validate. These tests should be borne when the likelihood of full deployment is high owing to an exceptional business case and certain external drivers, such as a highly supportive regulatory climate.

In sum, AMI is one of the most promising means by which utilities radically can impact society, consumers, shareholders, and employees. The success factors summed up herein provide the guideposts for effective and successful utility AMI solution selection. F

Ivo Steklac is the president and founder of Enspiria Solutions Inc. Andrew Trump is a senior consultant with Enspiria Solutions. Contact Steklac at isteklac@enspiria.com.