

Planning for AMI / Smart Grid Adoption in a Difficult Economic Climate*

By Andrew Trump, Executive Consultant, Enspira Solutions Inc.

Utilities and their customers are re-evaluating spending priorities in the face of a severe economic contraction. Tight credit conditions are impacting supplier and utility alike. No one knows how severe and how protracted the downturn will be. All of this will impact the pace of AMI and smart grid adoption both the U.S. and in Canada.

Some utilities, like Duke Energy, are moving forward with their programs despite the current conditions. Duke Energy recently received regulatory approval for its Ohio smart grid initiative. The company believes its business case is built on elements that have sustained value even during this severe economic contraction. As David Mohler, Duke Energy's CTO explains, "In Ohio, about 60% of the benefits are operational savings and infrastructure improvements — things that will help improve service and reliability — and 40% are societal. We did not position our smart grid on efficiency, but on improved reliability."

Counterbalancing the downturn is government encouragement of smart grid investments. Provincial governments (e.g., Alberta, British Columbia and Ontario) have programs in place that allow utilities to recoup some of their investments in the new AMI and Smart Grid technologies.

The U.S. stimulus package promises relief in the form of \$4.4 billion of matching funds for smart grid investments. Assuming this encourages another \$4.4 billion in utility-provided investment, the industry could see total investments of nearly \$9 billion over the next few years. Assuming an average investment for an AMI system of \$200 per metering location, \$9 billion is enough capital to place 45 million U.S. homes under advanced metering networks.

As utilities throughout North America continue in their AMI and smart grid evaluations, what factors should get additional attention? Which factors help to clarify whether the proposition makes sense in current economic conditions?

(See Table 1 for additional discussion of these factors)

UTILITY CREDIT

Both utilities and AMI and smart grid suppliers are impacted by tightening credit, making the weighted average cost of capital higher, and impacting the discounting of costs and benefits in the business case.

SUPPLIER CREDIT

The supplier community is also impacted by more expensive credit with the potential effect of higher prices and less flexibility on commercial terms for both its customers and its suppliers. As one senior executive of a meter supply company explains, "As a manufacturer we spend a great deal of effort managing working capital. It has a dramatic impact on our cash flow and, as a result, to credit worthiness and debt ratings." Meter manufacturers, for example, have a long cash conversion cycle stretching 100 days or more. For a meter priced at \$120 this means it may have to finance working capital of around \$100 for this period. Unless mitigated by higher volume and sales, the higher credit costs will find its way into higher prices facing the utility customers. These effects impact the entire supply chain, not just the meter manufacturer.

EMPHASIS OF BENEFITS

The composition of benefits is key. Many AMI / smart grid business cases reflect 60-70% operational benefits and a large contribution from demand response (DR) benefits. Often, and prudently, the DR benefits are expressed using ranges of uncertainty based on customer



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behavioral responses to price signals during peak events. These programs, however, are justified on future prices of capacity, which will change. On the wholesale side, future prices of natural gas — the marginal fuel for capacity — are uncertain. Wellhead prices for natural gas dropped from over \$12 per thousand cubic feet in June of 2008 to under \$6 by November. On the demand side, consumers are spending less on energy. Thus, utilities would be wise to add additional rigor to their evaluation of capacity costs and to lessen the business case's reliance on DR benefits.

NEW BENEFITS

The current conditions also provide opportunities to capture additional operational benefits, such as AMI-enabled remote disconnect switches to address rising accounts receivables.

CHANGES TO REAL AND NOMINAL PRICES

Perhaps one of the biggest challenges is how the business case should treat the role of both real and nominal prices in the economy over time. This is a huge source of uncertainty. A simple model that looks at pricing uncertainty suggests that cost to the utility or the meter supplier could swing +/- 20%.

At the macroeconomic level some experts believe that the U.S. economy faces the twin prospects of stagnant growth and higher prices. This environment may also impact real prices in dramatic ways. Take the meter supply which easily represents 70% of the capital involved in an AMI / smart grid program. The credit squeeze for meter suppliers has already been mentioned. The weak economic conditions could also lead to consolidation in the market and this could give remaining companies more pricing power. A stimulus-driven uptick could also lead to higher real prices, as the industry does not have the capacity today to supply a million meters a month (the level implied by the stimulus). Working in the other direction, one could imagine price declines due to innovation, scale and learning effects in the

manufacturing process, and market competition.

PROGRAM DESIGN

Commissions want to ensure that there is not an imbalance in how benefits and costs accrue within their customer base. This concern will heighten as economic conditions worsen.

SUPPLIER DUE DILIGENCE

In general, utility efforts at due diligence have greater importance than ever, with particular pressures on venture funded companies who do not have adequate cash flow to fund operations.

STIMULUS

The wild card in utility plans is the ability to secure government money to supplement capital investment. Any additional dollars will favorably impact the net revenue requirements on any investment.

While Mohler agrees that he and his counterparts in the industry expect a slowdown in smart grid and AMI deployments, he also stresses that many of the risks of AMI and smart grid investments remain unchanged. Utilities still face the risk of investing in systems that may not meet the future needs of the utilities or the expectations of their customers. As Mohler explains, "It's not about the meter, the recloser, or the smart appliance; it's about the intelligent network being flexible and open enough to evolve." The core challenge in building the smart grid remains how to construct multiple pathways to create value and yield benefits that are dependent less on specific hardware or applications than on the right system architecture.

Table 1. Factors to Consider in Evaluating AMI/Smart Grid Under Difficult Economic Conditions

Factor to Consider	Economic Realities	Impact on AMI/Smart Grid
Utility Credit	<ul style="list-style-type: none"> • Utilities find it harder to access the capital markets • Weighted average cost of capital is higher 	<ul style="list-style-type: none"> • Impacts the discounting of costs and benefits in the business case
Supplier Credit	<ul style="list-style-type: none"> • The supplier community is also impacted by more expensive credit 	<ul style="list-style-type: none"> • Higher supplier credit costs find their way into higher prices facing the utility and its customers
Emphasis of Benefits	<ul style="list-style-type: none"> • The typical mix of benefits in an AMI / smart grid business case (60-70% operational benefits and 30-40% demand response benefits) may not be justified based on uncertainty in future capacity pricing as well as the downward trend in consumer spending on energy 	<ul style="list-style-type: none"> • Within the business case, need to add additional rigor to the evaluation of capacity costs and lessen the reliance on DR benefits • This requires elevating the prominence and potential value of many of the distribution system reliability benefits that are by nature harder to quantify
New Benefits	<ul style="list-style-type: none"> • Additional AMI opportunities arise in difficult times • For example, utility accounts receivables rise as economic conditions worsen, and AMI-enabled remote disconnect switches may help the utility manage the disconnect / reconnect cycle more effectively and save on labor costs 	<ul style="list-style-type: none"> • The business case should capture such additional benefits • Every 1 or 2% improvement in the operational business case is important
Changes to Real and Nominal Prices	<ul style="list-style-type: none"> • Meter supply costs, which represents 70% of the capital involved in an AMI / smart grid program, are a huge source of uncertainty — and could swing up or down by 20%. 	<ul style="list-style-type: none"> • This large of a price swing has a dramatic effect on the business case results • One way to mitigate this risk is to try to secure long-term contracts with fixed escalation terms but this may work against other risks associated with supplier default risk and capturing the value of innovation
Program Design	<ul style="list-style-type: none"> • Regulator concerns about the fairness of AMI and smart grid investments across the customer base heighten as economic conditions worsen 	<ul style="list-style-type: none"> • Need to pay more attention to how AMI and smart grid program elements are positioned around the fairness question and consider ways to structure programs such that customers do not pay for technology that does not provide them with benefits • Broad mandates that force all customers into DR programs will not work • Focusing on improved reliability, power quality and non-peak energy conservation are large payback areas that don't require any customer participation
Due Diligence	<ul style="list-style-type: none"> • There will be tremendous pressures on venture funded companies in this environment who do not have adequate cash flow to fund operations • The utility's efforts in due diligence have greater importance than ever. 	<ul style="list-style-type: none"> • There is a trend toward setting up smart zone test beds rather than large turn-key deployments • This approach allows the utility to test out all of the related AMI, DA, SA and Smart Grid technologies and determine which advanced applications have the most benefit
Stimulus	<ul style="list-style-type: none"> • The wild card in utility plans is the ability to secure government money to supplement capital investment 	<ul style="list-style-type: none"> • Any additional dollars will favorably impact the net revenue requirements of the AMI/Smart Grid investment



ABOUT THE AUTHOR

Andrew Trump specializes in AMI/MDMS business case and financial analysis. He has performed business case analysis, TCO modeling, pricing evaluation, and regulatory compliance support for utilities across North America. Mr. Trump holds a Bachelors in Physical Sciences from Harvard College, and has a professional certification in Project Management from UC Berkeley Extension. He also expects to complete his Masters in Public Policy from George Mason University this year.