

Benefits Realization for Smart Grid Investments

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Utilities across North America are implementing Smart Grid projects – many in the US doing so with matching funding from the DOE and with expectations of regulatory recovery of expenditures. To achieve regulatory recovery, utilities must ensure that the projects are based upon prudent expenditures and actual achievement of promised benefits. Utilities typically hone in on cost effectiveness because it is most easily tracked, but equal attention should focus on the realization of anticipated benefits. Without a target on benefits, actualization is difficult to achieve and subsequent recovery of expenditures may not occur. A rigorous program of benefits realization will ensure that committed benefits occur in the valuation expected.

Regulatory Drivers for Benefits Achievement

Recent regulatory orders have linked benefits achievement to the potential for recovery of Smart Grid project expenditures. In its order 83532, the Public Service Commission of Maryland (PSCM) ordered Pepco Holdings, Inc., to develop metrics for tracking customer benefits and report periodically against those metrics. The PSCM stated:

“These periodic reviews will monitor the Company’s progress, and the results may well inform our analyses of prudence and cost effectiveness in the rate cases to

follow, and thus may influence our future cost-recovery decisions. The reviews will focus primarily on whether the project is being deployed properly and on schedule, whether and how it functions, whether and to what extent customers are receiving benefits, and how the costs compare to the Company’s budget.”

Similarly, the Public Utilities Commission of Nevada (PUCN) is tying benefits achievement to Smart Grid cost recovery for NV Energy’s Smart Grid project implementation (PUCN dockets 10-02009, 10-03022, 10-03023):

“...the Companies must produce evidence of the progress in achieving the benefits that were used as the basis to support this application, including verifiable savings related to meter reading, field services, revenue protection, distribution planning, billing, credit collections, and load research. The Companies are responsible for the execution of this project to ensure that the potential benefits are realized and that these benefits flow to the Companies’ customers in a manner that is equitable and commensurate with the risks involved in this endeavor. Failure to demonstrate that the benefits of this program are reasonably realized could result in a rate base adjustment and or expense adjustment in future general rate cases.”

Benefits Realization Process

(The key steps of the Benefits Realization Process discussed in the following paragraphs are enumerated in the sidebar on this page.)

Steps in the Benefits Realization Process

Benefits Realization should incorporate the following key steps:

- Identify and document the benefits to be considered
- Gain business unit buy-in for each benefit
- Cash flow the benefits over time – full valuation of a benefit does not occur until the system is fully deployed
- Gather data and quantify the actual benefit achieved – where will you get the data? How often? From what systems?
- Certify the benefit – utilize a defined process to ensure acceptance of that benefit and that the project gets credit
- Understand that external forces may change benefits valuation
- Identify and take credit for new benefits
- Consider qualitative, strategic benefits

The Benefits Model

All Smart Grid projects should be based upon a business case that includes a benefits model. Benefits modeling should start with identifying the business units that will be impacted by the implementation of a Smart Grid project. Business units are being called upon to commit to benefits – commitments that will reduce resources and budgets and require changes in processes and procedures. Documentation of commitment to a benefit must occur and should include sponsors, assumptions, methods of quantification, key inputs to quantification, expected outputs, and the systems needed to produce the data that will quantify a benefit.

Some benefits are easy to quantify but politically sensitive to realize. Eliminating meter reader positions as a result of AMI is easily quantified based on known budgets. But the act of eliminating personnel can result in potentially significant economic, labor relations, and public relations issues. In addition, significant time elapses between the approval of a business case and the deployment of a Smart Grid project. For example, up to five years can pass between the time a utility approves an AMI project and the last meter is deployed. During this time, personnel change and support for projects evolves. Ideally, a signed commitment from business units ensures cooperation of future leaders when the time comes for budgets to be reduced to reflect benefits achieved.

Cash-Flow of Benefits over Time

Once quantified, the cash flow from benefit streams should be modeled over time. Benefits models typically quantify benefits based on a fully-deployed solution. Deployment of an AMI solution, for example, can occur over many years. An increasing portion of benefits can be realized monthly, quarterly, and annually over the term of deployment. But the full, annualized amount won't be realized until the system has been fully deployed and is operational for a year.

Cash flow from benefits is based on many factors, including number of meters deployed and the various systems and integrations needed to affect business process change and replace eliminated FTEs (Full-time Equivalents). For example, as more remote-disconnect enabled meters are deployed, more premises become eligible for remote disconnect for non-payment or change of party activity. Integrations among the AMI, MDM, and billing systems, often referred to as business releases, must be operational regardless of the number of meters deployed before any disconnect activity can occur.

Meter deployment plans and business releases are fluid and subject to continual modification. Original assumptions for cash flows should be clearly documented, and drivers for changing cash flows must be clearly understood. Significant variations in benefits realization may require special communications to, and approvals from, regulatory bodies to ensure the continued feasibility of recovering costs or receiving grants/reimbursements.

Quantification – Where do you get the data?

Once the assumptions for quantifying benefits and modeling cash flow over time are documented and agreed to, the data to quantify the benefits must be gathered. Some data inputs are easily gathered; others may be more difficult. While a meter reading budget may be clearly documented and easily sourced, the data needed to quantify a benefit from billing customers earlier in the meter reading window with AMI may be harder to gather.

Key steps include identifying the data required to quantify the benefit; identifying the sources of the data, including systems and owners; and identifying the queries and reports that will be required to provide the necessary data. For example, implementing an AMI solution obviates the need for a meter reader. As meter reader routes for a full bill cycle are saturated, those routes can be cut over to billing via AMI reads. When routes cut over, meter reader FTEs are eliminated. Human resources documents the reduction in FTEs, and the actual versus budgeted meter reading spend is calculated to quantify the dollars saved.

Once you've identified the sources of data needed to quantify the benefits, start acquiring the data and executing the calculations. Recognizing salvage value of removed legacy meters is usually simple: the disposition of meters is tracked in the meter asset management system. A value is assigned to each salvaged meter, then that value is given a project number in an accounting system, and monthly queries of that project number report value achieved to date. Other benefits are more difficult. The availability of interval data allows for the better understanding of the transformer's under- or over-utilization. Utilizing the interval data requires complex modeling and analysis algorithms to ascertain the true operation of an asset. New models must be compared with old models. Dollars saved due to improved asset utilization may require trending and longer term analysis to validate savings realized.

Getting Credit for Benefits

Utilities often implement multiple strategic projects simultaneously. Each project has a stand-alone business case that articulates the expected benefits. In some cases, these projects may compete for similar benefits. For example, utilities that implement both a remote disconnect technology and a mobile workforce management system seek to achieve labor efficiencies and savings. Labor savings due to mobile efficiencies are distinct from labor savings that result from avoided disconnect field trips.

A certification process should be established to ensure appropriate assignment of benefits as they actually occur. Certification should be conducted by independent organizations within the utility – typically a Financial Planning and Analysis or Internal Audit group. Corroboration by such “third parties” lends credibility to certification. It can also arbitrate budget changes, since these organizations typically set and enforce those budgets.

Certification should follow an established, defined process. On a periodic basis, typically quarterly, the project team identifies the quantified benefits for that period. Formal documentation of the achieved benefits, including the quantification process, assumptions, inputs, and outputs, is gathered and presented to the impacted business unit. Often the “benefitting” business unit is negatively impacted when labor savings are realized and/or process efficiency improvements occur. The business unit must support the benefit, or a compelling case for overriding business unit objections should be presented.

Once signed off, the benefit is presented to the “third party” for validation and acceptance. Accepted benefits are presented to the project steering team and executive sponsors, and approval is secured. Upon approval, benefits and the decision to accept them should be documented, and supporting information archived. Once certified, business unit budgets are permanently impacted. The budgeting organization reflects savings as reductions in capital or labor budgeted and actual costs.

Benefit Uncertainty

The value of benefits originally determined in the benefits model may be reduced due to external forces. The implementation of a remote disconnect allows utilities to better manage the collections process and reduce past due and charged off balances. Utilities can disconnect customers as soon as and every time they meet collections criteria – something not always achieved due to labor limitations.

Utility regulators protect customers’ rights during the collection process via a Consumer Bill of Rights (CBOR). Disconnect practices have been challenged and CBORs have been strengthened, causing some utilities to reduce realizable benefits.

Other external factors may also negatively impact benefits valuation. Slumps in the economy can reduce utility customer growth rates. The value of benefits that depend on growth rates (e.g., avoided new meter sets) declines when new home construction decelerates. Negotiations with bargaining units can result in increased severance or job placement costs. Politics and relationships with regulatory bodies can inhibit support for the inclusion of new benefits (e.g., the value of demand response). In order to keep the business case strong and deserving of cost recovery, it is critical to ensure that existing benefits are managed and new benefits are identified.

Benefit uncertainty is not limited to external forces. Internal politics and the simultaneous implementation of capital intensive projects can lead to a clamoring for benefits. As discussed earlier, multiple projects can potentially claim the same benefit. These claims can result in eroded confidence in, and support for, project valuation.

New Benefits

Business cases and their supporting benefits are typically conservative and often do not reflect the full potential of a Smart Grid project. Technologies are nascent and deployments not wide-spread, so the extent of a quantifiable benefit is sometimes underestimated or not included at all.

For example, estimates of energy theft and diversion vary greatly across the utility industry. Some believe that no incremental theft recovery will be realized; at the same time, some utilities believe the occurrence of theft (and corresponding recovery) can be as high as 5% of revenue. Because of this disparity, and due to the need to meet regulatory benefits commitments, some utilities have estimated theft recovery low. During deployment, the real value of theft is determined, and the project should get full credit for the actual benefit realized.

As project deployment continues, the occurrence of new benefits should be monitored. Similar to the process above, utilities should implement periodic assessments, develop a process to quantify benefits, collect data, and implement the quantification. New benefits should ultimately be certified with the rest of the benefits model.

Strategic Benefits

Should qualitative, non-quantifiable (“strategic”) benefits be included in a business case? This depends on the nature of the benefit and the regulatory climate in which the utility operates. Too often, utilities are willing to consider strategic benefits only as icing on the cake; these are examined only when the business case is very favorable. Still, a benefits realization process should track these benefits, too. Reduced call center volume may be an indicator of increased customer satisfaction with a utility, but assigning a dollar value to satisfaction has not been accepted throughout the industry. An understanding that customer satisfaction has improved may positively influence the outcome of a future general rate case.

Conclusion

Many utilities are implementing complex, enterprise-wide Smart Grid solutions. All utilities have modeled business cases with large values of quantified benefits justifying significant capital expenditures. Although most utilities concentrate on implementing these solutions, only a few focus on the process of realizing the benefits required to obtain cost recovery. A rigorous process of benefits realization should be implemented early during project implementation to ensure that utilities deliver on the promised benefits. Without such a process, utilities may not achieve cost recovery if actual benefits realized are less than those previously promised. ■



ABOUT THE AUTHOR

Jeff Evans is an Executive Consultant with over 19 years of experience in the utility field. He has particular expertise in Smart Grid and AMI solutions and related technologies. His areas of expertise include strategy development, requirements analysis, business case development, solution benefits identification and qualification, vendor evaluation, contract negotiations, solution implementation and project management. He holds a BS in Mechanical Engineering and an MBA.

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