A **Michigan Public Service Commission Staff** Report

6545 Mercantile Way, Suite 7
Lansing, MI 48911
www.michigan.gov/mpsc

Vendor Relationships with Smart Grid Deployments

Abstract

In the Michigan Public Service Commission's (MPSC) November 4, 2010 order pertaining to Consumers Energy Company's Electric Rate Case U-16191, it was requested that the MPSC incorporate an investigation of utility/vendor practices into a report to be filed with the Commission April 1, 2011. The following report details the results of the investigation into utility/vendor practices and provides recommendations of practices that could be used in the industry to minimize the cost of smart grid technology implementations.

Problem Statement

The United States Department of Energy (DOE) was charged under the Energy Independence and Security Act of 2007 (EISA 2007) with modernizing the nations aging electric grid.[1] This legislation supported electric infrastructure improvements commonly referred to as "smart grid." In 2009, the American Recovery and Reinvestment Act (ARRA) provided $4.5B in Smart Grid Investment Grants (SGIG) for select utilities to develop and demonstrate Smart Grid systems.[2] Numerous utilities nationwide have begun rolling out custom configurations of vendor products to execute their Smart Grid vision. Some first adopters have had instances of cost overruns associated with vendor and technology selection. The following report explores different methods of vendor selection and the lessons to be learned from first adopters of Smart Grid technologies.

Regulated Utilities - Vendor Selection

The following is a review of the Smart Grid projects of five regulated utilities throughout the country. The following case studies represent common approaches taken by utilities when selecting Smart Grid vendors.

Case Studies:

- **Consumers Energy**
- **Xcel Energy**
- **Pepco Holdings Inc.**
- **Detroit Edison**
- **Oklahoma Gas and Electric**

Case #1 Consumers Energy

Consumers Energy is one of the nation's largest combination utilities, providing electric and gas utilities to approximately 6.5 million residents of Michigan.[3] In January of 2007, Consumers Energy began its Advanced Metering Infrastructure (AMI) program with a staged approach assessing and testing smart grid technologies prior to any pilot applications. In 2009, Consumers Energy began its first AMI pilot program in Jackson, Michigan. Approximately 6,500 AMI meters have been installed in the field in order to conduct extensive functional and operational performance testing.[4] Consumers Energy is currently seeking approval for additional AMI deployment.

Project Overview:[5]

Type: Advance Metering Infrastructure, Direct Load Control
Cost: $750 Million
Endpoint Installations: 2,400,000

Vendor Selection Process:

In 2008, Consumers Energy opened a Smart Service Learning Center (SSLC) in Jackson, Michigan where smart grid vendor products could be tested and developed prior to deployment. Assessment activities include testing seven AMI vendors in the SSLC and field to confirm effective communication, standards compliance, and security. Based on the lab results, vendors that have performed sufficiently were then used in a pilot program. Vendors that performed adequately in these pilot programs would then be considered in the event of full deployment of the AMI technology.[4]

Program Highlights:

1. Was not a recipient of DOE Smart Grid Investment Grant.[2]
2. Long term testing of vendor products for standards compliance, functionality and interoperability before pilot deployment.
3. Participation in numerous Smart Grid standard development organizations.
4. Delayed deployment to allow for vendor product maturity to minimize risk of stranded technology.[4]

Case #2 Xcel Energy

Xcel Energy is a combination utility providing electricity to 3.4 million customers and gas services to 1.9 million customers in Colorado, Michigan, Minnesota, New Mexico, North Dakota, South Dakota, Texas and Wisconsin.[6] In 2007, Xcel acknowledged that a smart grid pilot project would help gain experience with the integration of emerging smart technologies into the distribution system and to enable the company to assess the feasibility and benefits of those technologies. SmartGridCity™ was designed to be a comprehensive pilot program integrating various smart grid applications into Boulder, Colorado's electrical grid in order to assess their benefits.[7] Xcel Energy is seeking approval for full cost recovery of its expenditures for SmartGridCity™.

Project Overview:[8]

Type: Integrated Smart Grid Pilot (AMI, HAN, Distribution Automation, Distributed Generation, PEV)
Cost: $44.8 Million
Endpoint Installations: 24,000

Vendor Selection Process:

After compiling a selection of potential vendor partners for SmartGridCity™, interviews where held to determine those most suitable for the pilot project. In December 2007, Xcel Energy established the Smart Grid Consortium, bringing together leading technologists, engineering firms, business leaders and IT experts from the interview process. The intent of this group was to provide guidance as well as the products and services needed to realize Xcel Energy's vision of SmartGridCity™.[9]

Program Highlights:

1. Was not recipient of DOE Smart Grid Investment Grant.[2]
2. Some of the SmartGridCity™ vendors were offered publicity rather then payment for products and services leaving many highly qualified vendors uninterested.[10]
3. Exceeded their initial budget estimate by more than $30 million.[8]
4. There was no formal cost/benefit analysis preformed prior to the project.[8]

Case #3 Pepco Holdings Inc

Pepco Holdings, Inc. (PHI) is electricity provider servicing in Delaware, the District of Columbia, Maryland and New Jersey. PHI has three subsidiaries in the following states: Delmarva Power, Pepco, and Atlantic City Electric. In 2002, PHI used $2 million acquired through a merger with Conective to fund a "smart metering pilot," later named PowerCentsDC™. Consultants were hired to design and implement PowerCentsDC™ taking vendor selection out of PHI's responsibility. The pilot program was designed to test AMI, dynamic pricing, and direct load control. PHI has been approved for full deployment of smart grid technologies in its Delaware, Washington D.C., and Maryland service territories.[11]

Project Overviews:[12] [13]

Delmarva DE & Delmarva MD
Type: AMI, Distribution Automation
Direct Load Control
Cost: $195.5 Million
Endpoint Installations: 520,000

Pepco DC & Pepco MD
Type: AMI, Distribution Automation,
Direct Load Control
Cost: $300 Million
Endpoint Installations: 850,000

Vendor Selection Process:

PHI performed a competitive selection process to obtain a consulting firm to assist with the AMI selection. PHI selected Enspiria to provide support to develop the RFP and to evaluate the bids. Enspiria will also assist in evaluating the performance of the systems during the field acceptance prior to full deployment. They were selected based upon previous experience in performing similar work for other utilities. AMI communication network vendor finalists were evaluated against the company's key strategic drivers.[14]

Program Highlights:

1. Received $168.1 Million in DOE Smart Grid Investment Grants.[2]
2. Hired Ensperia, a consultant experienced in Smart Grid deployments to assist in planning and vendor selection.[14]
3. Use of RFP to create a fair and competitive vendor selection process.
4. Negotiated vendor contract securing the intellectual property of the chosen vendor products in case of catastrophic event (bankruptcy, receivership, etc).[14]

Case #4 Detroit Edison

The Detroit Edison Company (DTE) is a combined utility providing electric and gas services to over three million customers in Michigan.[15] In October 2008, DTE began its AMI program by installing 10,000 smart meters in Grosse Ile, Michigan. This pilot program was intended to test the AMI network functionality and quantify its benefits. The success of this initial pilot led DTE to develop further pilot programs testing home area networks, smart appliances, and distribution automation in southeast Michigan. DTE is currently seeking approval for full AMI deployment for their entire service area.

Project Overview:[16]

Type: Advance Metering Infrastructure
Cost: $455 Million
Endpoints Installations: 2,600,000

Vendor Selection Process:

DTE assembled a team to visit vendor sites and completed installations to learn more about potential vendors. DTE then sent a request for qualification (RFQ) to 34 vendors to identify interest and compatibility for their smart grid vision. Based upon responses DTE created a list of eight qualified vendors. In December 2006, a request for pricing (RFP) was sent to these eight vendors and their responses were rated and ranked before offering contracts in 2007. Based on the results of the RFP responses, DTE chose Itron Openway as their AMI system provider. Itron had already successfully installed 2.5 million endpoint meters with Southern California Edison, San Diego Gas and Electric and CenterPoint.[17]

Program Highlights:

1. Received $84 million in DOE Smart Grid Investment Grants.[2]
2. Provided a RFQ to potential vendors to allow them to gauge interest in project, and also recognize vendor ability to meet company project expectations prior to submitting RFP.
3. Use of RFP to create a fair and competitive vendor selection process.[17]
4. Active communication with utilities further along in their deployment of Itron Openway system to help anticipate operational need. [17]

Case #5 Oklahoma Gas and Electric

Oklahoma Gas and Electric (OGE) is a combined utility providing electric and gas services to 765,000 retail customers in Oklahoma and western Arkansas.[18] In October 2007, OGE began piloting 6,600 smart meters in Oklahoma in order to test AMI meter functionality, remote disconnects and the associated operational savings. OGE continued to pilot smart grid technology in 2008 when they preformed a demand response pricing pilot on 25 households to measure technology performance and customer response to time of use pricing options. The success of these pilots led OGE to begin deploying meters at a much larger scale. Initially OGE planned on installing 42,000 smart meters in Norman, OK, but upon receiving a SGIG, OGE was approved full deployment.[19]

Project Overview:

Type: Advance Metering Infrastructure, Distributed Automation, Dynamic Pricing
Cost: $366 Million[20]
Endpoint Installations: 771,000[19]

Vendor Selection Process:

To assist with the vendor selection process, OGE recruited the help of a leading provider of consulting services for utilities The Structure Group. OGE with the help of The Structure Group drafted a Request for Qualification (RFQ), a 38-page document outlined project scope, company expectations, and terms and conditions of the project. This document was sent to potential vendors to gauge interest and pre-qualify vendors for OGE's smart grid deployment. Qualified vendors where then sent a Request for Proposal (RFP) from which OGE selected project vendors.[21]

Program Highlights:

1. Received $130 million in DOE Smart Grid Investment Grants.[2]
2. Hired The Structure Company, a consultant experienced in Smart Grid deployments to assist in planning and vendor selection.[22]
3. Provided a RFQ to potential vendors to allow them to gauge interest in project, and also recognize vendor ability to meet company project expectations prior to submitting RFP.
4. Use of RFP to create a fair and competitive vendor selection process.[21]

Summary

As demonstrated in these case studies, vendor selection and technology decisions made by first adopter utilities have varied widely. These variances affect the cost implications of smart grid programs. Costs associated with regulated utilities' smart grid deployment programs are typically passed on to consumers. It is in the best interest of the regulating bodies and regulated utilities to observe first adopter case studies and lessons learned to assure cost effective smart grid deployments. The following list details best vendor selection and technology practices found in the case studies outlined in this report:

Best Practices

To mitigate risk and prevent cost overruns in smart grid deployments:

- Use pilot programs strategically to quantify benefits. Vendor products can be tested in smaller lab or field studies or guaranteed by vendors for functionality and interoperability.
- If possible select product vendors that have performed similar sized deployments to what the utility requires.
- Provide potential vendors with RFQ to allow them to compare their product capabilities to company expectations prior to responding to a RFP.
- Perform detailed cost/benefit analysis for all technology in order to understand product life cycle cost and product life cycle benefits.
- Negotiate vendor contracts that provide a shared risk between the utility and vendors. This provides protection for possible product deficiencies or business bankruptcies.
- Explore potential cost/benefits associated with hiring an experienced smart grid consultant with existing vendor relationships.
- Consider hiring an experienced consultant to assist with the vendor selection process.

[1] http://www.smartgrid.gov/sites/default/files/pdfs/sg_advocates.pdf
[2] http://www.smartgrid.gov/smartgrid_projects?category=1
[3] http://www.consumersenergy.com/content.aspx?ID=1286
[4] CMS ENERGY, Executive Briefing: Advanced Metering Infrastructure, November 2009
[5] Michigan Public Service Commission E-Docket Case U-16418 AG 2nd DISCOVERY RESPONSE
[6] http://www.xcelenergy.com/Colorado/Company/AboutUs/Pages/Temp.aspx
[7] http://www.xcelenergy.com/Colorado/Company/Newsroom/News%20Releases/Pages/Xcel_Energy_announces_first_Smart_Grid_City_in_the_nation.aspx
[8] http://www.xcelenergy.com/SiteCollectionDocuments/docs/smart-grid-city-cpcn-application.pdf
[9] http://www.xcelenergy.com/Colorado/Company/Newsroom/News%20Releases/Pages/Xcel_Energy_announces_Smart_Grid_Consortium_partners_intent_to_bring_Smart_Grid_City_to_life.aspx
[10] http://www.glgroup.com/News/Smart-Grid-City---Who-Got-What--52048.html
[11] Morgan, Rick. "PowercentsDC™ Smart Pricing for the Smart Grid." Powerpoint
[12] http://www.eia.doe.gov/conference/2010/session8/gausman.pdf
[13] http://www.sgiclearinghouse.org/ProjectList
[14] Pepco Holdings Inc. "Proposal for Advanced Metering Infrastructure (AMI). 28 July 2009. Powerpoint
[15] http://www.dteenergy.com/dteEnergyCompany/aboutDTEEnergy/overview.html
[16] Michigan Public Service Commission E-Docket Case No U-16472, Exhibit A-18
[17] Michigan Public Service Commission E-Docket Case No. U-16472, Testimony of R.E Sitkauskas
[18] http://www.oge.com/about/OurCompanies/Pages/OGEElectricServices.aspx
[19] http://www.eei.org/meetings/Meeting%20Documents/2010-10-20-StrategicIssues-Smart%20Grid%20Overview%20-%20Johnston%20-%20OGE.pdf
[20] http://smart-grid.tmcnet.com/topics/smart-grid/articles/91018-oklahoma-corporation-commission-approves-oges-smart-grid-deployment.htm
[21] http://www.oge.com/about/DoingBusinessWithOGE/RFPs/Documents/OG+E%20SmartPower%20RFQual%20-%20Final.pdf
[22] http://www.allbusiness.com/energy-utilities/utilities-industry-natural-gas/12277272-1.html