Leveraging Data for Solutions
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Work Flow Management

Utilities of all types across the country are investing massive amounts of money in taking infrastructures that were largely built after World War II and upgrading them to inject intelligence throughout their operations. There has been a resultant tidal wave of information that will help utilities better manage their assets and serve their customers. Utilities will face a number of difficulties in the upcoming years that will both disrupt their business processes and create new opportunities, and the analysis of this information is crucial to their ability to be successful and to provide outstanding service to the public.

This paper features observations, concerns and strategies presented in an October, 2013 webcast sponsored by Elster Solutions, with panelists:

- Marty Rosenberg, Editor-in-Chief, EnergyBiz Magazine, Moderator
- Marc Gerken, President and CEO, American Municipal Power
- Andrew Duhon, Customer and Support Services Manager, Lafayette Utilities System
- Michael Johnson, Technical Marketing Manager, Software and Applications, Elster Solutions

The Challenges Presented by Changes in the Power Industry

Views from Marc Gerken, President and CEO, American Municipal Power

Utilities will face a number of difficulties in the upcoming years that will require increasing sophistication and oversight. Financial investments required to upgrade infrastructures will place increasing stressors on utility businesses from an operations technology as well as an IT technology standpoint. Partners in our investments want to see real-life data as power generation operates, which puts security and technology burdens on the industry. American Municipal Power (AMP) has 129 members from all energy markets that have invested almost five billion dollars since 2007 in diverse portfolios. AMP is charged with meeting the challenges of coming up with technology solutions as well as related business processes.
When we look at business and IT trends, we're really talking about Smart Grid. Its initiatives are grid optimization and modernization to improve reliability, resilience and recoverability, and to address the need to involve consumer participation in the provision of energy, such as on-premise generation and consumer energy efficiency initiatives. Smart Grid development will increase data quantity by several orders of magnitude. The development and operation of the program will require action-oriented skill sets and strong leadership to accomplish the integration of operations and information technologies.

These skill sets must include business knowledge to provide more accurate and timely meter reads, improved billing and customer service, and better fraud and theft protection. They will be required to include the ability to conduct remote connects and disconnects.

Reliability is fundamental to energy and utility companies and their members. Customers’ perceptions of reliability are changing, and failures in utility reliability receive more publicity than in the past due to social media and digitally connected customers. Utilizing Smart Grids, social media and operations data allows a utility to employ predictive analytics, such as forecasting of commercial/residential loads based on weather variations, prediction of equipment failures based on condition observations, and prediction of changes in customer segments and energy usage based on demographics and behavioral statistics. Predictions can be made with regard to grid instability based on analysis or failure measurement data.

The North American Reliability Corporation (NARC) set standards that are in a volatile period of change, with new standards nullifying old ones. With increased threats, both domestic and international, and the increased amount of data, both from a customer and an operational standpoint, privacy protection is a real concern. IT and OT security projects tend to be long-term and require significant preparation.

Utilities with physical assets in regions that may be vulnerable to attack need to invest in the monitoring and surveillance of technology for infrastructure to provide early threat detection and response.

Addressing current trends will require a workforce that is highly skilled and well compensated. The technologies required to respond to these trends are capital intense, with very high operational costs. Most public power and municipal electric systems will struggle to adapt and/or adopt.

Views from Andrew Duhon, Customer and Support Services Manager, Lafayette Utilities System

Lafayette Utility System is an electric, water and wastewater utility located in Lafayette, LA. Its generating capacity comes from about two-thirds coal and one-third natural gas purchased power. Lafayette is one of a handful of cities with its own municipally owned fiber to the home system, called LUS fiber, so it also provides retail internet, cable television and phone services to residential and commercial customers. This provides a tremendous bandwidth to move all of LUS customers’ data captured by the Smart Grid meter system. In 2008, LUS conducted an evaluation of whether an advanced metering infrastructure system would be feasible. As a result of the determination that it was, LUS applied for and was awarded an 11.63 million dollar Smart Grid investment grant funded by the Department of Energy.
The grant is being utilized for replacing all electric and water meters and the communications necessary to read those meters and connect and disconnect them remotely. An outage management system is being implemented that addresses distribution automation, transmission automation, relay and data acquisition improvements, fault indicators, capacitor controls and voltage reduction. Customer systems such as in-home display and direct load control devices will allow customers to participate more in their usage of electricity and the development of the Smart Grid. LUS has also committed to a power rate study.

Views from Michael Johnson, Technical Marketing Manager, Software and Applications, Elster Solutions

Leveraging data for solutions empowers users to solve problems that are being addressed by utilities today using workflow-driven applications. Aging infrastructures and returns on investment must be considered while looking at the communities that the utilities are serving. Renewable energy must be supported. The industry must be able to improve operations while reducing costs. It must have a return on the considerable investment required to bring its infrastructure into the future.

Energy consumers are going to be looking to better manage their energy usage to achieve lower bills. To leverage the raw data coming in from sensors from meters and other information in the field requires Smart sensors, Smart networks and Smart back office systems to convert data into decisions. In order to address problems, accurate data must be collected, organized, formatted and aggregated into usable information.

Solutions to the Challenges

Views from Marc Gerken, President and CEO, American Municipal Power

AMP began investing in the Smart Grid early on, participating in the Carnegie Mellon Smart Grid maturity survey and pilot program. It created an internal steering committee consisting of IT and operational executive management and senior management on the marketing, technical and Smart Grid side.

The vision of AMP is to provide services to its membership that the individual member would not be able to pursue because of costs. IT and its risks are the drivers of a lot of costs. The ability to utilize data from a Smart Grid perspective will afford AMP and its members opportunities to become public power leaders in areas of power supply and project generation, financial stability, energy efficiency, technology services and safety.

Views from Andrew Duhon, Customer and Support Services Manager, Lafayette Utilities System

With the installation of new electric and water meters comes the capability to use the collectors and repeaters to move data into the meter data management system through a fiber system, and to read meters remotely. These accomplishments have allowed LUS to reduce costs and cut some staff. Remote connect and disconnect features are being implemented, creating connections with customers that can make changes in your business.
LEVERAGING DATA FOR SOLUTIONS

Through our MDMS project, which is still in the process of implementation, we will be able to extract electrical data at 15-minute intervals. We will extract water data hourly, which will preserve the battery life of our water meters. This data aids tremendously in explaining customers’ patterns and use of utilities.

LUS will be going live with a meter data management system this fall. It will provide tremendous amounts of data which will be of benefit to the system in many ways, some of which we can’t even imagine at this point in time.

Our outage management system will go live in the spring of 2014. It will allow customers to communicate and work with us on restoration of power after outages due to weather and give us the opportunity to respond quickly.

Compiling the data collected will allow us to provide superior customer service, troubleshooting high bills more effectively. We will have the ability to remotely disconnect, connect and reconnect customers. These changes will have tremendous impact in the way our customers can interact with us. We will be able to restore power much more quickly and check on customer service benefits and meter readings in real time.

The aggregated data from meters will allow us to troubleshoot mechanical problems more quickly and effectively. We are able to analyze load to insure that the right sized transformer is employed, which has allowed us to replace large transformers with smaller ones and move the larger ones to other locations where they’re needed.

Implementing these changes is a multi-disciplinary effort, requiring the collaboration of customer service, operations, engineering and IT teams.

Views from Michael Johnson, Technical Marketing Manager, Software and Applications, Elster Solutions

The utility industry is correlating and analyzing collected data to perform data analytics and complex calculations that drive intelligent actions and business decisions.

In a Smart Grid, you have field personnel involved that look at different tools to resolve a particular outage situation. How do users make sense of all of the systems and data that they have to deal with to solve problems quickly and efficiently? Application portals allow users to have one integrated workspace, one common link to application screens across multiple applications. Workflows must step the user through the process and must be available everywhere throughout the system. Information must be available on PCs, laptops, tablets and field devices so that all users, including customer service representatives and field personnel, can access systems and get what they need to solve a problem. We must purchase software that is customizable to fit the needs and adapt to the processes of the business, instead of requiring our workforce to adapt to the software system. Using the right system to create and share content and make it easily accessible creates a workforce of super-users. It results in increased productivity. It empowers employees by allowing them to use a tool to customize and share applications and workflows, and to optimize their jobs and be more efficient. It encourages collaboration in information sharing and problem solving. Employees are more satisfied and more productive, which helps the utilities secure their investment in their workforce.
Questions from Marty Rosenberg, Editor-in-Chief, EnergyBiz Magazine, Moderator

What kind of employees will you be looking for to mine this data-rich resource and create actionable activities and processes in your organizations?

Views from Andrew Duhon, Customer and Support Services Manager, Lafayette Utilities System

We need to put a bigger premium on IT professionals who can support the systems, because the interfaces that occur once you start putting the systems together are tremendous. It takes persistence to get the systems to speak to each other, and to transfer the data in a logical manner. Even customer service reps will have to be armed with a lot more information to make informed decisions and to interact with our customers. We’re finding that we can use interval data to pinpoint the exact time that a customer’s high consumption occurs, assisting us greatly to convince the customer that yes, you used this amount of electricity at this point in time. The data can be used to make good decisions and a better customer experience.

Marc, I’d like to pose the same question to you, with this added background. A massive amount of people around the country are going to be stepping out of this industry. Does the topic we’re talking about here create a tool for you to recruit a new kind of worker, and what are the challenges of finding that worker, especially in the rural parts of America where you serve?

Views from Marc Gerken, President and CEO, American Municipal Power

For small communities in rural America, compensation is the biggest difficulty. We still have elected officials and other people that don’t see that kind of compensation, and it messes up their water and sewer, their street department’s compensations. You also have the challenge of what the community has to offer them. We try to do as much empowering as possible, but it’s a challenge. Management must have ties to the outside world and know who can provide services reliably and with very good quality, and that requires managers that can go out and outsource a lot of specialty work. We have to provide empowerment and incentive.
What are some the cultural workplace barriers that you encounter that hinder utilities’ abilities to leverage data for solutions?

Views from Michael Johnson, Technical Marketing Manager, Software and Applications, Elster Solutions

Smart Grid and the IT/OT convergence require a lot of new skills as well as new investments. In the old days, people went out and manually read the meter, and brought the data back. Now there are many disparate communications that have to be maintained. Data has to be mined, collected, aggregated and implemented in the software systems, which requires a good deal of expertise. Systems have to be interoperable. I think the utilities that are really doing a good job have figured out how to accomplish that. Investing in people that have the skills and educating them to come up to speed and embrace the new technologies pays off.

Views from Marc Gerken, President and CEO, American Municipal Power

We have a new generation out there in a new world with wind and solar power and their integration. Technology on turbines and operating systems requires the IT side to be able to ramp up fast. Then you integrate it with the OT side and the long-term service agreements. The systems have to be able to understand each other. Every time you do a warm start or a start or stop, the operating side is impacted. The energy side needs to understand. They need to work together and data has to flow in a lot of different directions. We’re seeing real time operating data from turbines or hydroplants through software. Everybody’s looking at it for different reasons, but you’ve got to integrate it at the end.

Views from Andrew Duhon, Customer and Support Services Manager, Lafayette Utility System

If you can cut your teeth on your CIS system, involving as many different groups as possible, then as you move into AMI and MDS and the like, you can start getting all those groups, customer service, operations, engineering and IT to work together and accept ownership of the system.

Questions from Listeners

Has anyone on the panel seen a direct correlation between leveraging the new data sets with a measurable increase in customer satisfaction? If so, can you please provide an example?

Views from Michael Johnson, Technical Marketing Manager, Software and Applications, Elster Solutions

There have been some things published out in the industry that talk about that. If you think about some of the benefits that can be had with investments in these types of technologies, you’re looking at reduced outage times and better customer service. An AMI network can have the capability to actually tell you in near real-time where there is a power outage, so you’re not waiting for a customer to call in and tell you their power’s out. When they call, you can tell them you already know about it, have figured out where the fault is, and are already working on getting a field crew out to fix it. Customers are already seeing big benefits.
Views from Andrew Duhon, Customer and Support Services Manager, Lafayette Utilities System

We haven’t done customer satisfaction surveys yet, as the system is relatively new to us. I can tell you that the remote connect/disconnect/reconnect process was initially regarded as onerous by the customer, and is now being seen as a good thing, because they can be reconnected much more quickly. We know customers are satisfied with that part of the process.

How do you use the big data to help your business customers and your larger users save on energy costs?

Views from Marc Gerken, President and CEO, American Municipal Power

We think if we can give them real-time ability, and capabilities of real-time pricing, we can help them on the demand response in our area.

Our transmission costs are related to the highest critical peaks. If we can take the data, including weather and load, we can use it make predictions. I’ve got to hit it on the hour. Over the course of a year, I can save ten million dollars in transmission, and that falls back to those people that are willing to shed load and push out load to different hours. With respect to smaller customers, they are able to head into real-time pricing, even at the residential level. It might not sweep over the country overnight, but we see it as a huge advantage to the customer that wants to be more sophisticated and control some of their costs.

In the area of outage response, do you have algorithms to automatically dispatch crews on service orders without submitting it to control room operators?

Views from Michael Johnson, Technical Marketing Manager, Software and Applications, Elster Solutions

Something like that can be looked at where algorithms are concerned. You’re looking at the ability to share the information between systems, so that you’ve got not only the knowledge of what’s going but the ability to enter a workforce management system and determine where a particular fault has to be addressed somewhere in the field. But I would expect that, obviously, something like that wouldn’t be 100% automated. You have to have someone checking to make sure that the right personnel are assigned to go out and address the fault. You can do some level of automation or integration to make that a lot quicker and easier. Using algorithms in your outage management system or your distribution management system to predict where faults occur in the network can trigger the workforce management tool an operator can use to quickly get a crew put together and out to address the issue.
More Questions from the Moderator

_Data is being used to right size transformers. Can you think of other low hanging fruit that will be in the first wave of extracting benefit from this investment in intelligence? What would you like to be gearing up to tackle next?_

Views from Andrew Duhon, Customer and Support Services Manager, Lafayette Utilities System

The example I gave about right sizing transformers does seem to be one of particular interest. We can also use the data in handling capacitor banks and aggregating meter data, and to reduce the cost of re-conductoring and things like that.

On the customer service side, the low hanging fruit for us has been the remote operations and the availability of data to interface with customers. Further down the line, we expect that we will be able to use the data for the benefit of the customer, to make web presentations and offer mobile apps, those things I think are the coming wave. The customer will not only like it, but probably expect and demand it in the future so that they can manage their utilities and bills more effectively.

Views from Marc Gerken, President and CEO, American Municipal Power

Our members are just starting to look at some of the Smart Grid implementation. Outage management is a big low hanging fruit. On the bill side, quicker bills out mean more revenue in. When you can connect and disconnect without rolling a truck out or sending a person out, it adds up. It also resolves a security issue that can occur in some cases in trying to do a shut-down.

Smaller companies are encountering a huge hurdle in managing the large volumes of data. AMP is looking at hosting a data center that can be managed by a qualified third party to help lower costs and impart information. Standardization is key for economy of scale and reliability.

_Reference was made to the availability of Federal stimulus funds to help get you rolling down this path we’ve been discussing. Are you beginning to identify what the next generation of investments might be? Explore ways of funding that? Or is pretty much dealing with what you have right now?_

Views from Andrew Duhon, Customer and Support Services Manager, Lafayette Utilities System

We expect we’ll be dealing with what we have now, since it’s a pretty comprehensive package, integrated and cross-cutting. We are tasked with trying to juggle all of these projects at one time, and to get everything in on budget and on schedule. I see the next wave as being about web presentment, demand-response uses, the sorts of things that will be important to the customer and be an effective use of all that great data.
Has the spend in this area largely ended, or do you see increased investment? What do you hope to buy from that investment if you are going to make it?

Views from Marc Gerken, President and CEO, American Municipal Power

From an investment standpoint, we expect to receive the best return on our investment. The data we amass will enable us to make decisions on generation, building infrastructure, getting into the transmission area and managing load. It will allow us to combine operations, making utility members more competitive. Smaller companies are still very manual oriented, and we may be able to take over some of their services through automation for cost-effectiveness. We see our investments paying big dividends.

If we reassemble one or three or four years from now, what kind of issues will we be talking about when we address the issue of leveraging data for solutions? What are the coming problems? What are the coming opportunities down the road a bit?

Views from Michael Johnson, Technical Marketing Manager, Software and Applications, Elster Solutions

As far as investments go, I think you’re going to see more investment in integrating these systems. They have to be interoperable and able to exchange data. You will see investments in niche applications such as portals, pre-pay, outage management and monitoring of field assets, like we talked about with transformers.

Further down the road, we’ll be talking about how we can ensure the systems can be maintained and migrated and how we can extract more value out of them. We’re going to see cutting edge applications in the convergence of distribution automation and AMI data in the distribution of water, gas and electricity. We’ll be doing advanced analytics.

From an industry perspective, we’ll be replacing an aging workforce, and amassing operational knowledge will enable us to bring new folks coming in quickly up to speed for training purposes. That’s where tools such as embedded knowledge and embedded documentation and training materials, such as application portals and tools, will go a long way toward making changes in the workforce more seamless.
About the Contributors

Marty Rosenberg, Editor-in-Chief, EnergyBiz Magazine, Moderator

Marty Rosenberg is editor-in-chief of EnergyBiz, a national publication covering the energy industry that circulates to more than 24,000 senior executives and managers of the electric and natural gas industry, energy experts and analysts. EnergyBiz has received multiple prestigious Eddie Award medals since its first publication in 2005. Mr. Rosenberg has written extensively about energy, technology, finance and international business. His freelance work has appeared in the New York Times, Seattle Times, Japan Times and other publications. He was previously editor-in-chief of Utility Business, a monthly publication that won numerous journalism awards. Mr. Rosenberg was a Fulbright Fellow to Japan, where he studied economics.

He is a graduate of Reed College and holds a master’s degree from Northwestern University’s Medill School of Journalism.

Marc Gerken, President and CEO, American Municipal Power

Marc Gerken, PE has been Chief Executive Officer and President of American Municipal Power-Ohio, Inc. since January 2000. Previously, he served as Vice President of Business & Operations from 1998 to 2000. Mr. Gerken began his public service career in 1990 with the City of Napoleon as City Engineer. In 1995, he served as City Manager of Napoleon until his employment by AMP. He has been the Chair-Elect of American Public Power Association Inc. since July 2008, and serves as a Director of the National Hydropower Association. Mr. Gerken has provided testimony on numerous occasions to the Federal Energy Regulatory Commission and Congress regarding electric industry issues.

Mr. Gerken has a Bachelor of Science degree in Civil Engineering from the University of Dayton.

Andrew Duhon, Customer and Support Services Manager, Lafayette Utilities System

Andrew Duhon has been the Customer and Support Services Manager at Lafayette Utilities System in Lafayette, LA for almost 25 years.

Michael Johnson, Technical Marketing Manager, Software and Applications, Elster Solutions

Michael Johnson serves as Product Manager for Software and Applications at Elster, a leading provider of Smart Grid Solutions for the utility industry. In this role, Michael works on software strategy development, requirements management and strategic enterprise partner activities. He currently serves on a number of U.S. and international smart grid standards bodies including the IEC TC57 WG14 (CIM) and the Multispeak Technical Committee. Prior to joining Elster, Michael has previously held Software Engineering positions within the defense and telecom industries working on battlefield operational planning software and telecommunications infrastructure firmware. Michael has a B.S. in Computer Science from North Carolina State University.
About Elster Solutions

Elster Solutions is the North American electricity business unit of Elster, a multi-national, 7500-person company providing electricity, gas and water meters and related communications, network and software solutions to customers in more than 130 countries. Headquartered in Raleigh, NC, Elster Solutions is focused on delivering the vital connections utilities need to achieve the greatest possible value from their meter data.

From smart meters and other grid sensors, to advanced metering infrastructure (AMI), meter data management (MDM), network communications, data analytics, and pre-integrated, partner-based solutions for sophisticated grid power management, Elster’s solutions unlock the data stored in electric, gas, and water meters. By transforming meter data into meaningful grid performance information, Elster helps utilities and their customers improve system reliability, enhance operational efficiency, enhance customer service, and reduce their carbon footprint.