

With the implementation of Smart Meter technology and the increasing volumes and types of data available to utility companies, the next challenge before the industry is turning this data into insights. The end opportunity is to run a more optimized utility enterprise – by going from data to insights, leveraging technologies and capabilities in the marketplace today and addressing the increasing challenges, changes and expectations in the industry. This piece describes further the views and imperative to become an optimized utility, outlines beneficial solution areas – many of which are enabled by data, intelligence, analytics and optimization – and provides perspective on how utility enterprises can move further towards optimization.

Context, Opportunity and Imperative for the “Optimized Utility”

In years past – related to the adoption of Smart Meter technology – the focus was primarily on the implementation of the metering infrastructure itself and frequent meter reads. Today, organizations are working to address the question of what they are really going to do with all of this data. This greater volume of data from meters is one of several factors related to this opportunity to move towards greater optimization. The rise of proven enabling technologies (e.g., data management, advanced analytics, and optimization) and their adoption across industries is also bringing to light the capabilities that are available to be applied in the utility industry. Regulators and government groups who have helped to provide significant funds to utilities enterprises are beginning to ask about the benefits that are being provided/ realized from this investment – in addition to the upgrading of portions of the core utilities infrastructure. Finally, with changing regulatory and environmental pressures, increasing need to treat customers as customers rather than ratepayers, many utilities are recognizing a shift in the industry taking place that use of data can help address.

The opportunity therefore in this day and age – with the data, technologies and capabilities available, and the expectations and requirements changing – is to run a better, smarter, or more “optimized” utility enterprise. Such an Optimized Utility can further address the business needs of the core utility, while meeting expectations of regulators and customers.

This opportunity is both critical and substantial. The criticality is driven by the changes in the industry – the regulatory changes, customer expectations, and changing markets with emerging new entrants (i.e., distributed generation) and business models (i.e., plans and approaches to driving adoption of renewable-based services); utilities must determine their views and position themselves relative to this. The substance comes through the benefits utilities enterprises can achieve. In part through analysis by the IBM Center for Applied Insights, findings indicate that utilities can achieve value by progressing their organizational capabilities from monitoring and automating, through sensing and responding, to analysis and optimization. Specifically, ten percent reductions in operations and maintenance costs in transmission and distribution could be realized through improved outage and asset management. Findings also show the ability to drive 2 – 6 percent reductions in peak demand (from a generation perspective), while potentially driving 7 percent reduction in energy consumption and significant decreases in cost to customers through improved outage management.



Insights and Solution Areas

There are number of business solution areas for organizations to consider addressing to move to a more optimized utility enterprise position. Specifically, these solution areas each provide potential answers to the question of “what do I do with all this data from the meters”. For each area below, description is provided; the role of data, intelligence, analytics or optimization are described; as are insights on how leading organizations are starting to addressing the area.

- **Health of the Infrastructure** – through monitoring analyzing the data coming back across the grid from the meters, the health and performance of the meters can be determined. This is achieved through the management of the data, and application of analytics and modeling. One leading utility enterprise, for example, was able to apply data management and analytics to identify upcoming meter failure early, such that changes could be made to the meters collectively before the issue became unmanageable (meaning before all meters needed to be replaced). This same approach applied for other instrumented capital assets.
- **Power Theft** – across the US and to a greater degree in other countries, power theft is a significant issue that impacts revenue and currently the ratepayer (ultimately). Reduction in power theft was stated as anticipated benefit in requests for government funding by a number of utilities. The implementation of smart meters and the more timely and accurate reads they provide is beginning to reveal that the 1 to 3 percent of power that was estimated to be stolen in the U.S. was a low estimate. Through the establishment of advanced analytic detection models, the positive indicators of theft can be identified accurately and early, leading to speed in addressing the theft and increase in revenue. A number of leading utility companies are looking to address this challenge in a more effective fashion, using the IBM Fraud and Abuse Management System and other leading detection packages in the marketplace. Regardless of the tools used, more rapidly eliminating theft can drive direct additional revenue to utilities in a financially constrained environment. Addressing of theft – versus leaving recovery for next rate case – can also build social capital with regulators.
- **Data Provisioning** – increasingly, the expectation is that data be provisioned to customers, meaning that customers are able to see their usage information online or in other similar fashions. Many utilities are providing this information to their customers today; others are expected to follow soon. The effective management, architecture, governance, storage, and security around this data are important to customers’ provisioning as well as security and privacy expectations. Provision of data is one small step towards engaging and serving customers differently.
- **Customer Engagement and Optimization** – focus on customer engagement and the application of analytics and optimization is increasing across the industry and is fundamental to beginning to engage the customer like a customer rather than a ratepayer. This includes the understanding of the customer characteristics; achieving the optimum set up of the right customer on the right channel and on the right product /service. It includes the ongoing cycle of understanding customer action and measuring and refining customer programs based on data. Management of customer, product, and action data is critical to enabling customer engagement, as are the application of business intelligence, advanced analytics and mathematical optimization across the customer engagement cycle. Several leading clients are defining their overall view on the use of analytics to further engage the customer. This solution area is anticipated to be one of significant focus and action, is top of mind for directors and vice presidents of customer service around the country, and will be an area of strong benefit going forward.
- **Demand Response** – related to understanding the characteristics and likely actions of customers is demand response. One must understand that the customers will actually do in order to drive effective demand response. Will customers who are signed up for such programs actually allow thermostats to be adjusted, or will they change them back – reducing the effectiveness of demand response calls? With this understanding of what customers will do, and other constraints around the environment (e.g., market prices,

capabilities, desired daily load curve) optimization can be applied to determine the recommended set of steps to achieve desired actions. This process of achieving the curve most effectively is a core benefit or outcome anticipated by many utility enterprises as they started out on their Smart efforts. Today many organizations are addressing this optimization in manual fashions or using simple tools, while beginning to move towards more leading optimization approaches.

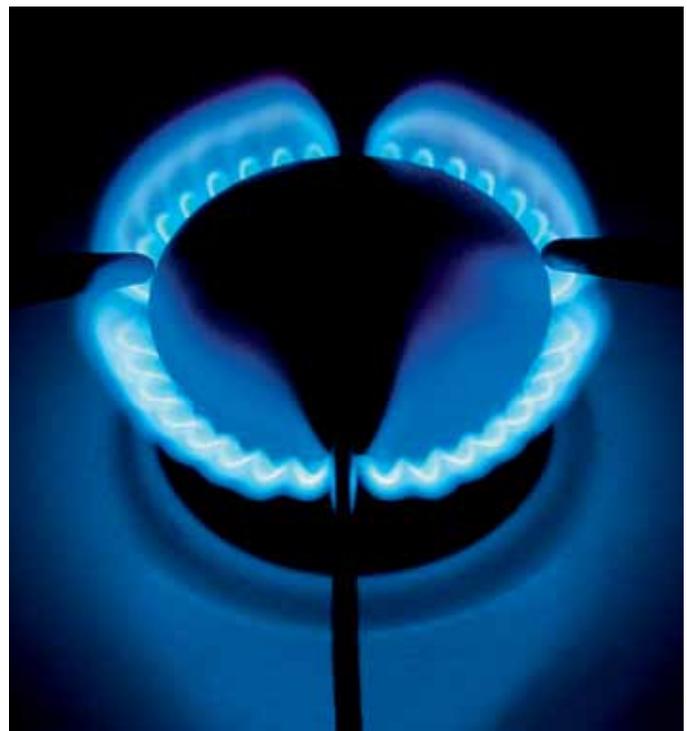
While there are multiple other areas of potential benefit in part from the use of meter data, (including virtual generation, improved business forecasting, and improved rate case filing efficiency) these examples illustrate “smart” ways to get business return from Smart infrastructure investments.

Moving to an Optimized Utility Environment

To move further towards an optimized utility environment, several general steps are recommended.

- Define and Communicate the Vision for the Utility – as there are changes afoot in the market place, it is important for a clear vision forward for the utility to be developed, communicated and known. Such a vision would include clear direction of the future business of the core utility, and the planned approach to the market, customers and regulators. For some utility enterprises, this means that they will continue to generate or distribute, continue to work to operate reliability, bill and collect, and abide by regulatory requirements. Other utilities are additionally looking at new business models (e.g., we will be the one place customers go for all energy related needs). Others are envisioning being data companies versus utility companies in the future. Such visions will provide the common context in which the organization can determine – looking at business needs and technical capabilities together – plans for using data, gaining insights, and optimizing in a way that supports the vision forward.

- Start with the Outcomes and Work “Down” – is recommended to start with a view of business outcomes related to an optimized utility vision, and then work down. For example, perhaps a business outcome desired (meaning as an optimized or smart or leading utility, we should be able to) would be “we systematically roll the right trucks to the highest priority outage locations”. From this question, other business questions arise as how we will know which are the right trucks, which are the areas of outage and of these which are the highest priority. The answers to these questions can be defined, and the needed data to support the questions identified. Advanced analytics can be applied to determine current state related to the overall question, and optimization can provide optimum steps going forward. By addressing this from the top down, one is taking a business-led view, and then one is managing data because there is a case, not just in case.





- Plan and Establish the Information Management Foundation – to support business benefits and solutions such as those described, an enabling foundation should be established. Many organizations have a form of foundation today, meaning various data systems, intelligence and reporting approaches, and perhaps initial analytic or optimization capabilities. It is recommended that – once the vision forward and outcomes from the top down are defined – the needed enabling technical capabilities be defined. Note, however, that in the visioning and top down discussions the capabilities that can be enabled by the solutions feasible in the market today should be shared, so that requirements are determined, not gathered. With the technical capabilities defined, an overall information management foundation can be defined. This means a solid enabling infrastructure, system, data, and technical solution environment – along with the governance and other processes and standards, and enabling software to support the optimized utility. This foundation can then be built/ furthered over time in a phased fashion as the business capabilities and solutions are adopted. This same foundation will support optimization of business processes and outcomes in areas outside of smart meters, such as capital spend and project allocation, asset management, and procurement and supply chain – as a few examples.

It is through these steps, and addressing of the business solution areas of value to a particular organization, that leading utilities will move towards optimized utility enterprises, for the benefit of the core utility, customers, and broader stakeholders.

For more information

At IBM, our priority is to help utility companies transform energy, environmental and sustainability issues into opportunities that positively impact the world. Today, IBM experts are working with utility companies globally to accelerate the adoption of smart grids that can make them more reliable and more efficient. IBM is involved in seven of the world's ten largest automated meter management projects. We are at the forefront of the development of an Intelligent Utility Network, which helps leading utility companies to fundamentally transform the way power is generated, distributed and used. And, IBM has developed the Smart Grid Maturity Model, a proven framework used by utilities to help plan their smart grid transformation. From network revitalization, to asset management, to plant operations; IBM offers smarter solutions, practices and technology that help utilities transform into new symbols of power in the 21st century.

To learn more about smarter solutions for smarter energy, visit ibm.com/energy.

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