Introduction

Evolution. Transformation. These are the words most often used to describe the journey of new systems and new processes being undertaken by today’s electric, gas and water utilities. The goal: a new utility structure capable of meeting the needs of the twenty-first century demands, as well as the needs, of its enlightened customers.

Not surprisingly, big data and predictive analytics provide the transformative cornerstone of the new utility. Terabyte after terabyte of new data streaming in from many different sources has forced utilities to re-examine how they look at information strategy, operational structure and customer engagement, as well as their abilities as an enterprise to cope with change and take more holistic, enterprise-wide advantage of the new data flow.

As operational processes and tools within the grid have increased and matured, so too has the amount of data being collected and the expectations of analytics capabilities evolved. Where once utilities were only able to analyze data on an ad hoc, hands-on basis through white boards, complex spreadsheets and business intelligence (BI) reports, the industry is now moving to a clearer reactive analysis (both descriptive and diagnostic) incorporating a much higher volume of historical data, with more complexity, and analyzing it much more quickly. Knowing what to look for, utilities can also yield insights from real-time information streams. Finally, with historical and real-time data at hand, utilities are also beginning to look forward with predictive and prescriptive analytics, creating real value to proactively mitigate potential operational problems before they arise.

Data analytics is providing utilities with an opportunity to better manage the enterprise based on data-driven decisions. By using analytics, they are better able to improve customer satisfaction through segmentation and communication personalization; improve operational reliability through monitoring and predictive maintenance; and expand operational efficiencies through improved planning and execution.

At the same time, the utilities industry is beginning to change its approach to acquiring analytics capabilities. In the same way it approached transactional applications like customer information systems (CIS) two decades ago, we see utilities now moving from in-house, custom-built data analytics systems to buying pre-packaged, in-application analytics tools and software-as-a-service (SaaS) analytics applications.
Imagine what analytics can do for your business

Top performers are 3x more likely to use analytics than low performers

Use analytics to drive strategy

Use analytics to transform daily operations

Organizations Which Use Analytics Get

For every $1 they spend on analytics, only 17% of utilities are completely prepared for the data influx. Up from 9% in 2012.

...and The Potential for Utilities Is Huge

Just 20% of utilities give themselves an “A+” for getting information to the people who need it. Up from 8% in 2012.

Sources: Oracle Study 2013 -- “Utilities and Big Data: Accelerating the Drive to Value” and MIT, Gartner, Nucleus Research.

There is a seismic shift occurring. Far beyond the technology evolution, a fundamental industry transformation is beginning to occur, a cultural shift in which utilities are altering their thinking about data and analytics, and the ways in which both might be more useful to the enterprise as a whole. Throughout the business, the new data offers distinct opportunities to drive increased operational efficiency and reliability, improved customer service, and greatly enhanced customer relationships. It also offers distinct opportunities to drive better and more efficient operations and maintenance (O&M) spending, including predictive maintenance rather than run-to-failure operations, load forecasting and balancing, asset optimization and failure analysis, better economies of scale, and more.

By operationalizing analytics—bringing analytics back into your business processes, and into your transactional and operational systems and processes—you can optimize expenditures and cut unnecessary costs, and create a more responsive, proactive enterprise.
Utility Challenges Driving the Need for Change

Today’s utility faces complex challenges to its mandate of delivering an affordable product (electricity, gas, or water) to customers reliably, cleanly and safely.

You can imagine them as five cogs that engage to run the business: Infrastructure Transformation, Customer Relationships, Demand Management, Revenue and Profitability, and Environmental and Regulatory Requirements. Additionally, each of these “cogs” interacts in a complex fashion with the rest, continually changing the operating equation.

As but one example, as many utilities complete their advanced metering infrastructure (AMI) deployments, and begin to bring more frequent interval data back to the enterprise to better feed transactional applications such as CIS, customer care and billing, and operational applications such as the network management system (NMS), they are also adopting more informed, proactive and interactive operations and customer service roles, reflecting their customers’ expectations that their utilities will benchmark their own service against that offered by other service providers such as financial institutions, telecommunications, airlines, and the retail industry.

However, the collection of interval data and events through AMI is not a necessary prerequisite for utilities to begin using analytics to drive data-driven business decisions. AMI is but one branch on a much larger, data-driven decision-making tree. Utilities can make substantial changes today with data from monthly meter reads (automatic or manual); supervisory control and data acquisition (SCADA), GIS and other grid sensor data; and third-party weather and forecasting data, or data and feedback generated by customers from various communication channels (including web, mobile and social traffic).

Utilities are continuously focused on replacing an aging infrastructure while under severe economic constraints that not only have negatively affected the utilities themselves, but also their customers, who are similarly trying to do more with less and keep their own costs down. In addition, changing environmental and regulatory requirements – less carbon emissions, more renewable energy, ever-increasing reliability even in the face of severe storms, and better reporting standards, to name but a few – have utilities turning to new tools with increased flexibility in order to continue to increase both operational efficiency and customer satisfaction. Data analytics can assist.
Identifying Utility Analytics Opportunities

Along with new technologies, the utilities industry is turning to refined and robust business intelligence and analytics tools to assist in improving customer satisfaction, reliability, operational efficiencies, and safety.

While “customer need” has traditionally been identified very simply as a basic desire for reliable power and water at affordable prices, in reality customers have come to expect a whole lot more. Many have shown that they want to take an active approach to managing their energy and water usage, to be able to budget and even, in some cases, prepay for these services as they do with other services like mobile telephones. And they want to be able to do it simply, inexpensively, and in the time and communications manner (in person, mail, online, mobile phone app, etc.) that best suits them. In addition, in the case of energy usage, many consumers have indicated that they are in support of technology that will reduce energy waste and help the environment.1

Beyond the overall need to utilize the new data available to improve the utility’s enterprise capabilities, utilities’ specific data analytics needs and approaches are as individual as the utility itself. Operational reporting and tracking of key performance indicators are a must, of course. Beyond this, though, there are a number of key opportunities in which analytics can play a pivotal role in improving a utility’s overall focus on its mandate.

Our 2013 study determined that utilities see a number of opportunities for value from predictive analytics:

- **70%** Improving revenue protection
- **61%** Reducing asset maintenance costs
- **57%** Reducing asset replacement costs
- **54%** Reducing infrastructure costs
- **50%** Analyzing distributed generation
- **41%** Reducing generation planning costs
- **39%** Reducing generation operations costs
- **26%** Assessing electric vehicle impact

Here are a few:

- **Improved customer satisfaction through segmentation and communication personalization.** Customer data analytics, encompassing both structured meter data and more unstructured customer data (such as social media and customer relationship data), can provide the utility with a means to better provide its customers with information about their usage patterns, target them for new programs that better fit their individual needs, establish new pricing programs based on usage, and implement more effective demand response and demand-side management programs. Analytics can also provide information to enable the utility to be more proactive with its customer service: for example, it could easily alert customers to usage spikes that may indicate a water or gas leak or an issue with an electric appliance within the customer’s home or business.

But this data isn’t yet being fully utilized. For example, Oracle Utilities’ second annual study in the Big Data series, “Utilities and Big Data: Accelerating the Drive to Value,” found, in its interviews with 151 North American senior-level electric utility executives, that fewer than half of the utilities surveyed are currently using the new data to provide alerts or make direct customer service improvements. Of those surveyed, 57 percent leveraged the data to provide customers their usage patterns, 47 percent to implement demand response programs, 40 percent to target customers for new programs, 34 percent to establish new pricing programs, and 26 percent to alert customers with usage spikes. Clearly, there is still plenty of room for opportunity here.

- **Improved reliability through monitoring and proactive maintenance.** Operational data analytics can aid a utility by providing both an historic and a real-time view of the utility’s operations. Bring predictive analytics into the mix, and the utility can then begin to compare historical data to identify trends in usage and asset health, overlay weather maps and forecasts, and forecast demand to more accurately predict energy or water usage, grid impact of renewable generation, and more.

Being able to better analyze and predict asset health and manage potential outages or leaks can turn what has historically been a reactive, “run to failure” utility approach to asset and outage management into a much more proactive, predictable, cost-reductive process.

- **Improve operational efficiencies through better planning and execution.** From revenue assurance and employee utilization and prioritized field work to the reduction of both infrastructure and asset replacement costs, predictive analytics can leverage data from multiple sources, across organizational departments, for new insights into utility operational performance.

In fact, the utilities surveyed in Oracle Utilities’ “Accelerating the Drive to Value” big data study overwhelming indicated they expect to achieve the greatest value from new data in mainly operational areas, including revenue protection, reduced asset maintenance and asset replacement costs, reduced infrastructure costs, and the ability to analyze distributed generation.

- **Improve safety by understanding and mitigating risks.** Analytics can be used to proactively approach vegetation management, as well as asset management, eliminating unnecessary outages. Public safety is improved, as well: Besides being able to analyze usage spikes for the benefit of the customer (a potential water or gas leak, or a malfunctioning appliance), usage spikes can also indicate a potential public safety hazard a utility can act upon quickly as soon as it is identified. For example, through daily monitored tests, Oracle analytics detected more than a dozen such cases, including copper theft wherein vacant homes had their copper pipes stolen, causing unfettered gas leakage.

From meter operations, billing support and call center support to revenue protection, demand-side management and distribution operations and planning, analytics offers utilities abundant opportunities to better manage their businesses, and their customer relationships, across the enterprise. And with the new opportunities available, it’s easy to forget that the analytics process is an evolution of learning and integrating. Over time, new analytics processes will migrate into standard operating procedure, to be replaced by newer and even more potentially complex analytics issues.

But this will not occur unless utilities begin to up the stakes on data usage. Oracle Utilities research\(^3\) clearly indicates that, while utilities are using more data today, many are not using that data as efficiently as possible. As a result, they are not realizing the economic benefits of analytics as quickly as they could be. In fact, less than half of the utility executives we surveyed are using the data they have collected to improve their operations. Significant opportunity remains to harness data to improve customer service and satisfaction, as well as asset performance and network reliability, which will result in reduced operations costs.

Utilities Face Key Challenges in Realizing Full Value of Analytics

However, firmly grasping the reins on the opportunities available will require a seismic shift in the culture of the utilities industry. For years now, there has been a growing awareness that historic industry silos need to be pulled down, allowing a more open, holistic and collaborative environment in which data, in particular, is owned and used by the entire enterprise, rather than by specific utility departments. Integrating analytics into historically static business processes will also require a collaborative approach, which will, in turn, benefit the entire enterprise. Finally, as indicated in our research,\(^4\) many utilities have indicated that they still have a data analytics skills gap, which they are closing with a combination of hiring, training, and third-party solutions. Only when these issues are addressed can a culture of data-driven decision-making grow and thrive.


The Analytics Process

When choosing an analytics solution, it is important to ensure it considers the entire analytics process. As shown below, a collaborative approach to the process, enterprise-wide, needs to leverage both the captured data and the expertise from all utility areas, rather than hold it in silos.

As we noted earlier, it is important that data is not kept (and owned) in distinct utility organizational silos. A utility’s ability as an enterprise to cope with change and take advantage of the new data flow requires the data to be owned by and available to the entire enterprise, as necessary, in order to make data-driven decisions.

And while it is strategically important to choose the right solution or tool for the right job—there are different types of analytics that require different approaches, and are used for different purposes or outcomes—it is also imperative to decide where the tools fit in an overall solution, rather than cobbling together disparate reports and one-off analytics projects, and to decide how to share the right information with the right people at the right time (and in the right format) in order to more fully benefit the entire enterprise.

A closed-loop approach is required to create lasting analytical benefits.
Translating Opportunities into Capabilities

In order to fully embrace the advantages of what analytics solutions have to offer, it’s important to look at data, and at analytical processes, across the organization, beyond each of the utility’s traditional organizational silos. There is great value to be had in sharing and leveraging diverse sources of data across the entire utility enterprise. An effective analytics solution better utilizes available resources to focus on the right tasks. As well, it will transform data into actionable information, making it easy for the business to access and utilize the information to drive business results.

But in order to do that, it is essential for a utility to step back and assess its current business processes in order to best utilize the new data flowing in. There is considerable value that can be achieved, but it will take looking far more broadly at the business cases each utility is setting out for itself.

To be able to fully tap the well of new, actionable information available, it’s imperative that utilities ask themselves: “What else can we do? How else can we achieve value? How can we leverage our analytics to change our business processes? How can we better drive our decision making?” This will mean looking more deeply into the analytics pool, sharing data and collaborating across the utility enterprise silos, and experimenting with mash-ups of the disparate types of data the utility has collected. For example: How is customer segmentation impacted by load profile? What data can we aggregate and then analyze across all silos to give us a deeper, more holistic understanding of our business? Or, more specifically: How can we use interval data to drive maintenance activities? How can we use data to more accurately identify where and why power loss is occurring? How can we use data to better optimize our assets? The possible questions are unlimited and, once identified, can provide increasingly stronger business cases for the utility to pursue.
Why Oracle?

Only Oracle addresses the full analytics lifecycle. We provide the deepest and broadest utility-specific analytics platform, both integrated and flexible, allowing for the best performance and scalability. Built leveraging world-class transactional systems and big data technology, Oracle's analytics solutions cover a breadth of functional areas, and have been developed with an understanding of the underlying data structures.

Oracle brings to the table unrivalled industry experience, with proven utility results. With 2,600 utility customers worldwide, and half a billion end customers, we constantly leverage industry standards as well as the needs and feedback of our utilities community, using those real-world needs to hone our products and solutions. Operational rather than simply informational, Oracle genuinely understands utility operations, and we know how to deliver quick wins with a high return on investment.

And with Oracle, there is no "one size fits all" approach. We offer far more: a wide choice of applications and technologies to fit the precise requirements of the problems you are trying to solve. When you choose Oracle, you work with our industry experts to define your immediate analytics goals and your longer-range directions. You move forward at the speed your staff and your budget can accommodate. You choose the right applications and technologies from among the broad array of Oracle solutions.

More than just tools, Oracle provides an out-of-the-box analytics solution that is tuned for performance, focused on the fundamentals that drive utilities today. From credit and collections, revenue and customer to device, grid, and meter data; from work and asset management to mobile workforce, Oracle offers end-to-end analytics for the utility’s myriad systems and processes.

To us, analytics is not just a theoretical exercise; it is a pragmatic approach to getting the most out of the enterprise’s operations.

End-to-end analytics for utilities: practical approach, real results.
CONTACT US
For more information about Oracle Utilities Analytics Solution, visit oracle.com/goto/utilities or call +1.800.275.4775 to speak to an Oracle representative.

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