

FutureReady

WHERE THE SMART GRID IS HEADING

Predictive Analytics:
Transforming Data into
Valuable Business Intelligence

**Meter Data Management
Systems Are Redefining
How Utilities View Analytics**

Powerful Protection:
Federal Mandate Will Change Utility Security

Small Utilities, Big Data:
Tips for Leveraging
New Levels of Intelligence

Compete & Conserve:
How Games Can Drive
Consumer Engagement

News from Landis+Gyr

>
Compete and Conserve:
How games can drive consumer engagement

>
A Message
from Richard Mora

>
Predictive Analytics:
Transforming data into valuable business intelligence

>
Meter Data Management Systems
Are redefining how utilities view analytics

>
Powerful Protection
Federal mandate will change utility security

>
Small Utilities, Big Data:
Tips for leveraging new levels of intelligence

>
News from:
Landis+Gyr

23

79

13

15

17



the **big** data challenge

a message from
Richard Mora

The utility industry is one of many business sectors questioning how to manage and extract value from today's influx of data. An IT blogger recently posed this question to readers, "You know you have Big Data when..." and got a few humorous responses and a few that hit close to home. One that stood out: "Your IT spends more time purchasing storage capacity than making sure the business has the data they need."

The advent of big data from the smart grid certainly poses challenges, but progressive utilities are excited by the potential for predictive analytics. Not only do smart grid analytics offer to improve utility operations and greatly increase efficient use of resources, they serve up new opportunities to engage consumers in efficiency efforts.

Utilities are also connecting with consumers through games and competition. Landis+Gyr is participating in the "Biggest Energy Saver" effort, while similar consumer engagement programs are gaining in popularity. As data flow increases, so does the

importance of MDM systems and other advanced tools. Utilities of all sizes are using data management applications to increase the accuracy of demand response, outage management and revenue protection programs.

Of course, the first step in effective data management is security. The federal government and supporting agencies continue to outline standards and requirements for protecting smart grid systems and data. Landis+Gyr actively extends these efforts by contributing to standards development and deploying and testing leading-edge security solutions.

The evolving smart grid is not without challenges, but the benefits are already helping utilities deliver a more efficient and secure energy future. We hope you find this issue of *FutureReady* informative and look forward to an ongoing discussion on these issues.

Richard Mora

Landis+Gyr President & CEO Americas

Predictive Analytics

Transforming data into valuable business intelligence



Seeking to leverage interval data from smart meters, many utilities are beginning to use predictive analytics to improve performance in everything from grid and asset optimization to customer operations and engagement.

With new regulations and economic pressures — as well as exponential growth in the volume of operations and customer data entering the enterprise every day — it's no wonder that utilities are exploring the potential of predictive analytics to help improve decision making, identify potential risks and opportunities, and provide more personalized customer experiences. Predictive analytics, or the use of predictive models to analyze current data and historical facts, uses algorithms to detect patterns in data to help predict a similar future outcome.

According to a recent report by [GTM Research](#), big data and analytics are creating a complete reinvention of the utility business — by generating new interest in the capabilities of data analytics software that will enable utilities to track, visualize and predict.

Contemporary use of analytics

Many utilities are taking a big-picture view of their data and how to extract the most value from it. According to the [Utility Analytics Institute \(UAI\)](#), a membership organization dedicated to the adoption and use of analytics, the value of meter data analytics is tracking far ahead of expectations.

In its 2012 “[Annual Market Outlook & Forecast](#),” the UAI reports that, while utilities still employ more traditional analytics capabilities, there is a growing

interest in more sophisticated predictive modeling capabilities and automated decision making. The focus of analytics is spreading beyond what happened and why, to predicting what will happen next and being able to take action quickly to adapt for those predictions.

Currently, approximately two-thirds of utilities in North America have launched an initiative around predictive analytics, with most focused on customer operations and engagement. It is expected that as those initiatives evolve, utilities will begin to focus on leveraging data for grid and asset optimization.

“Utility executives are aware at a high level of the capabilities of analytics,” says Dan Hokanson, Director of Meter Data Management Products, Landis+Gyr. He cautions utilities to be thoughtful as they launch their predictive analytics initiatives. “There’s a steep learning curve. In order to begin thinking about leveraging predictive analytics, they’ll need a data platform that will enable them to start looking at data over time and analyzing historical data.”

Hokanson also points to the importance of having a sensor network in place. While meters are a key part of the solution, multiple points enable more efficient network monitoring. “The more places you can pull in data, the more granular you can get with your analysis,” he says.

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Most promising applications for utilities

What assures maximum ROI for utilities seeking to leverage predictive analytics? With more devices being deployed, utilities can take action based on new and abundant intelligence. As a result, predictive analytics delivers measurable benefits to the areas of grid management, outage management, system modeling, grid optimization and distribution automation (DA) .

“Grid optimization and reliability offer more potential for ROI than on the customer service side, especially in light of new regulations restricting load generation,” says Jonathan Leifheit, Senior Product Manager, Landis+Gyr. The most popular applications are outage management, system modeling, grid optimization and advanced DA.

Predictive analytics offers many applications for the customer side of the business, too. A common business use of predictive analytics today is customer churn analysis, or searching for models to help determine which customers are likely to churn so the business can take action to prevent that outcome.

As the UAI report indicates, many utilities use big data to support customer engagement programs — leveraging analytics in order to more precisely communicate with consumer personas by using customer segmentation strategies. “Utilities are starting to understand how to do a much better job at customer segmentation,” says Mike Smith, vice president of UAI.

“For example, a utility can increase participation in its demand response program by understanding the

“The more places you can pull in data, the more granular you can get with your analysis.”

Hokanson agrees. “As utilities find more distributed generation going on in their networks, they’ll need to predict where a load will be at different times of the day and different parts of the distribution network,” he says. “It’s going to be very important to predictively model the peaks of usage and generations that they might not have direct control over.”

behaviors and needs of that customer segment,” he says. Revenue collection is another area that can benefit from predictive analytics. “In dealing with a bad debt problem, for example, by communicating better with particular customer segments, a utility can begin to drive down that debt,” says Smith. “One utility used this technique to drive down bad debt by 100%.”

How to get started

A successful predictive analytics initiative begins with a clearly stated business goal. “Utilities must go in with a focused approach and a clear goal,” says Hokanson. “Think in terms of solving a problem or meeting a challenge. Instead of rolling trucks and putting people in the field, utilities need to go to the data to meet today’s challenges.”

Of course, it is critically important to vet vendors carefully. Ask about staff credentials and the methodology used for adding analytics to the package. Ask for proof points in solution performance at other utilities. Can they show cost savings and improvements?

The Landis+Gyr platform is a robust enabler of analytics. “In fact, Landis+Gyr

is uniquely positioned to provide an end-to-end solution,” says Hokanson. “We have the sensors network, and data platform to enable predictive analytics for valuable business intelligence.”

Conclusion

Predictive analytics promises to be the fuel to power tomorrow’s utilities. Those who prepare today will be far ahead of the pack in the future. Don’t assume analytics are too complex or far-reaching for your utility. Even small utilities can benefit. ■

¹ “The Soft Grid 2013-2020: Big Data & Utility Analytics for Smart Grid,” GTM Research, <http://www.greentechmedia.com/research/report/the-soft-grid-2013>

² <http://www.utilityanalytics.com/resources/insights/top-three-changes-analytics>

³ “2012 Annual Market Outlook & Forecast Summary Report,” Utility Analytics Institute, p. 10, http://www.energycentral.com/marketing/UAI/2011_UAI_Market_Report_Summary.pdf

Here is a step-by-step guide to launching a predictive analytics initiative. Assuming smart meters are installed on at least 95% of your customer base:

1 Clearly define your business goal.

2 Build your IT infrastructure. Make sure all unit leaders are partnered with your CIO and have a clear understanding of capabilities.

3 Ensure the right skill sets are in place. This may require training existing staff or partnering with a third party, employing analytics as a service.

4 Make sure you have a data platform. Historical data will help in predictive analysis. Many utilities are using **meter data management systems** for this purpose.

5 Employ a sensor network that accesses information from meter to substation. The more places you can monitor the network, the more granular the analysis.

grid.com for more information.



Compete

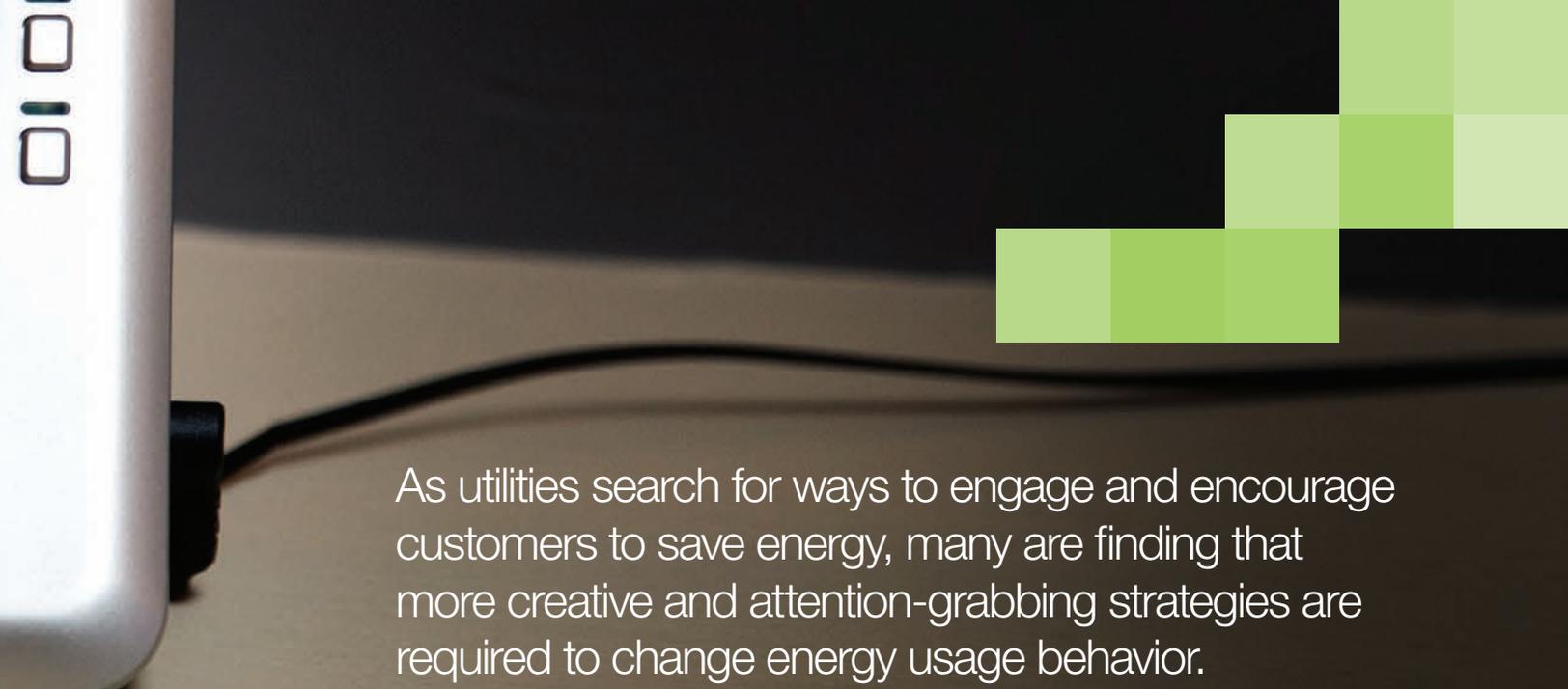
One strategy that seems to be working is gamification, which — in the words of Gabe Zichermann, a leader in the gamification industry — is “the use of game, loyalty and economic concepts to engage consumers and employees.” In fact, since 2010, the use of gamification has caught on in nearly every industry — with big names like Ford, eBay, Oracle, SAP, Adobe and Walgreens. Zichermann projects that the U.S. gamification industry will grow to \$500 million in 2013.

Texas Biggest Energy Saver™ Campaign

One major gamification success story in the utility industry has been the **Biggest Energy Saver**, a campaign launched in Texas in 2011 by Landis+Gyr and other founding partners. In the program’s first year, the goal was to get residential consumers whose electricity is delivered by Oncor or CenterPoint Energy to register for the **Smart Meter Texas™** portal,

reduce their electric energy consumption and demonstrate the benefits of using smart meter data and tools. That year, during the hottest summer on record in Texas, the average savings for the top 10% of contest participants was 26%.

This year, the competition is incorporating a two-pronged approach. In addition to reducing energy consumption, utilities are looking to shed loads around peak periods.



As utilities search for ways to engage and encourage customers to save energy, many are finding that more creative and attention-grabbing strategies are required to change energy usage behavior.

Conserve:

How games can drive consumer engagement

“Gamification is becoming an integral tool in keeping consumers engaged,” says Jonathan Leifheit, Senior Product Manager, Landis+Gyr. “It takes interaction to another level because consumers can see benefits immediately and it keeps them interested.”

Other utilities are integrating social media in their consumer engagement strategies. For example, Pacific Gas and Electric, San Diego Gas and Electric and Southern California Edison

are partnering with Simple Energy to use a gaming application to integrate energy usage data with social media.

Launching a gamification strategy

Of course, a successful data-driven gamification strategy demands a robust and flexible data platform. With the frequency and accuracy of data it provides, Landis+Gyr’s Gridstream data platform can open

many doors to encourage customer involvement in saving energy to lower their bills. “Our Gridstream product line is a proven enabler of gamification and improved consumer engagement,” says Leifheit.

¹ “Gamification: The Hard Truths,” by Gabe Zichermann, Huffington Post, http://www.huffingtonpost.com/gabe-zichermann/gamification_b_2516376.html

Meter Data Management Systems Are Redefining How Utilities View Analytics

Utilities are in different stages of laying the foundation for receiving and managing smart grid data. In addition to smart meters, utilities are receiving more and more data from other distribution assets such as transformers, fuses, switches, reclosers, and other devices and sensors. The potential to leverage this information beyond billing is a reachable goal for an expanding number of utilities.

There are many solutions that play a role in a utility's enterprise analytics approach, and [the meter data management \(MDM\) system](#) is an important one. MDM systems are built to normalize data from many different sources. They scale to meet the daily processing needs for hundreds of millions of reads and diagnostic events, and provide accurate information to adjacent utility systems and business intelligence solutions.



More capabilities, more value

When first conceived as an idea a little more than a decade ago, MDM systems were little more than a repository to store meter data, as a central collection point and a single system of record for all meter data. While modern MDM systems remain the central collection point and the single system of record, they have



matured and are becoming part of an overall analytics strategy for utilities.

“The MDM systems most valuable to a utility’s analytics strategy are those able to validate every meter read every day in order to provide current and reliable data to adjacent solutions,” said Dan Hokanson, Director of MDM Products at Landis+Gyr.

It is also vitally important for MDM systems to be easily interconnected with adjacent systems. The centralized and interconnected nature of MDM solutions give utility departments access to the most relevant data in a ready-for-use format to fulfill the department’s mission — accurate billing data for the billing department, real-time usage data for customer service representatives and timely outage information for grid operators.

Providing analytics through the MDM system is a threefold process:

- 1** Business analytics that are embedded within the core product provide for the basic daily needs of understanding usage and creating billing determinants.
- 2** Additional analytic packages can be added for specialized business cases such as outage management, transformer load management, revenue assurance and more.
- 3** Standards-based integration supports export and sharing of the most current and valid data from the MDM system into enterprise business intelligence solutions for further actions and analysis.

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Everyday operational support

The first step in getting true value from the system is having the embedded analytics that provide daily operational information necessary for the utilities to effectively process the usage and diagnostic event data.

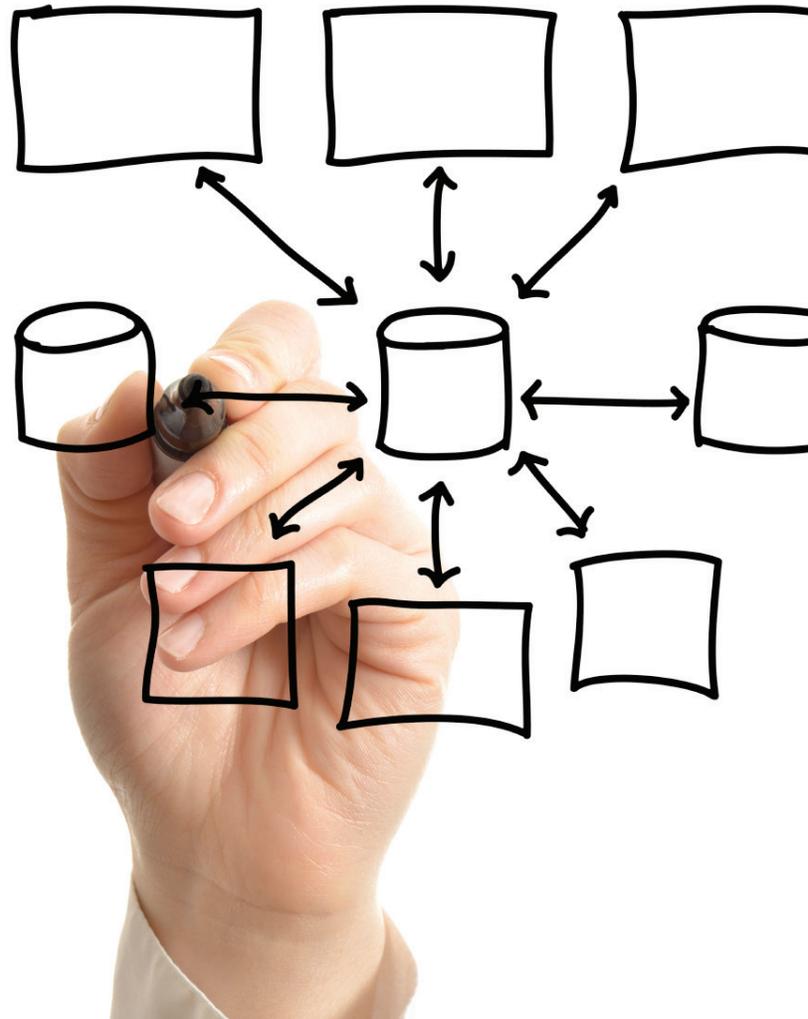
Embedded business analytics like validation, estimation and editing (VEE) rules identify the data outliers, sometimes caused by the communication network being unavailable for a period of time. For example, when communication is interrupted, it can be difficult for smart meter technologies to send only the missing reads back through the validation process. Instead, to ensure that the utility has all the meter reads for that time period, the entire batch of meter reads needs to be sent back through validation processes. This can place an enormous burden on the MDM system to process this missing time period in addition to its normal workload. The embedded analytic approach enables this process to run smoothly.

Specialized analytics

The second step is adding specialized, extended analytics packages that leverage the current and valid data provided by the embedded processes and use it for specific utility programs.

An outage and restoration event is a great example of an operational use case that leverages near-real-time data of advanced meters to augment the information typically found within an outage management system. The extended analytics approach for outage and restoration scenarios leverages data from smart meters to determine the location and size of outages and the effectiveness of the restoration activity.

Because not all of the last gasp messages make it back to the head-end system during every outage, analytics are developed to infer meter status and





determine the scope of the outage event. Once the outage has been confirmed, the analytics coordinates with the VEE engines to generate precise zero consumption reports during outage periods.

“Utilities obviously do not want a consumer portal showing estimated usage during an outage event,” said Hokanson. “That’s why the integration between the outage activity, the validation engines and portal displays must be synchronized.”

Instead of waiting for the consumer calls to report outage locations, utilities are using this type of meter information and the extended analytic packages of the MDM solution to respond quickly to outages. In normal blue-sky operations, a utility can experience thousands of outage events across its service territory. Using extended analytics that leverage meter diagnostic information, the utility is notified of these outages immediately by the MDM and smart metering system, and often these outages are repaired before the customer knows an outage has occurred.

Adjacent system integration

The final step involves integration of the MDM system with adjacent systems. It’s very important that integration tools and procedures are based on accepted standards. This not only speeds up the installation process, but also ensures compatibility with new systems that are added in the future.

International standards are becoming more important to achieve well-defined, non-proprietary interfaces that will work in all regions of the world. One such set of standards are the International Electrotechnical Commission (IEC) 61968 family of standards. The functionality afforded by this series of standards aligns well with other industry or consortium-led standards that are prevalent within the utility industry. These include [MultiSpeak®](#) and the [SAP Meter Data Unification System \(MDUS\)](#) specifications. These industry standards are compliant with the [IEC 61968 standards](#) and interoperate through a relatively short development cycle to create lightweight adapters between protocols.

The analytic capabilities of a central and intelligent MDM system allow utilities to begin identifying many new use cases for the smart grid data. The combination of embedded and extended analytics plays a critical role in enabling many utility programs, adding business and operational value for its smart grid infrastructure. ■



Powerful Protection:

Federal Mandate Will Change Utility Security

On February 12, 2013, President Obama issued an Executive Order designed to improve the cybersecurity of U.S.-critical infrastructure, which encompasses finance, energy, transportation and other industries vital to the nation's economy.

Cybersecurity Executive Order 13636 gives federal technology agency, NIST (National Institute of Standards and Technology), the mandate to work with the private sector to develop a voluntary “framework” of standards, guidelines and best practices institutions can use to reduce the risk of cyber attacks. To that end, NIST is gathering feedback from vendors in the energy and other industries, and developing a framework for public comment, that will begin in October.

Now is the time to get involved

“Utilities should seize this opportunity to make their point of view known before this window of opportunity closes,” says Hugh Head, Senior Product Manager, Landis+Gyr. “We



Homeland Security

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recommend that everyone review the opportunities available to provide input. If you have the means to participate at the federal level, get involved. This is your opportunity to be heard.”

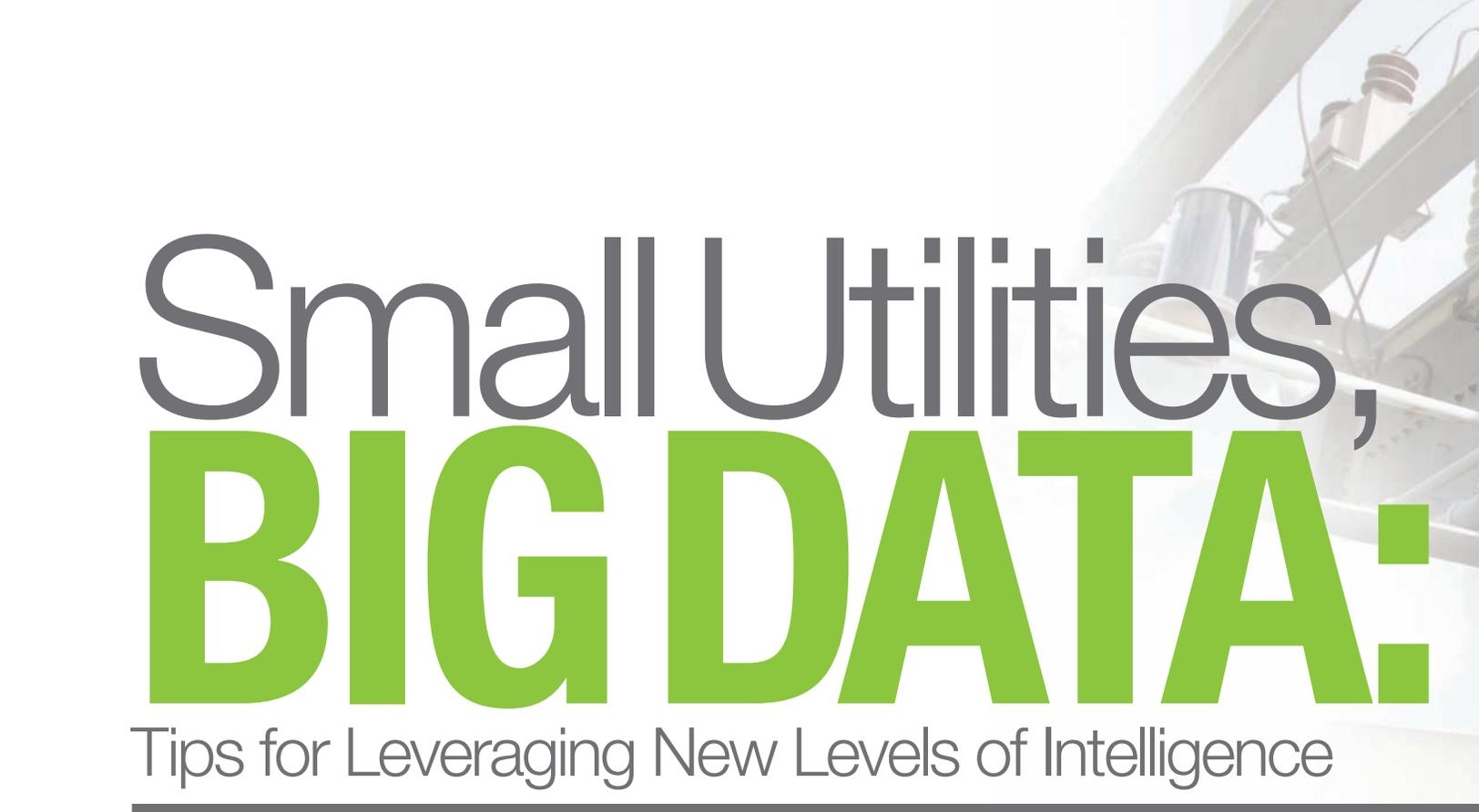
The current draft of the “Preliminary Framework to Reduce Cyber Risks to Critical Infrastructure” is a work in progress. It is available online for review and comments.

Security standards — current and proposed

When all is said and done, though, “it’s not clear how binding any framework that NIST develops will be,” says Mike Demeter, Security Architect, Landis+Gyr. “NIST makes recommendations, not mandates.”

According to Demeter, utilities must adhere to **Critical Infrastructure Protection (CIP)** standards developed by the **North American Electric Reliability Corporation (NERC)**, a nonprofit agency operating under the **Federal Energy Regulatory Commission (FERC)**.

“It is Landis+Gyr’s position that, whatever framework is proposed, it should refer to existing standards or those that will be agreed to by industry groups,” says Head. “There should be no highly proprietary standards. These undermine security in the long run, because they do not undergo widespread testing, application and input.” ■



Small Utilities, **BIG DATA:**

Tips for Leveraging New Levels of Intelligence

To date, [meter data management \(MDM\)](#) has been adopted primarily by larger investor-owned utilities. Now, many municipal-owned utilities and rural cooperatives are looking to implement MDM systems as well. According to a recent study by GTM Research, 70% of the approximately 2,000 municipal-owned utilities, which serve about 13% of U.S. energy customers, could have smart meters by 2017.

GTM Research also forecasts that rural cooperatives will be investing heavily in smart grid technologies, with a major focus on investments in AMI, followed closely by distribution automation technologies.

“Over the past 100 years, as electricity became available to rural areas, meters were read once a month,” says Lisa

Fennell, Director of Sales Engineering, MDM Division, Landis+Gyr. “Later, they were read once a day. Today, data is captured every 15 minutes and, in some cases, voltage values are read every five minutes. That’s 96 intervals a day. Even if the utility has only 30,000 meters, that’s a lot of data. Small utilities need to decide where to expend their resources in leveraging that data.”

According to Fennell, there are two areas in which small utilities can immediately benefit from smart meter data. “Small utilities know that they may soon need to define rates that are amenable to end-use consumers and to prevent the need to purchase energy. Capturing, storing and using interval data is a good thing to be doing right now, while waiting for billing programs to fall into place.”



Best Practices

Here are some data management tips:



Select software that conforms to standard integration practices. You need to be able to easily get data into the system and out again to third-party applications.



Focus on applications that save consumers money, such as outage management and voltage conservation.



Consider Software-as-a-Service (SaaS) solutions from smart grid vendors. You don't need to take on the entire burden yourself.



Look at a total solution platform that will grow with your needs. In other words, don't use a limited CIS system as an MDM that accommodates billing, but does not accommodate voltage data. ■

Real-time data can also help engineers understand how energy is demanded by type of property. With all that data, engineers can understand how to more efficiently design the network, thereby enabling the utility to enjoy significant savings with the infrastructure they deploy.

¹ "70% of Muni Utilities Could Install Smart Meters by 2017," Greentechgrid, <http://www.greentechmedia.com/articles/read/70-of-muni-utilities-will-install-smart-meters>

² "The RuralSmart Grid 2013: A Survey of Utility Deployment, Expenditure and Strategy," <http://www.greentechmedia.com/research/report/the-rural-smart-grid-2013>

Options for Utilities

Landis+Gyr offers many options for the small utility taking the first step toward leveraging the power of big data. Whether the utility wants to own and manage the infrastructure or outsource any part of the data management universe, **Landis+Gyr can help**. It's all about flexibility in how the data is provided.



LIPA Begins **ADVANCED METERING PROJECT** on Fire Island

Long Island Power Authority (LIPA) is moving forward with an advanced metering deployment on Fire Island. The project is part of a plan to enhance service, safety and reliability of the electric distribution system for residents and businesses.

The utility is installing Landis+Gyr's Gridstream® RF network — which enables communication with advanced meters, distribution devices and home area network technology — along with 4,500 E-350 FOCUS® AX-SD advanced meters.

Once the deployment is complete, LIPA will have more visibility into distribution grid conditions. The system will also assist with outage management, provide information to consumers on their energy use and improve customer service by expediting response to seasonal account changes.

“This project is another example of the tangible benefits an advanced metering solution can deliver,” said Gary High, Vice President of Sales at Landis+Gyr. “Gridstream is proven to promote efficiency and reliability of distribution systems, while improving customer service and providing the information to help manage energy better.”

LIPA is a non-profit municipal electric provider based in Uniondale, NY. It owns and operates the retail electric transmission and distribution system on Long Island and provides electric service to more than 1.1 million customers in Nassau and Suffolk counties, and the Rockaway Peninsula in Queens. ■

MDMS

DATA MANAGEMENT UPDATE:

Gridstream MDMS Version 3.2 Released

Landis+Gyr recently announced the release of Version 3.2 of Gridstream Meter Data Management System (MDMS). In addition to functional enhancements, this update aligns Gridstream MDMS with the broader smart grid solution suite for a greater flow of data from an array of grid sensors across Gridstream systems.

The 3.2 release includes SmartData Exchange (SDX), the integration layer for the Gridstream MDMS based on the IEC-CIM family of standards. SDX maintains the adapters for a growing library of Application Programming Interfaces (APIs) necessary to translate messages between Gridstream MDMS and an array of third-party systems, providing data from a variety of end-devices.

“In today's smart grid deployments, utilities are increasingly integrating the MDMS with other systems and continue to rely upon our solution to efficiently process large amounts of data,” said Dave Connaker, President of Gridstream MDMS at Landis+Gyr. “The release of Gridstream MDMS 3.2 builds upon that strong track record that enables millions of data points to progress from information sets to true insights benefiting many stakeholders within the utility.”

Gridstream MDMS 3.2 is available now.
For more information, contact your
Landis+Gyr sales representative. ■

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System reliability
Distributed generation
Data analytics
Grid automation
Interoperability
Consumer engagement
Peak load management

Where is smart grid heading?

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