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FutureReady

WHERE THE SMART GRID IS HEADING

Renewable Energy:
How much is too much?

Is the grid ready for **3.8 million EVs?**

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TODAY AND TOMORROW

News from Landis+Gyr

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a message from

Richard Mora

As utilities work toward a more intelligent and interconnected energy future, they continue to wrestle with complex challenges. For instance, how can they engage energy consumers in efficiency programs and load shedding efforts? How should they prepare the distribution grid for electric vehicles (EVs) and renewable energy sources? In this issue of *FutureReady*, we examine various strategies for addressing these smart grid challenges — and others.

The article, "Utility Prepay Programs: Today and Tomorrow," explains why one Texas utility believes prepayment programs are critical tools for enhancing consumer relationships and managing overall load. Meanwhile, "Three Keys to Consumer Portal Success," offers advice on encouraging personal energy management and driving portal usage. And if you are concerned about grid stability, don't miss, "Is the Grid Ready for 3.8 Million EVs?" It outlines what American utilities are doing to prevent grid overload and maintain service consistency. Finally, "Renewable Energy: How Much Is Too Much?" looks at the challenges of managing wind and solar power — intermittent, two-way energy that can destabilize the grid.

Because controlling costs remains a utility priority, this e-zine also explores the pros and cons of cloud-based computing solutions. In "Cloud Computing: A Smart Approach for Smart Grid?", our experts weigh the potential savings of outsourced solutions against the inherent loss of control.

As with every issue of *FutureReady*, we offer these smart grid insights in the spirit of collaboration and advancement. We hope this issue expands your perspective and enables informed choices. At Landis+Gyr, our goal is simple: To help utilities perform today and prepare for tomorrow.

Richard Mora
Landis+Gyr President & CEO Americas

Cloud Computing:

From Web-based email to online photo sharing to intranet-driven business software, it's clear that cloud-based computing has permeated our personal and professional lives. What's less clear is its viability for utility smart grid needs.

In essence, cloud computing refers to the availability of computing resources (software or hardware) delivered as a service via the Internet. Cloud services might include the use of remote servers hosted on the Internet for accessing applications and/or storing, managing and processing data. A recent survey by IDC Energy Insights found that 36% of utilities are currently evaluating cloud-based technology, and 23% plan to implement a solution in 2013.

So is the cloud right for your organization? "That depends," says Jim Blake, Director of Customer Operations at Landis+Gyr. "What are your objectives, and how willing are you to rigorously evaluate vendors? I have sat in many of the seats our utility customers are in today as they evaluate cloud-based services. The most critical piece is partner selection."

Weighing the pros and cons

Businesses in many industries already rely on cloud computing to meet an array of IT needs, including third-party website hosting, remote file backup, Internet-based software and much more. To evaluate the cloud for smart grid, however, it makes sense to focus on the areas most affected by smart grid technology — operations (e.g., grid management) and finance (e.g., consumer billing). These disciplines would employ cloud computing for:

- *Software hosting*
- *Software hosting, plus data management*
- *Complete system outsourcing (e.g., total administration of a system by a third party)*

A smart approach for smart grid?

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Fewer capital expenditures — For utilities focusing on the bottom line, cloud computing means avoiding some significant purchases. There is no need to buy software, or the servers, racks and other hardware required to support it. No additional staff is needed to operate and maintain the system. All services are typically provided by the solution vendor; the utility simply pays a "subscription" fee from its operating budget.

No asset upkeep, replacement or depreciation — Owning your own computing system means staying abreast of software updates, making sure hardware is operating properly and replacing worn-out components. It also means accepting that, over time, your hardware investment will lose value. Choosing a cloud-based solution bypasses these concerns. Maintenance and updates are the vendor's responsibility, as is the financial burden of asset depreciation.

24-hour-a-day monitoring — To ensure they are functioning properly, servers must be constantly monitored. In addition, they require specific environmental conditions, such as air temperature and humidity levels. Utilities may have to invest money and manpower to accommodate these needs. But with a cloud solution, these duties fall to the service provider.

Expert compliance support — Utilities must comply with a variety of standards — from those set forth by local regulatory commissions to those mandated by the federal government. A cloud-computing vendor with utility industry experience is ready to meet requirements for disaster recovery, security and data privacy, and can "design in" certain features and protocols that simplify compliance responsibilities.

The ability to focus on energy delivery — Perhaps the greatest benefit of the cloud is dramatic simplification of IT management. And with fewer computing details to manage in-house, utilities can focus on what they do best — efficiently delivering energy.

The Pros of Cloud Computing

The Cons of Cloud Computing

Concerns about stability and reliability — Outsourcing any part of your business involves risk. That's because you are relying on the service provider to meet your requirements. Will they fulfill their responsibilities to your organization? Will their service be reliable and responsive? Cloud-computing vendors typically oversee multiple aspects of an IT function –– from the actual availability of the software and/or data (e.g., "It's ready to use when I need it") to the health of the hardware that hosts this information (e.g., "There's a backup generator in the server room if the power goes out"). In some cases, the vendor may manage the entire service. That makes it critical to carefully vet vendor credentials, experience and service-level agreements.

Concerns about service and/or data accessibility — Another common hesitation around cloud computing is disaster recovery. And utilities have good reason to be cautious; after all, they provide an essential civil service. What happens if a utility can't access its software because a third-party server was knocked out by a storm? Reputable cloud-computing vendors have plans in place for restoring service after a disaster, but there are limits to what they promise. Utility decision makers who are uncomfortable with this level of uncertainty must choose partners carefully — to proactively ensure the best possible outcome if disaster strikes.

Concerns about security — When it comes to cloud computing, utilities must be concerned with security on two levels — cyber security (e.g., "Is my data safe?") and physical security (e.g., "Is the server location safe?"). Potential vendors must be able to demonstrate they not only offer the right levels of data encryption and digital access control, but also take care to control physical access to servers and other computing hardware. Typical precautions include on-site surveillance, 24-hour security guards and keycard access for staff.

Concerns over the loss of control — In an industry where IT functions have traditionally been handled in-house, giving up oversight of certain systems may be too hard a sell — for some utilities, at least. Decision makers interested in pursuing a cloud solution must be prepared to make a strong internal case.

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AMI vendors with cloud offerings

Recently, several advanced metering infrastructure (AMI) suppliers have begun offering cloud-computing solutions of their own. Most involve some level of data hosting and/or grid management services. For many utilities, partnering with a company that understands the energy industry brings advantages. Unlike more traditional cloud providers with little or no experience in smart grid, AMI companies understand your organizational requirements and objectives.

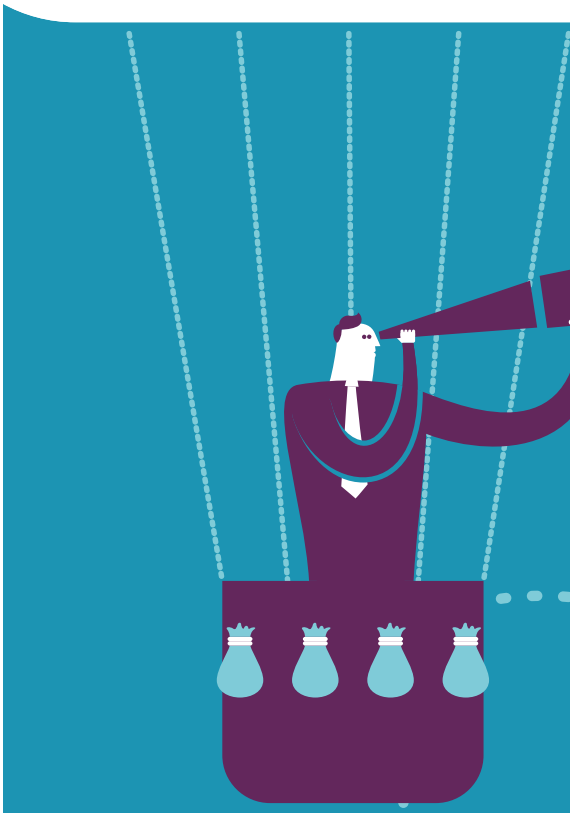
But experience level varies. While most AMI companies are new to the cloud, Landis+Gyr has been delivering cloud-based services for over 15 years. Our Managed Services program serves over 230 utility customers that rely on us for:

- *Hosting and managing of head-end smart grid software*
- *Hosting and managing an AMI database*
- *Managing software and data for RF mesh systems*

In addition, Landis+Gyr offers data hosting for customers that own all of their hardware and software — a service we've proudly delivered since 2005.

While cloud-based computing solutions may not be the best approach for all utilities, their popularity is on the rise. Look for these services –– and the vendors offering them — to support your energy delivery success. But remember to thoroughly evaluate providers before choosing a solution to ensure the greatest return on your investment. ■

A Guide to Evaluating Cloud-Comput Vendors



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Considering a cloud-based solution for your utility?

Be sure potential vendors have smart answers to these questions:

1. What operational methodologies and best practices does your facility/solution follow?
2. What security standards guide your operation?
3. What uptime targets are typical for this type of solution (as specified in service level agreements)?
4. What steps are being taken to meet them?
5. How consistently are they being met?
6. How long has your company been providing these type of solutions?
7. What practices do you have in place to ensure future compliance?
8. What are typical disaster recovery provisions?
9. Does your facility/solution comply with standard IT methodologies (e.g., ITIL, COBIT, etc.)?
10. In what areas of communication/operation are there built-in redundancies?

Is the grid ready for 3.8 Million EVs?

While it's true electric vehicles (EV) are not as popular as once predicted, sales have been steady. In fact, a recent Pike Research study suggests nearly 4 million EVs will be on the world's roads by 2020.[1]

Pike Senior Research Analyst Dave Hurst says, "Sales of plug-in EVs will grow at a compound annual growth rate of nearly 40% over the remainder of the decade, while the overall auto market will expand by only 2% a year."

The continued (if somewhat dogged) growth of EVs may be due to the Obama Administration's advocacy for eco-friendly transportation options. But as more American drivers plug in, can our electric grid keep up?

Utilities are taking proactive steps

According to a 2012 study fielded by Deloitte, American utilities are taking the challenges posed by EVs seriously, but most believe they can handle the predicted uptick without adding new generation.[2] Still, readying the grid for chargeable vehicles takes planning and preparation. And many utilities are taking action.

Examples of EV preparation include:

Determining proximity to projected high-EV-adoption areas

For many utilities, the first step is to assess how likely customers are to become EV drivers. Certain metro areas, like New York City, Los Angeles and San Francisco, are expected to realize high concentrations of EV ownership. According to Deloitte, 70% of utilities in these high-adoption areas either have or are building an EV-integration strategy.

Analyzing "last-mile" distribution grid impacts

A key concern is the possible development of neighborhood "EV clusters," or multiple EV households on a single low-capacity transformer. Many utilities are conducting studies to evaluate the risk of overload in such situations.

Developing time-of-use (TOU) rate models

Some utilities seek to lower the risk of overload by changing EV owner behavior. Through TOU pricing, utilities can offer more attractive rates when energy demand is low. If most owners wait to charge their vehicles until it is less expensive, grid impact can be minimized.

Creating notification programs

In some U.S. regions, utilities are working with vehicle manufacturers and regulatory commissions on a system that alerts them when an EV is sold in their service area. The goal is to provide an accurate tally of local EVs to enable more efficient and effective grid management. ■

[1] "Research predicts 3.8 million EV drivers by 2020," Jan. 9, 2013, FierceSmartGrid.com
[2] "Charging Ahead: The Last Mile," May 2012, Deloitte Center for Energy Solutions

A constant challenge for utilities is finding better methods to engage consumers in energy efficiency and load shedding efforts. One strategy steadily increasing in popularity is the use of consumer energy portals. Allowing homeowners and businesses to review and manage their energy consumption, these secure online sites present a clear picture of how consumers' behavior affects what they pay. Often, this simple step is enough to inspire customers to consume less or shift usage to off-peak times. Portals also enable utilities to more efficiently respond to customer inquiries.

Getting it Right from the Get-Go

Successfully launching a consumer portal means asking the right questions upfront and carefully vetting vendors and solutions. Jonathan Leifheit, Senior Product Manager at Landis+Gyr, has some advice to consider before you dive in.

1 Strongly consider a "bundled" solution

Today, many meter data management system (MDMS) providers and advanced metering infrastructure (AMI) companies offer consumer portals as a smart grid solution component. So before considering third-party portal options, it's smart to check with your AMI provider to find out what they offer. A solution that is already integrated with your AMI technology can ease implementation efforts. Plus, it can facilitate easy add-ons, such as prepayment, in the future.

DID YOU KNOW?

The federal government estimates that 36 million homes and business will soon have access to their energy usage data through the Green Button initiative. Much like a portal solution, Green Button seeks to provide energy consumers with secure access to energy usage information via utility websites.

Keys to Consumer Portal Success

2 Decide what data to present and how best to do it

The data you feed to your portal will ultimately impact how your consumers look at their consumption patterns. So consider your sources carefully. Portals can either use raw, unfiltered data from an AMI system, or they can use data from an MDMS that has been verified, estimated or edited. You'll also want to consider the technology options for presenting usage data to consumers. The greatest flexibility comes from systems with many access options — like Web portals, interactive text messaging and mobile applications. The ability to subscribe to daily email or mobile alerts can be particularly beneficial for consumers, as they don't have to log in to check their progress.

3 Have a thorough communications plan

No matter what technology you choose, customers need to fully understand the benefit of the program before they will embrace it. Therefore, how the offering is introduced and explained to consumers is critical. This will likely involve some marketing investment. Understand how other utilities successfully engaged consumers to gain insight on communicating your program. And don't forget to thoroughly train customer service representatives — they are key advocates for explaining the direct benefits to callers. ■

Utility PREPAY PROGRAMS: today & tomorrow

For many municipal and cooperative utilities, prepay is a win-win proposition. Now, with advances in smart grid technology and market drivers like demand side management, many large, investor-owned utilities are taking another look at prepay programs.

The benefits are obvious. By offering customers the option to purchase their electric usage in regular increments, utilities realize reductions in bad debt and energy consumption, as well as improved operational efficiencies resulting from fewer meter visits and improved customer management. At the same time, customers appreciate the ability to manage energy costs more effectively.

"In fact, the biggest reason utilities should consider a prepay program is that customers love it," says Jonathan Leifheit, Senior Product Manager at Landis+Gyr. "If you look at most of the prepay programs, they have a higher customer satisfaction rate than traditional post-pay programs."

The high level of consumer interest in prepay electricity programs is borne out by a recent survey by EcoAlign, a strategic marketing agency in the energy sector. That study concluded that "prepay electricity shows promise for high satisfaction among the consumers who choose to use it" and that "convenience and control are leading drivers for customer satisfaction with prepay services."[1]

consumer advocates consider them to be too harsh. That's one reason investor-owned utilities may be shying away from launching prepay programs.

"The large utilities are often reluctant to initiate prepay programs because of the regulatory hurdles they need to overcome," he says. "In the past, they encountered a lot of resistance from consumer

energy efficiency. That's because prepayment programs, by their very nature, make consumers aware of their actual energy consumption. As consumers use power, they see their prepaid balance decrease. With that awareness, they begin to exert greater control over their energy usage.

According to Leifheit, prepay customers often report a shift in mindset

"In fact, the biggest reason utilities should consider a prepay program is that customers love it."

What's happening now

Leifheit estimates that there are well over 100 utilities currently offering prepay as an option to their customers, most of which are municipals and cooperatives. Because these programs are often targeted to low-income customers at risk of disconnection for nonpayment — or as an alternative to a large security deposit to start or retain service — some advocates and consumer-friendly boards that consider prepay to be a punitive measure."

Yet, with pressures from many states to implement aggressive energy efficiency initiatives and with advances in customer information available from smart meters, many utilities are reconsidering the benefits of prepay. Beyond the obvious cash flow and operational advantages, prepay programs are proving to be a valuable tool for improving

from powerlessness to the ability to control their electricity spend. No longer at the mercy of the electric utility bill at the end of the month, they can monitor and control their energy usage and costs. "When people switch to prepayment, they tend to consume less energy overall," says Leifheit. A highly visible example is the Salt River Project's M-Power prepaid program. A recent study by EPRI found that M-Power customers tend

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[1] "Prepay energy's pathway to consumer satisfaction and benefits," EcoPinion Survey Results from Texas and Arizona, February 20, 2012, ecoalign: http://www.ecoalign.com/node/400

to consume about 12% less power than those on traditional post-paid power accounts.[2]

Considering prepay?

Utilities interested in launching a prepay program must consider technology requirements. "First, you need an engine that will do the prepay calculations," says Leifheit. "It could be part of your customer information system (CIS) or a separate system. And you should make sure that you have a payment and billing system that can take payments in a variety of ways — such as online payments, kiosk payments or even paying in person at the utility."

When vetting vendors for a prepayment program, integration with the advanced metering infrastructure (AMI) is key. "The integration capabilities between the prepayment vendor technology and your AMI and CIS systems are critical," Leifheit continues. "It's important that the vendor has a successful integration track record."

Does the vendor provide a consumer presentment system? "Look at how they provide access to consumer consumption data and how robust the information is," Leifheit advises. "The nature of prepay dictates you must be able to get balance and payment information to the consumer — typically through a Web-based consumer portal, mobile apps, text messages or all of the above — or the program will fail."

Prelaunch planning must also include preparing consumer-targeted messaging and promotion, along with training of customer service representatives.

According to Leifheit, a successful prepay program comes down to making everything easy for the consumer. "The more difficult it is, the less successful you'll be. It's not an insignificant expense, but it's not a difficult business case to make."

Field report: United Cooperative Services

United Cooperative Services (UCS), a rural electric cooperative serving more than 75,000 member homes and businesses in North Texas, recently launched a new prepay program called PrePower™. Testing began with employees in 2011, followed by an official launch to customers in March 2013.

> **" Our 'aha!' moment came when we realized that our AMI and CIS systems could support it. "**

"We knew that other co-ops and utilities were doing prepay systems for quite a while," says Jared Wennermark, Technical Services/Planning Manager at UCS, "and we always had our feelers out.

[2] "Paying Upfront: A review of Salt River Project's M-Power Prepaid Program, electric Power Research Institute, October 2010: http://www.srpnet.com/environment/earthwise/pdfx/spp/EPRI_MPower.pdf.

Our 'aha!' moment came when we realized that our AMI and CIS systems could support it."

Because UCS had already implemented Daffron software for its financial and CIS systems, making the business case to implement the Daffron prepay program was easy. To implement the solution, Daffron integrated a new module for daily bill processing to the UCS billing system and a customer portal for daily reads.

Although the program is in its infancy, UCS is already receiving positive customer feedback. None of the employees who participated in the initial test have reverted to the traditional payment method. UCS foresees prepay customers growing in number and satisfaction. "Last quarter, we set an all-time high of 91% on the ACSI [American Consumer Satisfaction Index] score," he says. "And we expect, with prepay, that we'll only go up from there."

Additionally, UCS expects to realize the operational benefits they anticipated from the outset — including improvements in cash flow, reductions in bad debt and fewer truck rolls for service connections.

Advice for other utilities

What's Wennermark's advice for other utilities consider making the move to prepay? "Meet with your utility commission," he begins. "The Texas Public Utility Commission gave us approval a year in advance."

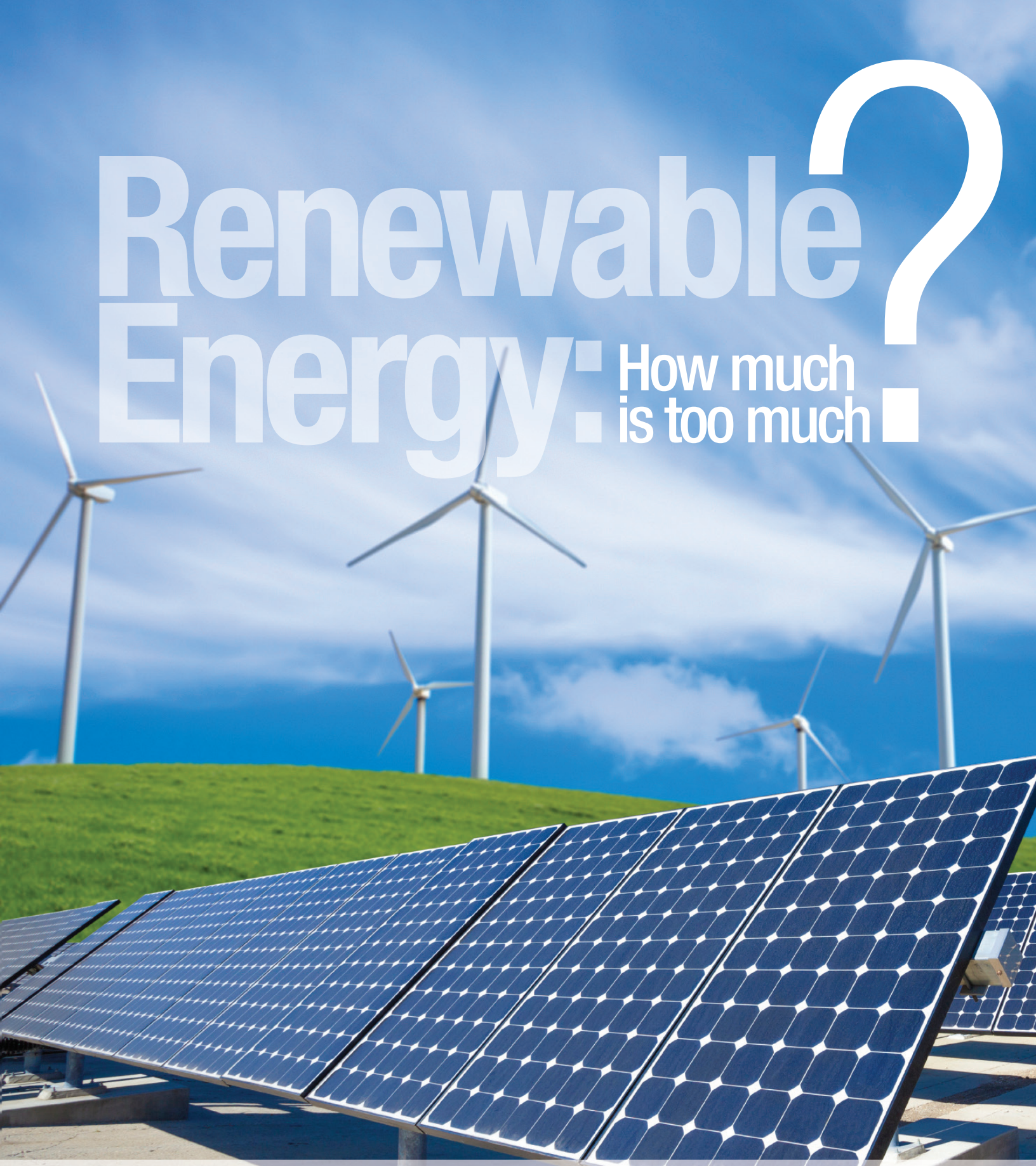
Wennermark also points out that UCS uses daily billing rather than estimation to avoid pitfalls other systems have experienced. "Utility commissions frown on estimation, because they consider it to be potentially discriminatory," he says. "And the rates we charge our prepay customers are not any different. The commissions believe that utilities should treat everyone equitably."

The utility should also dedicate much of its initial thinking and focus around positioning the prepay initiative as a positive member relations program, he adds. "Market it as a benefit, be methodical and take it slow." Leifheit agrees. "Make sure your internal folks are ready and well trained, too," he adds. "They'll get calls, so be sure that your customer service representatives understand all the rules." ■

How Landis+Gyr helps

With its open architecture, the Landis+Gyr Gridstream® solution makes it easy to integrate a prepay solution from nearly any third-party vendor with your AMI system. To date, Landis+Gyr has worked with over 30 U.S. utilities to integrate a prepay solution.

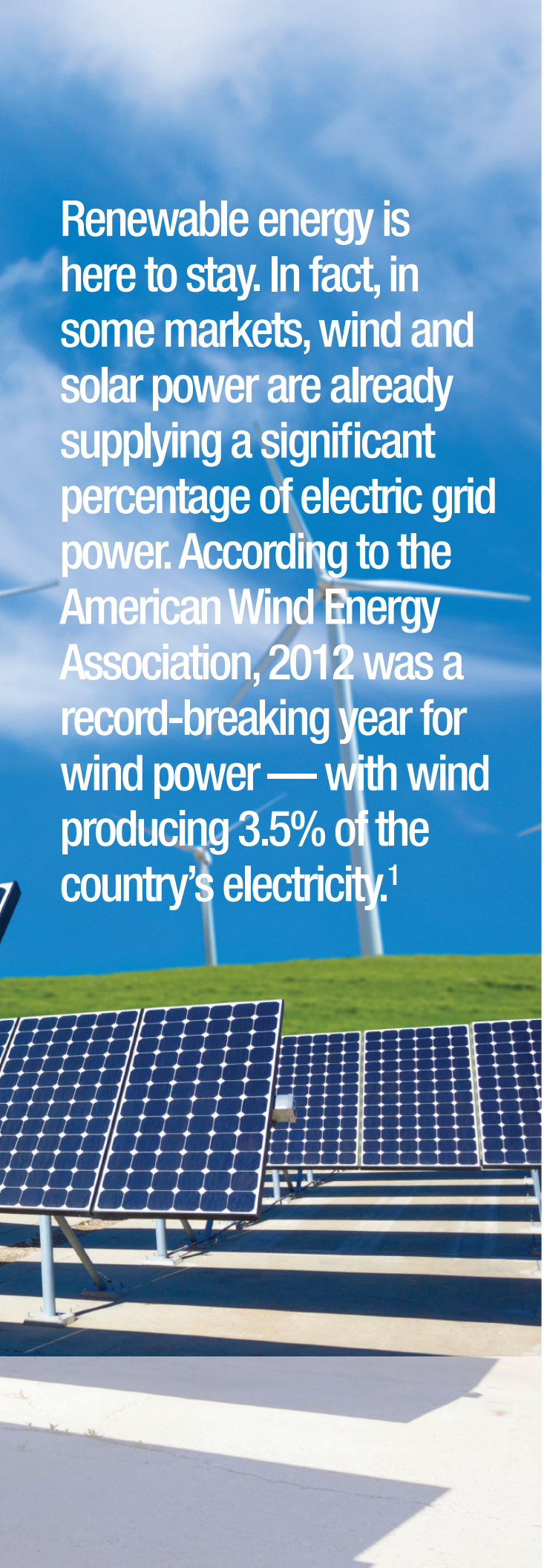
Renewable Energy: How much is too much?



[1] "Wind penetration crosses 10% threshold in nine states. Grid problems to follow?" Smart Grid News, March 20, 2013: http://www.smartgridnews.com/artman/publish/Technologies_DG_Renewables/Wind-penetration-crosses-10-threshold-in-nine-states-Grid-problems-to-follow-5606.html/#.UVBtOnCSLss

[2] California girds for Electricity Woes," Wall Street Journal, February 26, 2013: http://online.wsj.com/article/SB10001424127887323699704578328581251122150.html

[3] "How much renewable energy can the grid handle?," greentechgrid, March 4, 2013: http://www.greentechmedia.com/articles/read/on-the-uncertain-edge-of-the-renewable-powered-grid



Renewable energy is here to stay. In fact, in some markets, wind and solar power are already supplying a significant percentage of electric grid power. According to the American Wind Energy Association, 2012 was a record-breaking year for wind power — with wind producing 3.5% of the country's electricity.[1]

That's the good news. Here's the not-so-good news: The need to effectively manage these new energy resources is creating urgent new concerns about how much distributed energy the electricity grid will be able to handle in the years ahead.

In California, for example, where aggressive renewable energy initiatives are encouraging the use of solar and wind power, energy companies and regulators are working to find a solution to wildly fluctuating power production from renewable sources. According to California Energy Commission Chairman Robert Weisenmiller, many of the sources of wind and solar energy that were added to the grid in recent years "actually made the system more fragile, because they provide power intermittently."[2]

Engineers at many California utilities are taking steps to provide more flexibility for managing the grid and meeting new challenges. Those include handling two-way power flows on networks that were originally built to handle one-way power flows, managing disruptions, integrating data from a wide range of devices, and storing surplus green energy.

Now, the industry is discussing how best to integrate renewables into smart grid initiatives — including the development of parameters for the use of distributed energy resources and determining their appropriate size and scale. At the recent ARPA-E Energy Innovation Summit,[3] for example, experts highlighted the need to predict, plan and manage wind and solar power output in ways the grid can handle. ■

Landis+Gyr Named 2013 Global Company of the Year by Frost & Sullivan

Based on its recent analysis of the Advanced Meter Infrastructure (AMI) market, Frost & Sullivan recognized Landis+Gyr with the 2013 Global Company of the Year Award.

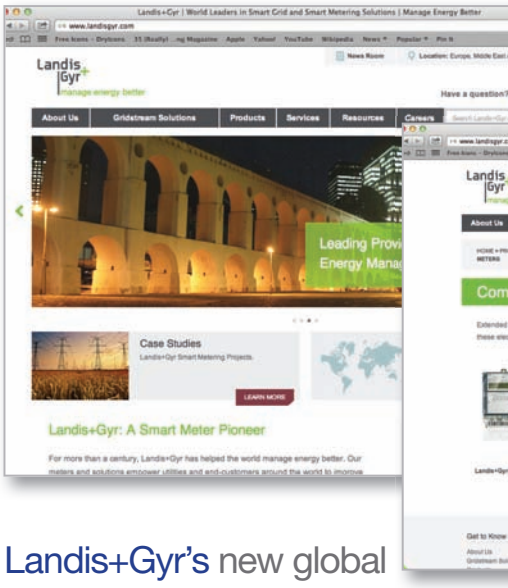
Landis+Gyr was selected for its technology and service offerings that — combined with industry expertise — have made it a sales leader in North America, Europe, Brazil and Asia Pacific. In addition, the company has participated in some of the world's largest smart meter and smart grid projects.

In North America, Landis+Gyr has demonstrated its ability to offer superior customer value through successful projects with leading utilities nationwide. The Texas-based Oncor project is the company's largest advanced metering system rollout in the US, while its residential smart meter, E-350 FOCUS AX, is widely deployed.

In Europe, the company rolled out 200,000 smart meters and deployed load-shifting technology for electric-heated homes in Helsinki, Finland. It also signed a major contract with Ericsson Eesti to enable Estonia's largest distribution company, Elektrilevi, to fully move to smart metering by 2017.

"Landis+Gyr unites its advanced smart metering technologies and services with the Toshiba group's comprehensive expertise in energy management," noted Frost & Sullivan Research Analyst Neha Vikash. "Such synergies allow the company to provide customers with sophisticated one-stop solutions that support optimum power monitoring and management." ■

New Global Website



Landis+Gyr's new global website features many user-centered enhancements, such as improved navigation, intuitive search and quick access to support resources.

The new website serves as a hub of smart grid educational tools, and improves the accessibility of informational assets including videos, white papers and case studies. Today, visitors can now select their region of preference, yet quickly access valuable thought-leadership content from other parts of the world.

Overall, the new Landis+Gyr website delivers an improved visual experience and rich content driven by customer

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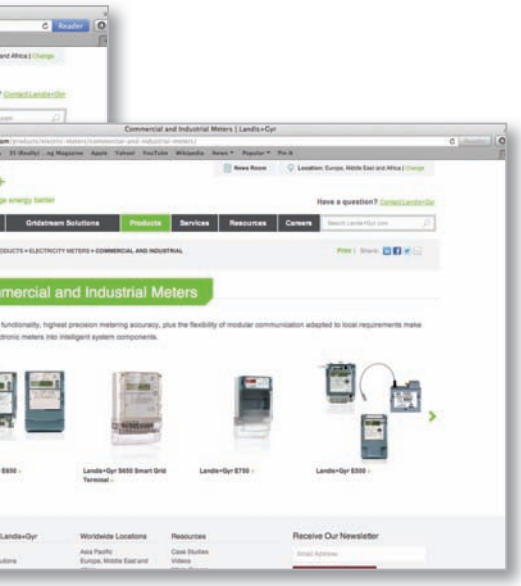

needs. While new features and improvements are ongoing, the coming months include rollout of site availability in 13 languages.

"Our new global website reinforces our position as an industry leader operating on the cutting edge of smart grid technology," said Stan March, Senior Vice President of Corporate Communications at Landis+Gyr. "With an eye on making the site more user-friendly and content more shareable, we've developed a dynamic platform that supports both our worldwide customer base and broader communications goals." ■

yr.com

Lower Yellowstone REA Selects Gridstream® PLX for Advanced Metering Deployment

Lower Yellowstone Rural Electric Association has signed an agreement to deploy Gridstream® PLX, which would offer the utility a large increase in data capacity over legacy power line carrier (PLC) systems.

The utility has used Landis+Gyr's first-generation TS1 system for meter reading since 1999. Deploying Gridstream PLX provides the two-way communication capacity to run the latest smart grid applications and will allow the utility to retrieve interval data from commercial and industrial accounts for load profiling and power quality monitoring.

Based in Sidney, MT, Lower Yellowstone REA is a distribution cooperative that serves residents of northeastern Montana and parts of North Dakota. The area has seen substantial growth from oil drilling and transportation activities on the Bakken oil fields.

"Our service territory is really booming. We've added a couple of new substations and are averaging 30 new meters a month. By updating to Gridstream PLX, we will be able to take advantage of engineering and customer service data that wasn't available to us before and really position the utility to better manage growth," said Corey Candee, Electrical IT Manager at Lower Yellowstone REA. ■

Landis+Gyr
manage energy better

befutureready.com/scalability