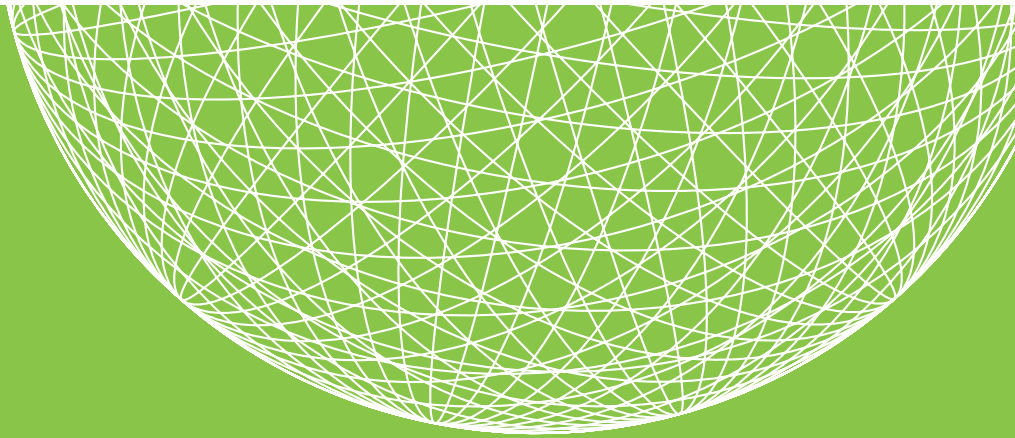


pathway

01



understanding both sides of the meter

business models and customer benefits in the smart world

from the editor



Dear Readers,

Welcome to “pathway”, our new customer magazine. We are living through a time of revolutionary change in the way we generate and distribute energy. In this first issue of “pathway”, we take a closer look at what this means for our customers in the energy industry and for the consumers they serve. We explore business models and customer benefits of the smart world and evaluate the progress of different countries in the EMEA region.

At Landis+Gyr, we believe that the introduction of smart metering and the development of smart grids represent more than just an energy policy development or a phenomenon particular to the energy industry. It's the foundation for the sustainable world of the future. To build a sustainable world, we have to start looking at smart metering and the smart grid as building blocks for Smart Communities, i. e. comprehensive urban systems able to maintain and increase the level of comfort for its inhabitants while significantly cutting energy consumption.

This year, Landis+Gyr became part of the Toshiba Group. Our new parent company has devoted an entire division to Smart Communities. With our wealth of knowledge and experience when it comes to smart metering and smart grids, we will become an important platform within the Toshiba Group. With Toshiba behind us, we are set to become even more effective at completing our mission: helping the world manage energy better.

Jon Stretch

Executive Vice President EMEA, Landis+Gyr

contents



MANAGEMENT AND SOCIETY

large-scale projects – more than just logistical challenges	18
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REPORTS

regulation vs. the market: two nordic tales	6
a blueprint for change	16
power with brains	24



STRATEGY

smart business models	10
customers taking control	14
interview: rules for the grid	15



FACTS & FIGURES

smart figures	4
smart grids in a nutshell	26

EURELECTRIC (Union of the Electricity Industry) estimates: the sector needs to invest € 1.8 trillion between now and 2030 to replace aging plants, develop smart grids, meet surging demand and deliver on environmental targets.

€ 1,800,000,000,000



PIKE RESEARCH SAYS: almost 3.5% of the world's approximately 1.3 billion electricity meters can be considered "smart," and this number is set to grow to over 18% by 2015 · **SAP PREDICTS:** smart grids will require the storage and processing in real-time of up to 100 times the volume of data compared with today's electricity systems · **THE EUROPEAN COMMISSION REPORTS:** where smart meters have been installed, consumers have reduced their energy consumption by as much as 10%. The deployment of information and communication technology could achieve efficiency gains of up to 40% in electricity generation. **PIKE RESEARCH ESTIMATES:** by 2015, annual worldwide smart meter

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revenues will increase to over €2.8 billion · **THE EUROPEAN COMMISSION INFORMS:** up to now the low-carbon energy industry has produced 1.4 million jobs, and this figure could double by 2020 if Europe makes the necessary investment decisions · **PIKE RESEARCH FORECASTS:** shipments of over 200 million smart meters between 2009 and 2015 · **EUROPEAN COMMISSION PREDICTS:** demand for electricity will grow by 38% through 2030 · **EURELECTRIC (UNION OF THE ELECTRICITY INDUSTRY) ESTIMATES:** the sector needs to invest €1.8 trillion between now and 2030 to replace aging plants, develop smart grids, meet surging demand and deliver on environmental targets.



Smart meters in remote areas: just imagine running a monthly reading by a "meter man".



regulation vs. the market: two nordic tales

The Scandinavian countries are among the European early adopters of smart metering and smart grid technology. What can the rest of the region learn from the Scandinavian experience?

The factors driving the deployment of smart technology differ from country to country. A feature common to most is the need to integrate energy from renewable sources, but some variations remain due to differences in generation structure.

Accordingly, there is no such thing as a homogenous Scandinavian experience. The countries in the region are as diverse in terms of suppliers, markets and regulation as the rest of Europe: a closer look at Sweden and Denmark highlights this.

THE REGULATION-DRIVEN ROLLOUT

Sweden started liberalizing its energy market in the 1990s, and together with Norway created the common Nordic power market area in 1996. The electricity industry of Scandinavia's largest and most populous country consists of local, national and international players. The majority of the country's 158 electricity distribution system operators are local businesses. The three big players – E.ON Sverige, Fortum and state-owned Vattenfall – operate distribution networks alongside a high number of local energy companies, which mostly belong to municipalities. E.ON, Fortum and Vattenfall serve very diverse supply areas in Sweden. More than 60 % of E.ON's 1 million network customers are concentrated in the southern part of Sweden.

In 2003, the Swedish government announced that monthly readings of all electricity meters would be required by 2009. Although there were some early adopters, most Distribution System Operators (DSOs) waited as long as possible to upgrade their meters. At the beginning of 2008 only 1.5 million of the country's approximately 5.1 million residential meters had been replaced. About 70 % of the new meters were installed

during the final 18 months of the period between 2003 and 2009.

CHALLENGING VENDORS

DSOs proceeded cautiously and allowed themselves ample time to plan the projects. For vendors like Landis+Gyr, this strategy translated into a considerable challenge: the deployment of a large number of smart meters to a tight deadline. In one example, Landis+Gyr, the undisputed market leader in Scandinavia, was the partner of choice for E.ON Elnät Sverige to install 390,000 meters in remote rural areas. The catch – the job had to be completed within a year. (See special report on page 9.)

Sweden, among the top users of electric energy in Europe, became the first European country to achieve 100 percent penetration for smart electricity meters. According to schedule, the last legacy devices were replaced in June 2009. The Swedish story is an example of a successful regulation-driven rollout under fully liberalized market conditions.

THE DANISH ENERGY MARKET

Denmark took longer to implement the EU directives on the liberalization of the energy market. Full implementation took effect in 2003, when all electricity customers became eligible to choose their own suppliers. Denmark was also the last Nordic country to join the Nord Pool power exchange in 2000. Most Danish utilities are multi-utilities, supplying gas, heat, water, and electricity.

There are nearly 100 electricity DSOs in Denmark, operating at the local or regional level. Denmark is different from the rest of Europe because the ►

Sweden became Europe's first country to achieve 100% penetration for smart meters.



Scandinavia — beautiful, picturesque, and a hotspot for smart metering (above).

DSOs are predominantly cooperatives owned by the customers. The exception to the rule is state-owned DONG Energy, which is also the largest with 970,000 customers, i.e. a market share of almost 30 %.

THE WINDS OF CHANGE

Unlike other Scandinavian countries, Denmark doesn't have a lot of hydroelectric power. However, it does have access to offshore deposits of gas and oil in the North Sea. DONG exploits these resources. Denmark is also one of the world's most advanced developers of wind power technology, which already accounts for almost 20 % of Danish power consumption.

One of the most remarkable differences between Denmark and its neighbours is the fact that Danish power consumption per household is considerably lower than in the rest of the region. Danish households consume on average 3,400 kWh, less than half of the average consumption of a Swedish household. Part of the reason for this discrepancy can be attributed to Danish energy taxes, the highest in the EU, accounting for over 50 % of the retail price.

THE MARKET-DRIVEN ROLLOUT

Another marked difference between Denmark and the rest of Europe is the fact that the country's regulators rejected a mandatory rollout of smart meters. The government decided against a regulation-driven roll out for smart meters in March 2001, stating that the expected cost of around €200 per household was unjustifiable. Going a step further, new energy

market legislation in Denmark now prevents DSOs from recouping their costs for new metering through higher network fees. In this respect, Denmark does provide an interesting lesson for the rest of Europe, proving that there is a solid business case for rolling out of smart technology without regulatory pressure. According to figures from consultancy Berg Insight, presently 1,650,000 smart meters have been deployed in Scandinavia's second-largest country. This equates to almost half the 3.3 million electricity customers in Denmark.

Obviously, there is a compelling argument in favor of smart technology for DSOs who want to improve efficiency and customer service. Nevertheless, Finland and Norway have chosen a regulation-driven rollout, and will require smart meters for all electricity customers by 2014 and 2016 respectively.

EACH TO HIS OWN

The two tales from the North, different as they are, send one strong message: there is no one-size-fits-all approach when it comes to the deployment of smart technology. The Danish example shows that there is a business case for full-scale rollouts by DSOs, provided they are the customer's default metering operator. However, like Sweden, most of Europe has chosen to go down the path of regulation. The Danish and Swedish experiences show that a smart business case can be enough, but regulation-driven rollouts are effective and the more common choice in Europe. ■

case study: e.on elnät sverige

Granträskliden, Sweden – 32 degrees below zero. A snowmobile is moving slowly through the white landscape, heading towards a huge lake, completely covered by ice so thick it seems black. A man gets out of the snowmobile, the bright red of his arctic gear reminiscent of an oversized drop of blood in the snow. His face covered by a mask, carrying a black attaché case, he walks onto the ice to board the hovercraft which has been waiting for him. The hovercraft's engine is fired up, the lights go on and the final part of the trip is underway.

What sounds like a scene from a James Bond movie, was just a normal working day for one of the 250 specialists who installed smart meters for Landis+Gyr in Sweden. E.ON contracted Landis+Gyr to install and manage 390,000 smart meters. The contract included some of the logistically most challenging areas of Sweden. From 1 July, 2009, new legislation obliged all Swedish utilities to read their meters monthly and bill their customers on real consumption. It is impossible to use "meter men" to do this, especially in the north of Sweden where the population density is very low.

WHEN THE GOING GETS TOUGH

"When we got the contract, I knew it would be tough. But I also knew that we could do it and I was right," says a proud Hans Alesund, CEO Landis+Gyr Sweden. Landis+Gyr won the €100 million contract in June 2007 and used the rest of the year to run intensive tests for the final rollout. That left just one year for deploying almost 400,000 meters, some of them in a region where the preferred means of transportation is a snowmobile. "I think the figures say it all – starting in

January 2008 we had 45 weeks to install the meters, if you discount holidays and so forth. That means we had to install an average of 8,900 meters a week, or 1,800 a day. Our top score was a week in which we installed 12,000 meters," says Hans Alesund.

250 specialists worked full time for a year, a fleet of 90 cars and some snowmobiles were purchased and, yes, they did use hovercrafts, too. "There is an archipelago on which some of E.ON customer live. It's not connected to the mainland by roads or bridges. Normally, you get there by boat, but the ice made this impossible in winter. So we hired a hovercraft, complete with crew, to install our meters."

GETTING THE JOB DONE

Timely installation of the meters was just half the battle, however. "The IT side of things was no small challenge, either," explains Alesund. "Imagine a distributed network with almost 400,000 units in the field that have to send their information to a central database. It's a long way between the meter and your bill, believe me," jokes Alesund. In the end all units did communicate with the central IT system running on Landis+Gyr's Gridstream AIM. The Gridstream AIM is a fully integrated Advanced Metering Management software. "With the end of the installation process, our collaboration with E.ON hasn't ended by any means. We have a contract to provide meter reading services until at least 2013."

Hans Alesund and his team got the job done, met the deadline and delivered the complete solution to E.ON at the agreed time. The integrated solution that Landis+Gyr handed over to their customer was vast in its scope, comprehensive in its technology offering, and thorough in its testing. "I want to stress how helpful everybody at E.ON has been: we couldn't have done it without them," Alesund adds. "It was really more than just the usual relationship between customer and supplier. It's a relationship that will continue for a while yet." ■



"E.ON had a very clear idea of what they wanted: it was important to them to use products with a proven track record, they wanted field-tested meters, expert installation and cutting edge software from one supplier. They also wanted a company with a strong local presence."

Hans Alesund,
CEO Landis+Gyr Sweden



Landis+Gyr does whatever it takes to install the smart meters at the customer's home – even if it means hiring a hovercraft.



smart business models

Smart metering and the smart grid are the future of energy management. Driven by environmental and political concerns, the energy-turnaround creates exciting new business opportunities and benefits, for providers, customers and network operators alike.

It's time to smarten up the business model, to make sure that being in the energy business of tomorrow is lucrative as well as sustainable. A report prepared by the consultancy Accenture for the World Economic Forum sums it up like this: "Utilities should consider strategies for transitioning from commodity service provision to a broader set of consumer value-added services early in the planning process."

BENEFITS FOR RETAILERS AND SUPPLIERS

There are numerous examples on how transparency and information create improved services and enhance customer relationships. E.ON Germany, for example, has gone live with the "Energie Navi", a service which allows customers to check their energy consumption in real time. Customers who choose the service are provided with a smart meter and can access the information via smartphones or online. This premium service comes with a slightly higher price tag than the conventional offering.

British Gas in the UK has taken a different approach. The company has introduced "EnergySmart". While allowing customers to track their energy consumption with an energy monitor, and providing an online portal as well, "Energy Smart" is still based on conventional metering. Customers must submit their monthly meter reading online. "Energy Smart" uses a different pricing strategy and is 4% cheaper than the standard tariff. "Energy Smart" is obviously a way to prepare customers for the advent of truly smart technology. The British government and British Gas as one of the leading providers in the UK have made it clear that they are firmly committed to the deployment of smart meters. The Department of Energy and Climate Change announced in March 2011 that the country aims to roll out 53 million smart meters in the UK's 30 million homes and businesses by 2020. British Gas will install over 1 million of Landis+Gyr's "dual fuel" electricity and gas smart meters in the UK's first large-scale rollout. The project is already under way and 20,000 meters will be in place by January 2012.

The information provided by an advanced metering system can improve customer service and will eventually lead to a broader range of tariffs. "It's the equivalent of your PC talking to your printer, or several PCs talking back to one server to listen to your iTunes," Steve Cunningham, CEO Landis+Gyr UK and Ireland, said in an interview with Bloomberg. "In the future, all your devices will know how to talk to the meter to know when the best tariff is available."

A wealth of information

All of this is just the beginning of a fundamental change in the way energy providers and energy customers interact with each other. Smart meters will play a crucial role in building customer intimacy. The idea behind this concept is to create a virtuous cycle, in which the supplier gets to know the end-customer and is able to offer an optimal solution that goes beyond the current one-size-fits-all approach. In the Business-To-Business market this has been standard for years and we will now see a similar development in the Business-To-Consumer market.

Another promising development is the advance of prepaid metering. Similar to prepaid mobile telephony, prepaid metering allows more people access to the grid and guarantees revenue for suppliers at the same time. The deployment of smart meters able to switch between credit and prepayment is especially promising, since it minimizes site visits and offers a variety of ways for customers to add credit to their meter (see special report on prepaid metering on page 14).

From "turbine to toaster"

One of the key drivers for the deployment of smart grids is the growing need to integrate intermittent renewables. There is potential to turn this into a win-win proposition for energy providers and customers; by offering clean energy to progressively more conscious consumers at premium rates they simultaneously fulfill their responsibility towards society. A smart grid will allow a "turbine to toaster" delivery of energy on ►

"Utilities should consider strategies for transitioning from commodity service provision to a broader set of consumer value-added services early in the planning process."

Accenture report for the World Economic Forum

a broad scale. The smart grid allows full control of the energy flow, from generation to delivery into the end customer's home, i.e. from turbine to toaster. Using smart grids, providers can create a premium segment of energy and guarantee that it is generated by renewable sources.

BENEFITS FOR CUSTOMERS

Imagine the following scenario: you get your monthly phone bill, but it isn't based on the calls you actually made. Rather, it's based on an educated guess on the part of your provider. Maybe it's more, maybe it's less — you'll find out by the end of the year. That may not sound attractive, but it's the way in which energy customers have been billed ever since the electrification of households.

Deployment of smart technology means fundamental change. For the first time, customers will receive bills based on actual rather than estimated consumption. A recent report by consultancy Berg Insight has this to say about the topic: "In the new competitive energy market environment where customer retention is a top priority, there will hardly be room for estimated bills in the longer run."

The consumer's awakening

This, of course, is just the beginning of what a report by the consultancy Pike Research calls the "consumer's awakening". Consumers will be empowered in a number of ways: they will be considerably more aware of their energy spending and consumption, they will ask for more choice and tailor-made tariffs and they will start relating differently to energy suppliers and retailers.

At the moment, contact between retailers and customers is almost exclusively limited to moving house and complaints about bills. Under the new framework, customers will start looking to suppliers and retailers as partners and consultants to help them optimize their use of energy.

Another interesting option for both individual and institutional customers such as schools and universities is the possibility of becoming prosumers.

Climate and environmental concerns have arrived in the mainstream: the use of solar panels and other forms of microgeneration are well on their way to becoming a mass market. The benefit of becoming a prosumer is twofold: people can save money on their energy bills while making a contribution to building a sustainable society.

Talking to the grid

Conscious consumers, aware that energy is no longer the cheap and abundant commodity it once was, might eventually be willing to delegate a level of control over their smart homes to their energy providers.

The success of the HAN, (Home Area Network), incorporating any number of smart appliances controlled by a smart grid, depends on consumer acceptance. According to the Pike Report, the jury is still out on the HAN. At the moment, a number of pilot projects are underway in Europe and the United States to gauge consumer response.

Integrating the prosumer

An intelligent distribution network is essential for the integration of "prosumers". This expression, a portmanteau word combining the terms "consumer" and "producer", refers to customers who will also feed electricity into the grid.

Obvious examples of prosumers are institutions or individuals generating electricity with rooftop solar panels. Energy providers can act as retailers for the necessary hardware and as consultants for consumers interested in becoming prosumers. A comprehensive smart grid will also allow providers to manage energy more efficiently through enhanced demand response. Conscious energy customers will be empowered to shift their use away from peak times, or move it to times when energy from renewables is available.

BENEFITS FOR NETWORK OPERATORS

Active network management is a popular topic among network operators. A number of pilot projects have shown that the use of smart technology improves grid reliability, minimizes losses and allows for better load forecast and planning.



Hydropower: large-scale and sustainable.

To give a more concrete example: a smart grid is able to measure wind intensity and air temperature. Strong wind and low temperatures can act as a natural cooling mechanism for instance, allowing a higher load to be sent through the line. Based on this information, it can make a decision to increase or decrease the load of a particular part of the grid. This way, the grid can be used more efficiently and material failure can be avoided, reducing the operator's costs.

The large-scale deployment of smart grid technology will boost the networks' asset value and allow network operators to shift their maintenance strategy. Presently, network operators are mostly forced to employ a "run to failure" strategy. Running to failure to fix a "dumb" grid means the network operator, alerted by a customer calling to report a problem, responds to the alert by sending out a repair crew. Smart grids would allow them to shift to preventive maintenance strategies.

Experts assert that a smart grid will also provide higher quality power. Outages and power quality issues cost suppliers and retailers millions of Euros every year – smart grids guarantee more stable power, reduce downtime and put an end to such high losses.

Maximizing efficiency

The state of the grid differs greatly from country to country, but investment in maintenance is a necessity everywhere. Investment in the smart grid allows operators to get the most out of their investment, by efficiently utilizing the existing infrastructures. In the words of the consultants from Berg Insight: "Harmonizing local distribution with interregional energy flows and transmission traffic improves the use of existing grid assets and reduces grid congestion and bottlenecks."

THE SOCIAL RETURN

Comprehensive deployment of smart grid technologies means competitive advantages for the regions and even nations that move first. Demanding, environmentally conscious consumers will put pressure on businesses to invest in places that can guarantee a sustainable, efficient use of energy.



On the way to becoming a prosumer...

However, simply looking at the conventional business case provides too limited a perspective. Governments, businesses and citizens will need to find their roles as participants of the smart revolution.

The Accenture report offers the following recommendation: "It is recommended that utilities adopt a more holistic approach to business case building. By widening this value proposition, they will build their regulatory case and demonstrate to their consumers the broader benefits cases, which will be realized over time."

Aligning incentives

Adopting a more "holistic" business model is easier said than done, however. The onus is on governments and regulators to create more comprehensive frameworks and align incentives for each participant in the energy value chain. One possibility might be implementing a regime similar to the successful emissions trading scheme that penalizes wasteful, conventional energy management and delivery while rewarding smart, modernized ways of doing it.

Another important part of the social return will be the creation of secure, well-paid and highly skilled jobs in the energy sector. This is of special interest to DSOs, vendors and technology companies in the developed world who are currently at the forefront of the development. They will set benchmarks and have the chance to export their hardware and expertise to the rest of the world.

Every region and country will have to find an individual solution, which balances these two key interests: sustainable, affordable and efficient energy for customers and a viable business model for providers and network operators. ■

pay-as-you-go: customers taking control

An exciting market to watch out for is prepaid metering. Traditionally a solution for customers of small means, there is a good chance that this is about to change with large-scale rollouts of smart meters.



Modern consumers have a different perspective on pay-as-you-go

“It makes sense – if we are talking about customer awareness and control, there is nothing like seeing how much credit you have left on your meter”

Steve Cunningham,
CEO Landis+Gyr UK and Ireland

In the recent report from Berg Insight, the authors conclude that: “Another possibility with smart metering is to offer prepaid energy services, which has proven to be popular not only among customers of small means, but also in the significant group of consumers who generally feel more comfortable with paying in advance.” There are a number of factors driving this development. Most importantly, many customers have become used to “pay-as-you-go” mobile phone credit and regard it as an efficient way of cost control. Another reason is related to the shift of employment patterns – more and more jobs are becoming globalized and project-based.

NO RED TAPE – JUST POWER

For the modern, nomadic employee, who needs to spend two months in one country and three months in another, long-term contracts are cumbersome and impractical. Prepaid solutions, especially ones based on smart metering technology, are the ideal solution. The same is true for student housing and any kind of environment in which tenants change frequently. Smart meters with communication capabilities make buying electricity as easy as topping up mobile phone credit. “Eventually, you will be able to buy electricity credit using the ATM, just like you do it for your mobile,” says Steve Cunningham, CEO Landis+Gyr UK and Ireland.

All the 30 million meters to be deployed in Britain by 2020 will have the capacity to switch between prepaid and credit-metering. The UK is currently the only European country in which prepaid metering, based on conventional metering infrastructure, is already widespread, with an estimated 13% of electricity customers making use of the service. “Customer associations in the UK estimate that with smart technology, the prepaid segment will see some significant growth and we might be looking at 40% rather than 13% in the medium term. It makes sense – if we are talking about customer awareness and control, there’s nothing like seeing how much credit you have left on your meter,” Cunningham points out.

ELECTRIFYING EVERYBODY

Outside Europe, prepaid metering has been implemented for a different set of reasons. On the

African continent, for example, prepaid has been the technology of choice for the electrification of households. “While prepayment metering is offered to a broad spectrum of consumers, many customers living in remote, rural places might not have stable incomes or even a postal address to send the electricity bill to.

The prepayment solution allows them to purchase prepayment tokens within their budget and only pay for what they use,” explains Dave Tarr, Marketing & Product Manager for Landis+Gyr in South Africa. “Prepaid metering connects them to the grid while protecting the revenue of retailers and suppliers.” In South Africa, Landis+Gyr pioneered the “Split Prepayment Meter” solution, with a keypad to add credit inside the customer’s home and the actual meters installed outside. “This gives providers access for maintenance and reduces the likelihood of energy theft and tampering with the meter,” Tarr comments.

A BROADER TREND

The current split prepayment meters used in South Africa aren’t fully-fledged smart meters, but in order to provide flexibility to the energy provider, the meters supplied by Landis+Gyr in Africa already have the capacity to switch between prepaid and credit-metering mode. In addition, Landis+Gyr equipped them with remote access capabilities. “Utilities can make use of two-way communication with the prepayment meter, they can monitor the condition of the meter, be alerted to tampering and fraud and look at consumption patterns, for example,” says Tarr.

While being crucial to the electrification of households, prepaid metering in South Africa is experiencing the same trends towards broadening the target group. Tarr puts it like this: “There is no doubt that the increased awareness of what they are consuming and the visibility of their remaining energy on the in-house display creates a more energy-conscious consumer. Customers from all segments like to have control. They don’t want to receive estimated bills for times when they were on holiday, to give just one example.” With smart meters, prepaid metering becomes a win-win proposition. It secures the revenue of suppliers and retailers while giving customers full cost control and easy access to the grid. ■



Interview with John Harris,
VP, Head of Governmental
Affairs and Communications
EMEA, Landis+Gyr

John, as Head of Governmental affairs, you are often in Brussels and in close contact with policy makers and regulators. Can you bring us up to speed on where we are regarding a comprehensive regulatory framework for the rollout of smart metering technology?

The 3rd Energy Package provides a good basis for a European Union policy framework on smart metering. It foresees a ten-year rollout of smart metering in the Member States with 80 % of households being equipped with smart meters by 2020 — contingent upon an economic assessment in the individual Member States, should they choose to conduct one. The Member States are in the course of transposing those directives into national law, and conducting their economic analyses. Some are moving faster, such as Finland, which mandated that 80 % of end consumers be equipped with smart meters by the end of 2013, and others are moving more cautiously. Nonetheless, in its Communication on Smart Grids, published in April of this year, the European Commission recognizes that under the current regulatory regime, investments in smart metering and smart grids technologies are not being made quickly enough, and there may be a need for adjustments in the existing regulatory framework.

What are the main regulatory challenges for smart metering and smart grids investments?

Not surprisingly, there are different views when it comes to who should pay for what. In other words, how much of the investment should

rules for the grid

network operators be able to recover via increased grid-use fees, i.e. rollover to the end consumers. Some say that they should be able to cover the entire cost of the rollout, including the preceding pilot projects, but the consumer groups say that the network operators will also derive benefits from smart metering investments, so the consumers should not have to pay for the whole thing.

How do you assess the situation?

Landis+Gyr has been saying all along that the beauty of smart metering lies in the fact that the benefits are distributed all along the value chain: from the end consumers, who get accurate bills and detailed information on energy consumption and costs to the distribution system operator, who finally can see into the last “blind” mile between the substation and the point of consumption, thereby optimizing network operation and investment decisions. The transmission system operator benefits by increased information from the distribution grid and even generation is helped — especially as we move to increased renewables and microgeneration. And, of course, society as a whole benefits through a more modern and efficient energy supply system. The problem is that the benefits are longer term and distributed, whereas the costs are usually short term and concentrated. Therefore, there should be a fair distribution of costs, which will probably include grid-use fees.

Besides the question of how the investments will be paid for, what other contentious issues are there?

Sometimes I think the public debate is too narrowly focused: what is the energy savings potential for the final consumer or what will be the cost-benefit-analysis for the distribution system operator? The discretionary consumption of the final consumer will vary from place to place, and the French regulator, CRE, has said that any economic assessment of smart metering that focuses exclusively on the distribution system operator will be distorted. All of the actors in the value chain and society as a whole have to be taken into consideration. As I said earlier, any

examination of smart metering has to look at it as a comprehensive whole.

Where is public policy in regard to smart metering and smart grids heading beyond the 3rd Energy Package?

One of the flaws in the 3rd Energy Package was that it never defined smart metering, or “intelligent metering systems” as the legal text calls it. In the meantime, the focus of policy-making has shifted from smart metering to smart grids and to the energy efficiency aspects. Member States could implement whatever they wanted and call it “smart metering”. The smart metering standardization work among the European Standardization Organizations, CEN, CENELEC, and ETSI has done much to alleviate this by their listing of “additional functionalities” for smart metering. Furthermore, the smart grids communication from the EU I mentioned earlier, as well as the proposal for a new Energy Efficiency Directive the Commission published in June, make it clear that a smart metering system must have two-way communication and should “facilitate energy efficiency within the home.” This aspect will become even more important as we move beyond smart metering to developing smart grids.

What do you mean when you say “beyond smart metering?”

We are moving toward a dynamic energy supply system, with multi-direction energy and information flows—a smart grid. There is going to be increased need for information and control in the distribution network. The transmission system operators are not going to be able to do all the things demanded of them politically without some sort of congestion management at the distribution level. That implies knowing what is happening at the point of consumption. This is where smart metering really shines, it’s where the smart grid meets the end consumer and the smart home. The European regulators are already giving some thought to this issue and looking at the take-off of a demand response market with smart metering. ■

british gas: a blueprint for change

With the decision for a regulation-driven rollout of smart meters in the whole country by 2019, the UK has become one of the European hotspots for smart metering. British Gas, the largest retailer in the UK, has chosen Landis+Gyr to deploy over a million “dual fuel” electricity and gas smart meters. This early move will serve as a blueprint for subsequent rollouts.



THE BRITISH MARKET IN BRIEF

The foundation phase rollout happens in the environment of the most competitive energy market in Europe. Six major players and many smaller ones compete in the electricity and gas supply markets that have a combined value of more than €29 billion. British Gas, a subsidiary of Centrica is the market leader in both segments. Britain was the first European country to liberalize its energy markets in the 1990s. Unlike in most other European countries, the domestic energy metering market in the UK has been opened up for competition.



“Supplier changes are very common in Britain, happening at a rate of about 100,000 a week. That’s certainly a significant number, but it still takes 28 days to change supplier in a conventional metering environment. This time will come down significantly in the smart world.”

Steve Cunningham, CEO Landis+Gyr UK and Ireland

The British government is taking a proactive stance on combating climate change and regards smart metering as an important part of its policy. The official position is neatly summarized on the website of the Department of Energy and Climate Change: “Smart meters will play an important role in our transition to a low-carbon economy. They will help us meet some of the long-term challenges we face in ensuring Great Britain has an affordable, secure and sustainable energy supply.”

The cooperation between British Gas and Landis+Gyr is of particular interest, because it will precede the massive effort necessary to install 53 million smart meters for 30 million homes and businesses by the end of this decade. As part of the development, Landis+Gyr will share details of its smart metering system, allowing UK businesses a fast track to the creation of new and innovative solutions aimed at consumers, suppliers and utilities alike.

PIONEERING STANDARDS

“Together with our customer British Gas, we are part of what is called the foundation phase. The experiences of this phase will inform the way in



which full-scale deployment will be handled. We will pioneer the technical and practical standards that we hope will see every home and business in the country switch to smart metering within the next decade,” explains Steve Cunningham, CEO Landis+Gyr UK and Ireland.

Another reason for British Gas and Landis+Gyr to choose an open development is the ambition to integrate existing standards wherever possible. The intention is to encourage the faster development of a range of ‘smart’ household appliances, from intelligent dishwashers to self-regulating heating controls.

BAKING THE CAKE

Landis+Gyr started installing the first devices in August 2011. “We are excited because it really is a high-end package that we are delivering. The equipment’s level of functionality is cutting-edge and together with our touchscreen In-home displays will make for a whole new customer experience,” says Cunningham. The energy efficiency project could save consumers more than €223 million in energy bills. The British Gas project aims to be a real test for the technology, which

means that the 1 million meters will be deployed all over the country, exposing the technology to tough, real-life conditions. Another challenge Landis+Gyr has mastered is the integration of products and services from a variety of providers such as SAP and Vodafone into a comprehensive package. “You can imagine it like going to the supermarket because you want to bake a cake. Buying the ingredients is no problem, baking the cake is the tricky part,” is the analogy Cunningham uses.

With their cooperation on the first commercial-scale deployment of smart metering technology and their commitment to creating an open, practical blueprint for even larger-scale deployment in Europe’s third largest economy, UK market leader British Gas and global industry leader Landis+Gyr are making an important contribution to building the sustainable world of tomorrow. ■



large-scale projects – more than just logistical challenges

The green revolution, the energy turnaround, the second industrial revolution: whatever you want to call it, it's certainly a large-scale project. Renewable energy and the smart grid are its crucial components.

How to handle a project of such dimensions successfully - that's the million dollar question. It's a question that has no single answer. There is no blueprint, no five-year plan to relieve the uncertainty. A look back to the past doesn't provide a stable point of reference, because the technological progress of the last two centuries has no precedent. The speed of innovation is not slowing down. On the contrary, individuals, companies and societies have to adjust themselves to lifelong learning and constant innovation.

The first industrial revolution was asynchronous, the current, second one isn't. It's happening everywhere and it's happening now. It's certainly not happening at the same speed, but every country is facing the same problem and in principle has access to the same level of technology.

The real challenges will have to be faced in the emerging economies, with their ever-growing demand for power

According to a study by consultancy Energynautics, 6,000 kilometers of new transmission lines have to be deployed in Europe and 10,000 kilometers of existing transmission and distribution lines will have to be equipped with smart technology. But neither Europe nor the United States constitute the real challenge. The real challenges will have to be faced in the emerging economies, with their ever-growing demand for power.

THE DISTANCE TO THE MOON

Smart meters in the hundreds of millions will have to be installed in China and India, for example. The Chinese power grid is currently made up of 1.18 million kilometers of old transmission lines that carry around 3 million gigawatts of electricity throughout the

country. To put things in perspective: the distance from the earth to the moon is less than 500,000 kilometers.

Power plants are the tireless hearts of industrial societies, transmission and distribution lines are the veins and arteries and electrical energy is the life-blood of modern civilization. Mastering the challenge ahead will take the best of human effort and ingenuity, it's the infrastructural equivalent to an open-heart transplant. The implications of this challenge are momentous and the risks and opportunities that come with it are on the same scale.

MORE THAN SMART LOGISTICS

It's not enough, however, to focus on the logistical side of the problem. The challenge is formidable, but it can be mastered. Companies like Landis+Gyr prove that every day. Meticulous planning, inclusion of all stakeholders in the decision-making process, working with the smartest people and using cutting edge technology, are all part of the answer when it comes to handling truly large-scale projects.

Nevertheless, the time to face the really tough, the social and political questions will come. Is a sustainable future compatible with the current paradigm of economic growth? How can the goals of economic growth for every society and prosperity for every household be framed in the light of sustainability? On a more concrete level: how will it be possible to accommodate the justified desire of people in China and India to drive cars and use electrical appliances without accelerating climate change?

THE HUMAN FACTOR

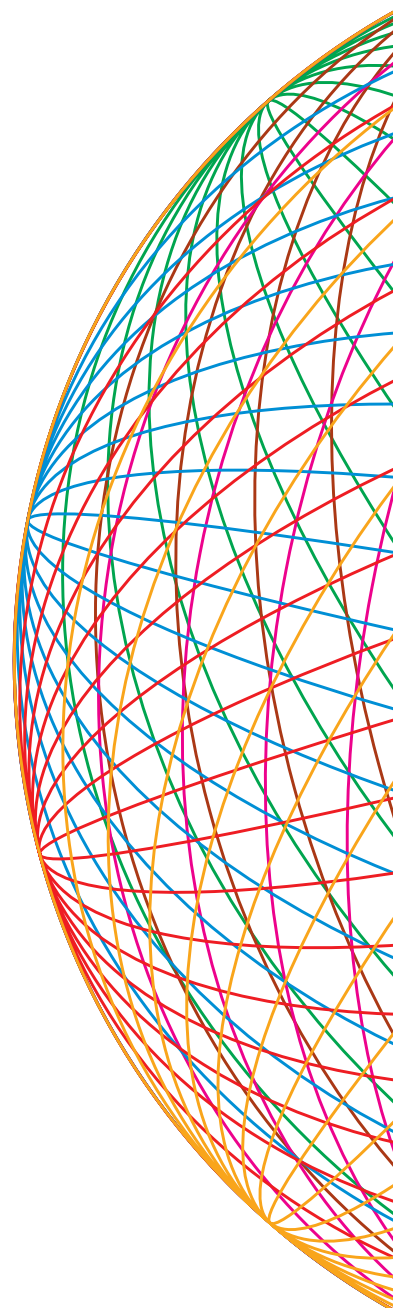
In the midst of all this uncertainty and change there is one constant to hold on to: human nature, the basic

make-up of the human psyche. This is an important fact to keep in mind underneath all the lofty rhetoric of combating climate change and ensuring the survival of the species. Self-interest lies at the heart of human motivation. More than a century of evolutionary biology and modern psychology prove this beyond reasonable doubt. In the best of all possible worlds, we can hope for the enlightened version of self-interest, but it would be unwise to rely on it.

This is true for all stakeholders, but especially important for consumers and businesses. On the corporate side, the 21st century has seen the rise of corporate social responsibility (CSR). Despite all criticism it has drawn CSR is a hopeful development. The forward-thinking mission statements of the early adopters among the energy providers are more than mere lip service. They are a case of enlightened self-interest, since an uninhabitable world is a bad place to do business.

CLEVER RULES FOR A SMART GRID

It's up to the politicians and the regulators they appoint to create a framework which gives energy companies an incentive to do their part to make the vision a reality. The European Commission is keenly aware of the problem and states in its latest report: "At present, there is a considerable gap between current and optimal investment in Europe, which can only partly be explained by the current economic downturn. Grid operators and suppliers are expected to carry the main investment burden. However, unless a fair cost-sharing model is developed and the right balance is struck between short-term investment costs and long-term profits, the willingness of grid operators to undertake any substantial investment might be limited." Consumers, for their part, need to become more conscious of the cost of energy and the way they ►





In Europe more than 6,000 kilometers of new power lines have to be deployed.



use it. It is essential to educate consumers in an effective way that inspires them to take action. Behavioral economics, pioneered by Danny Kahnemann and Amos Tversky, provides some important insights. Experiments show that people are more interested in avoiding losses than in additional gains, for example.

MEET NEMESIS

The problem with spreading the message about unwieldy topics like smart grids is that they are hard to imagine, they provide little tangible, concrete rewards to stimulate human desire. Sure, it's nice to help the environment and save some money on the power bills, but this is hardly the stuff dreams are made of. Saving money and lukewarm goodwill won't be enough to incentivize the significant changes in purchasing and consumption patterns the smart revolution depends on.

Cars, on the other hand, are the stuff that dreams are made of, especially in the developing world, but not only there. With electric vehicles, smart grids are finally starting to speak the language that people understand: the language of cars. The kind of incentive that prompts the necessary change might look more like Nemesis, an electric supercar, than any number of well-meaning brochures, educational videos and climate initiatives.

Dale Vince, the inventor of Nemesis, said in an interview with the BBC that he wanted to prove electric cars can be quick, beautiful, cheap and run entirely on wind

power. "I was not looking for something ecological, worthy and a bit self-sacrificial: far from it, I wanted to create something exotic and desirable. Something that would turn heads and challenge stereotypes" he added. According to the company's website, Nemesis is faster than a V12 Ferrari, has done 0–100 mph in 8.5 seconds and can reach 170 mph.

TEST-DRIVING THE FUTURE

One of the promising developments in 2011 is the fact that manufacturers are rolling out enough electric vehicles models to be visible. In the US, GM, Nissan, Mitsubishi, and Tesla are the most well known, but there are more than 30 EV manufacturers worldwide.

Just as important, a variety of recharging options are reaching actual city streets. More consumers seem to be interested in giving EVs a road test than are interested in being test drivers of home energy management systems that may help them save money but otherwise offer no personal payoff. Showing off the latest electric car in public has a more powerful appeal than optimizing the way we use energy at home.

There is no single approach and no plan equally valid for a diverse, multi-polar, rapidly changing world. An open, creative mind, and a willingness to listen to and to understand consumer behavior are the qualities needed to handle a project on the scale of the second industrial revolution. ■

Saving money and lukewarm goodwill won't be enough to incentivize the significant changes in purchasing and consumption patterns the smart revolution depends on





gridstream suite: power with brains

In a time of revolutionary change for the utility industry, Landis+Gyr offers an intelligent solution that covers all the bases and sets a benchmark for the competition.



*Felipe de Montagut,
Head of Solution Product Management EMEA,
Landis+Gyr*

The Gridstream Suite is a comprehensive, end-to-end solution that comes in a modular format. The combination of cutting-edge software and communication technology, underpinned by the proven, field-tested quality hardware of Landis+Gyr meters, makes one stop shopping possible. The Gridstream Suite is Landis+Gyr's contribution to make the global vision of smart grids a reality. At the same time, it takes customer concerns seriously. "I want to emphasize that we have taken the greatest care to make Gridstream a future-safe investment that enables smart grid" explains Head of Solution Product Management Felipe de Montagut.

The software is developed in an open architecture and can be easily upgraded. Gridstream customers can choose from the entire range of communication technologies, i. e. GPRS, Ethernet, PLC and PSTN. The solution is interoperable both on the system and device level.

AN END-TO-END SOLUTION

The Gridstream solution is especially interesting for DNOs (Distribution Network Operators), who are looking for a fast and low-risk way to deploy smart grid technology, without having to deviate from their own competencies. Big players have the financial resources and the manpower to find individual solutions for this challenge, but smaller players need a comprehensive solution that is easy to implement.

Customers who choose Gridstream often operate in competitive, deregulated markets. Gridstream offers one-stop and turnkey solutions, which minimize

financial risk and allow the utilities to focus on their core competencies.

OUR SOLUTIONS IN ACTION

A number of Gridstream solutions are already in commercial use. In Sweden, E.ON's rollout of smart meters in rural areas was realized by Landis+Gyr. The Gridstream software plays a crucial role in processing and managing the large amounts of data the meters accumulate. An example for a comprehensive, turnkey solution is the contract with Finnish utility Kuopion Energia. Landis+Gyr will enable the migration of Kuopio's entire customer base to smart metering by 2013. The deal comprises the delivery of 50,000 smart electricity meters, the smart metering software Gridstream AIM, as well as installation and project management. The turnkey delivery includes a meter reading service agreement valid for a period of ten years. Landis+Gyr will provide daily and hourly consumption data for the customer. Furthermore, the utility will receive regular reports on electricity quality and network status

READY TO MOVE FORWARD

"The deployment of smart grid technology is a complex issue which involves a large number of stakeholders" says Felipe de Montagut. "There are still a lot of challenges which need to be met, for example an incentive scheme for the utilities and a robust regulatory framework. At Landis+Gyr, we have done our homework and are ready to move forward and enable smart grids with the Gridstream Suite." ■

Gridstream



smart grids in a nutshell

what is a smart grid?

A smart grid is an electricity network that can intelligently integrate the actions of all users connected to it – generators, consumers and those that do both – in order to efficiently deliver sustainable, economic and secure electricity supplies. A smart grid employs innovative products and services together with intelligent monitoring, control, communication, and self-healing technologies to:

- better facilitate the connection and operation of generators of all sizes and technologies
- allow consumers to play a part in optimizing the operation of the system
- provide consumers with greater information and choice of supply
- significantly reduce the environmental impact of the whole electricity supply system
- deliver enhanced levels of reliability and security of supply

Smart grids deployment must include not only technology, market and commercial considerations, environmental impact, regulatory framework, standardization usage, ICT (Information & Communication Technology) and migration strategy but also societal requirements and governmental edicts.

the key challenges for smart grids

- Strengthening the grid – ensuring that there is sufficient transmission capacity to interconnect energy resources, especially renewable resources, across Europe
- Moving offshore – developing the most efficient connections for offshore wind farms and for other marine technologies
- Developing decentralized architectures – enabling smaller scale electricity supply systems to operate harmoniously with the total system
- Communications – delivering the communications infrastructure to allow potentially millions of parties to operate and trade in the single market
- Active demand side – enabling all consumers, with or without their own generation, to play an active role in the operation of the system
- Integrating intermittent generation – finding the best ways of integrating intermittent generation including residential microgeneration
- Enhanced intelligence of generation, demand and most notably in the grid
- Capturing the benefits of distributed generation and storage
- Preparing for electric vehicles – whereas smart grids must accommodate the needs of all consumers, electric vehicles are particularly emphasized due to their mobile and highly dispersed character and possible massive deployment in the next years, what would yield a major challenge for the future electricity network

Source:

European Technology
Platform SmartGrids

Strategic Deployment
Document (SDD)
for Europe's Electricity
Networks of the Future
www.smartgrids.eu

**Spelling partially modified*



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