

Digital utility transformation



The roundtable

More than 80 senior executives and experts from 12 different countries gathered in May 2015 in Paris, France, for PwC's roundtable on the digital utility of the future and the strategies that companies are implementing to get there. The speakers and moderators were:

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| Deborah Affonsa | <i>VP Customer Service, PG&E</i> |
| Volker Beckers | <i>Chair of the Advisory Board, Erasmus Centre for Future Energy Business; former Group CEO, RWE npower plc; Chairman and non-executive director of various companies in the power & utilities sector</i> |
| Andre Blumberg | <i>Director IT, CLP Group</i> |
| Christian Buchel | <i>Deputy General Manager and CDO, ERDF</i> |
| Don Clevenger | <i>SVP Strategic Planning, Oncor</i> |
| Tom Clewett | <i>VP & Chief Technology Officer, Exelon Corporation</i> |
| Jim Curtin | <i>Global Customer Management Leader, PwC</i> |
| Niall Dineen | <i>Commercial Director, Electric Ireland</i> |
| David Etheridge | <i>Global Power & Utilities Advisory Leader, PwC</i> |
| Marc Florette | <i>Chief Digital Officer, Engie SA</i> |
| Sunil Garg | <i>SVP & Chief Information & Innovation Officer, Exelon Corporation</i> |
| Dr. Sascha Kreiskott | <i>Head of Digital Solutions, E.ON Energie Deutschland GmbH</i> |
| Erwin van Laethem | <i>Chief Innovation Officer, RWE</i> |
| Steve Mullins | <i>Smart Energy Global Leader, PwC</i> |
| Duncan Page | <i>Director, PwC UK</i> |
| Pierre Peladeau | <i>Partner, Strategy& France</i> |
| Martin Ratcliffe | <i>Senior Manager M2M/IoT Strategy, Innovation & Partnerships, Vodafone Machine-to-Machine</i> |
| Laurent Schmitt | <i>VP Strategy & Innovation, Alstom Grid</i> |
| Norbert Schwieters | <i>Global Power & Utilities Leader, PwC</i> |
| Praveer Sinha | <i>CEO, Tata Power Delhi Distribution Limited</i> |
| Mohssen Toumi | <i>Partner, Strategy& France</i> |
| Christopher C Womack | <i>President, External Affairs, Southern Company</i> |

Introduction

“The promise of digital transformation is huge,” observed Norbert Schwieters, PwC’s Global Power & Utilities Leader. Introducing the roundtable event, he went on: “From grid management to customer relations, an effective digital strategy can revolutionise all areas of the power utility business. It’s at the heart of the energy transformation challenge.”

Digital transformation is top of company agendas. Over 80 per cent of CEOs view key digital technologies such as data mining and mobile customer engagement as strategically important for their company.¹ But successful capture of the benefits of digitisation is a tough call for many companies and power & utilities is a sector that is a little way off the pace. “The reality for many utility companies is that really productive and seamless digitisation remains some way off,” reflected Schwieters.

His comments were echoed by Mohssen Toumi, Partner in Strategy& France: “We see utilities as one of those industries that are waking up a little later than some others to digital. But the momentum of digital transformation in the sector is gathering pace. Digital is affecting not just the way companies face their customers or how that relationship is disintermediated but is also bringing deep changes in the core operational activities of utilities.”

All the more important then that power utility companies ask hard questions about their digital strategies. What are the key strategic issues? Which areas are best prioritised? How to address new business model opportunities? What are the critical choices along the way? And what lessons are being learnt? The roundtable brought together leading figures from inside and outside the utilities sector to discuss these and other issues.

We focus our summary of the roundtable discussion on:

- making moves along the digital transformation road *p4*
- digital promise and reality *p6*
- different customer expectations in a digital world *p8*
- delivering digital securely *p10*
- digital in the world of the ‘internet of things’ *p12*

Making moves along the digital transformation road

Pierre Peladeau, Partner Strategy& France, gave an assessment of the current digital maturity and future ambition of the power utilities sector, sharing the results of interviews with utility executives such as chief digital officers (CDOs) and chief information officers (CIOs) in 24 leading utilities across the world. Most utilities have significant digital ambitions but Peladeau said ambition was not being matched with investment: “We found the majority either had no digital team and no formal digital budget or had just a relatively small team and budget. Only a minority were backing ambition with a significant team and budget.”

Peladeau emphasised: “It’s crucial to be clear about your ambition. Power utilities are not Amazon and they are not Netflix but many things are ‘must haves’ – mobile is one of them”. His review of digital strategies highlighted a number of dilemmas facing power utility companies: “For example, should you focus on energy management alone or do you want to venture out into wider home services? We found some companies are doing the latter but, in a number of cases, it feels like it is just to be out in the market and not because they have thought about it really hard. Also when it comes to pure digital low-cost offerings, most utilities don’t want to push hard on this as they are worried about it destroying their premium offer services.”

Implementing digital transformation

With the scene set by Peladeau’s sector-wide review, the roundtable moved on to hear how leading companies are implementing digital transformation. For global giant Engie, digital transformation is accompanying major group-wide change as it moves from its old GDF-Suez structure onto a new footing. Marc Florette, Engie’s Chief Digital Officer (CDO), said: “It’s a unique chance for digital transformation as we move to a much simpler organisation and adjust to a more agile world where long-term capital expenditure is no longer the only major driver of value. Three ‘Ds’ – decarbonisation, decentralisation and digitisation – are now key to our strategy.”

As CDO, Florette sees his principal role as an ‘enabler’ of digital change across the group. He has established an internal ‘think tank’, a third of which is drawn from young professionals with high potential, and has also conducted a survey of existing digital activities, which uncovered more than 400 digital initiatives taking place at different levels and across the value chain, from upstream exploration and production down to customer relations. This internal intelligence is being complemented by external benchmarking. “Benchmarking is very important,” reflected Florette. “We are a large company but the world is complex and we cannot pretend to have all the good ideas. We can gain a lot from exchanges of information and partnerships with all kind of players. We’ve been meeting companies in all sectors and of all kinds – pre-digital companies, start-ups and big digital online companies.”

Florette emphasised that blending top-down digital strategy with bottom-up initiatives needs careful thought: “Collaboration, for example, is in the DNA of our group. Communities of practice have existed for some time so something like the decision to unify the enterprise social network builds on this. It now has collaborative tools such as a search engine and instant messaging, which are changing the way we work. Managers will play a major role to promote this change of culture. Being open to the outside world by investing in start-ups does not prevent us from also promoting internal creativity. We have done this by putting several teams into external incubators in startup-like conditions to innovate, mostly in digital.”

Keynote speaker perspective

“For me and for Engie digital is much more than just a tool, it’s changing the way of working. We have a lot to learn from external benchmarking, from start-ups and from partners but we also must not miss the extensive amount of creativity and know-how that we have already within the company”

(Marc Florette, CDO, Engie).

Digital focal points

Dr. Sascha Kreiskott, Head of Digital Solutions at E.ON Energie Deutschland GmbH, highlighted three focal points for digital transformation – customer channels, the delivery of new services and the role of digital in disrupting business models. In particular, he highlighted the advantages of digital in introducing new services: “We strongly believe some new services can only be introduced by digital because they have to be explained by way of content that can’t be done by a field force, at least not in the mass market.”

Kreiskott mapped E.ON’s own journey to improve digital customer interaction, which he characterised as moving from ‘completion’ through ‘integration’ and then into better ‘personalisation’. So, in the last two years or so, his focus has been on completion by adding missing channels and functionality. Now the priority is on increased usability through integration of channels and the centralisation of data. Looking ahead towards 2017, Kreiskott says the emphasis will be on ‘personalisation’ through customer-specific communication, interaction and product offerings.

Most utilities are venturing into digital offerings

Energy analytics – most energy analytics services are focused on B2B. Many are relying on smart meter rollouts to offer B2C services.

Smart homes – many see smart homes as essential to improve customer relationships and some see an opportunity to offer new services beyond the energy spectrum, e.g. health, security, etc.

Smart cities – most utilities recognise the relevance of smart city concepts. But, after initial attempts, complexity is deterring most from moving quickly.

Decentralised energy – utilities in countries with strong renewable energy development see very high importance in decentralised solutions.

Source: Digital Utility Maturity Survey, Strategy&, 2015.

Figure 1: The reach of digital – six key domains of digital transformation



Source: Strategy&.

Digital promise and reality

“The writing is on the wall and we have to change. The whole economics of the sector is changing – from old-style cost-plus economics to a world of high renewables feed-in and where customers want to have a say in decision-making and the economics of energy,” observed Praveer Sinha, CEO, Tata Power Delhi Distribution, as he addressed the roundtable.

Tata Power Delhi Distribution itself has already been through a dramatic change. Not so long ago, it was government-owned “with one computer with a cover so that the dust should not get inside it!” Sinha outlined how his company is using data analytics to introduce automated demand response and to revolutionise the customer experience. “We’re now at the stage of large-scale implantation of demand response. The consumer wants information on a real-time basis, not on something which will come to them by way of a bill after a month. They want to be able to say ‘I will only buy renewables or for certain hours of day I will buy from X supplier and other hours from Y supplier’. The consumer wants to be a participant in the whole decision-making process. There is a tremendous opportunity there.”

Big operational cost savings

Oncor is a regulated electric transmission and distribution service provider serving 10 million customers across Texas. It’s already seeing big operational cost savings flowing from the digital data information from smart meters.

Smart meters were deployed over a five-year period from 2008 at a time of high gas prices, principally to meet regulatory concerns about the need for better demand response. Low gas prices have eclipsed that somewhat, with customers little interested in demand response. But Oncor is gaining tremendously in terms of operational benefits from good analysis of the real-time data from smart meters.

Don Clevenger, Oncor’s SVP Strategic Planning, outlined some very tangible gains: “We saved about 18 million miles a year in truck miles from not having to roll trucks to do what the smart meters can do today and we’re saving over six million gallons of fuel now a year. We have reduced tampering by at least 75 per cent. We had about 150,000 outage events last year that we were able to correct before the customers phoned them in, so in theory before the customers were even aware. There were 32,000 occasions where a customer would call us and say ‘my power is out’ but we were able to check the meter and tell them ‘no, your meter is fine; it has to be on your side of the meter’. Before, we would have rolled the truck for absolutely no reason just to make sure that it wasn’t our equipment. We also had

2,500 events last year where we were able to prevent an outage from occurring because of data we received from the meters.”

A key future focus for Oncor’s digitisation will be on control systems for micro grids and energy storage. The company has built a small micro grid around a new environmental laboratory facility. “Anyone who says ‘yes, let’s go do a micro grid’, has got to realise they’re biting off quite a bit to make it a true micro grid that keeps running indefinitely were the main power on the grid to go down,” said Clevenger. “The ability of the control system to test the voltage, bring the battery up instantaneously as the voltage drops and then engage the micro turbine to make up the difference is an incredibly complicated process.”

ERDF’s digital transformation programme

ERDF manages the public electricity distribution network for 95% of continental France and sees digital transformation as a “key enabler” to achieving its strategic goals, which include leading the technological revolution of power grids in France and internationally. Christian Buchel, ERDF’s Deputy General Manager and CDO, used his keynote speech to outline how the company’s global programme, *le programme numérique*, is accelerating the company’s digital transformation and helping it address key strategic priorities.

These include setting the best industrial reference point for public service in power distribution in terms of security, quality, operational performance. Buchel stressed: “It’s about how we can use digital to accelerate and transform. Data is a key asset of the company’s future and is vital in optimising asset management, improving network operations and improving the investments.”

A second strategic priority is power grid transformation and here Buchel highlighted the emphasis being placed on this by ERDF: “We want to lead the technological revolution in power grids and we have invested a lot in research and development. We have a lot of demonstration projects and the challenge now is to move on from demonstrators to industrial development.

Keynote speaker perspective

“ERDF’s digital transformation programme has three major points of focus. It is seeking to capitalise on the richness of the data collected to enable us to be an ever better neutral digital market enabler. It is using the opportunity of new digital technologies to enhance our industrial economical and relational performance. Last but not least, it aims to pave the way for the true digitalisation of DSOs in France, in Europe and internationally”

(Christian Buchel, Deputy General Manager and CDO, ERDF).

Cities and local authorities want not only to be a stakeholder but to drive this transformation. We have to be very close to them and to help them to transform their territory from an energy point of view.” This leads on to ERDF’s third strategic priority of being an indispensable locally-based partner to local authorities and other stakeholders, to deliver energy efficiency and energy transition in local territories to support economic development. “We can use digital to become a much better enabler to empower customers, municipalities and everyone who can use the data to achieve this energy transformation.”

Digital relationships with clients and territories is one of six dimensions of ERDF’s digital transformation programme,

along with using digital in the areas of assets, culture and collaboration, data operations, innovation and mobile. On assets for example, Buchel said: “We want to use data to develop a new type of predictive maintenance and are in discussion with companies all over the world to achieve this. The prize of saving even 4–5% of expenditure is a big one but the challenge is to develop a truly predictive model for maintenance.”

An open data strategy

Earlier in the roundtable, participants had heard from Strategy&’s Pierre Peladeau that many utilities still have no or small data teams and a closed approach to data: “Our review of power utility companies

around the world found that only 24 per cent had an open data approach.” But ERDF is an example of a company that is developing an open data strategy. Buchel observed: “It’s not acceptable any more that a lot of information and empowerment stops at the wall of our industry.”

As part of its digital transformation programme, Buchel said the company is committed to “becoming a data-driven organisation” and increasingly moving to open data. “We have a roadmap for open data. Open data was not really in our culture but, in an era of digital social media, either you do it or the outside will do it for you. It’s an important part of our role as a neutral market enabler.”

Q&A

What have you done to make sure digitisation is shaped around the customer needs? How do you evaluate what they want?

Dr. Sascha Kreiskott, Head of Digital Solutions, E.ON Energie Deutschland GmbH:

We have a specific customer insight department and we have customer panels to prioritise what we are doing. If there isn’t a tangible value-added service for the customer, no-one will care. You have to offer something which is new and which is helpful, otherwise you won’t find any acceptance in the market and it will only be something for geeks and engineers.

Don Clevenger, SVP Strategic Planning, Oncor:

As a grid company, we don’t have customer billing so our vision is to be able to interact with the customer in the one place they really care about and that’s the outages. We want to be able to send them a text, or however they choose to get the communication, saying ‘you’re out, here’s the estimated time of restoration, you’re back on’, much like the airlines do with ‘your plane is delayed, don’t leave your hotel yet’.

Praveer Sinha, CEO, Tata Power Delhi Distribution Limited: The interactivity that comes with digital itself enables more things to be customer-driven. We already have an android app whereby the customer gets certain information (on billing and outages). We’re working on apps whereby they can control their equipment in their house and run it during a peak or off-peak period. There are a lot of products which will come and which will empower the consumer.

What do you think about the companies from outside the sector which are trying to find a spot or play a role in the industry? Is this something that you believe will have an impact or is it just something that will seem unimportant in a few years?

Kreiskott: I believe the Tesla Powerwall is the first thing which really threatens our business. I don’t see Nest as really disrupting our business model so far, at least just talking from a sales perspective. If we don’t become the ones who provide these kinds of services to the customer, then we won’t have business anymore. I believe we have to get prepared in order to be able to hook up these kinds of tools to our operations.

Clevenger: I think the combination of PV and batteries will have an impact. I keep thinking of the board of BlackBerry sitting there thinking the iPhone is more expensive, doesn’t do as much, isn’t supported by IT departments, so let’s not worry about it. Customers do things for non-economic reasons all the time and solar and batteries are becoming more and more economic.

Sinha: Absolutely, this is a new opportunity and the learning is that you have to be part of it. We have seen how in the US when solar came in, the industry resisted it. If the utilities had participated in it then, they would be owning more of it now but instead they have given some of that space to someone outside.

Different customer expectations in a digital world

Jim Curtin, Global Customer Management Leader, PwC US, introduced a discussion of how customer sentiment and behaviour are changing and affecting the value of customer service to a utility. “In some ways changes in customer sentiment are being shaped by the utilities and by being a customer of those utilities, and in a lot of ways they are being driven by customer experience in other industries, whether it’s banking, insurance, healthcare or retailing. But the bottom line is that, while customers welcome this extra interactivity, they don’t want to spend money on it and see it adding extra cost to the bill.”

This challenge of realising the value from digital in a world where customers expect digital to be free and to deliver cheaper goods and services was a central theme of much of the roundtable discussion. Another key theme was the challenges digital brings to the internal culture and mindsets of power utility companies.

“Digital is a wake-up call in the context of a smart energy grid future with two-way flows of power where customers can become ‘prosumers’,” observed Tom Clewett, VP, Chief Technology Officer of Exelon Corporation. As well as its competitive generation and energy trading operations, Exelon Corporation has traditional regulated transmission and distribution T&D utilities serving about eight million customers in central Maryland (BGE), northern Illinois (ComEd) and southeastern Pennsylvania (PECO).

Developing a digital mindset

For Clewett, matching internal culture to a new and changing digital customer environment is key challenge: “We’re turning round a big ship when it comes to customer orientation,” he pointed out. “Our research told us that customers see a role for the utility in advising them how to make an energy transition, that they trusted us to help them, or at least be a backstop to help them make that transition. But we also realised that we’re filled with engineers and that doesn’t necessarily help you to orient towards a customer-centric utility mindset. So the first thing we concluded was we need a more outward-focused mindset.”

The internal culture change challenge was echoed by Niall Dineen, Commercial Director, Electric Ireland: “The biggest challenge we had was moving from an engineering culture. So we’ve gone through a huge mindset change with our staff and with our culture. We’ve a lot of new people in our retail business and we’ve a lot of traditional core people. Normally you cross-pollinate, you move people around. We’ve stopped doing that to a large degree and we’ve changed the whole management team because what we are is a sales and customer-focused business, so the skills and capabilities we need are around business intelligence and business analytics.”

Electric Ireland was born out a previously monopoly business as a result of the deregulation and competition introduced into the Irish energy market in 2010. The company’s vision is to be the number one energy supplier in delivery of smart and innovative solutions to Irish homes and businesses, with the slogan ‘Be Smart. Be Digital. Be No. 1.’ “Everything we do, we look at it from a digital perspective,” explained Dineen. “We closed all retail outlets so our main interface is via contact centres or via the web, focused on self service. The whole customer experience for us is paramount and it’s very customer-centric. Obviously, you’re in a competitive environment so you’re trying to get the most cost-efficient way of doing it, but you’re also trying to get the customer experience.”

Putting digital in context

Pacific Gas & Electricity (PG&E) is the largest single operating utility in the US, serving 15 million people in California. Deborah Affonsa, VP Customer Service, PG&E, stressed the overriding imperative of lower costs: “The goal of the ‘digital utility’ for us, especially on the customer service side, is affordability and flexibility. By affordability we mean driving costs out of the business by utilising higher-value, lower-cost digital channels to service our customers. Our diverse customer mix expects us to provide service when they want it and how they want it – the flexibility to create a customer experience via telephone (contact centres), face-to-face (local offices) and digital (web and mobile). ‘Digital’ provides us an opportunity to lower costs while improving the customer experience by enhancing self-service options.”

Affonsa also stressed the need to see digital in the context of the many different customer types that utilities need to serve: “We do not look at digital as a strategy. We look at the customer experience as our strategy and digital is a channel alongside other channels to improve our customer experience.”

“We have 75 local offices and over 600 payment centres where people still pay bills in person. I have to service and provide options and choice for all of our customers, from the folks who visit our local office monthly to pay their bills to the tech-savvy customer who wants to only interact with us through digital channels.”

Chris Womack, President, External Affairs, Southern Company took up the cost theme: “Cost is a key focus. Developments like smart meters and cybersecurity require capital investments. We will get returns from the investments we make but does that growth keep up with our growth projections going forward? The answer is no. That means we have to challenge

ourselves in terms of how we use digital. How do we use this commitment to additional customer service? Are there additional products and services that we can offer that will thus grow revenue? For us digital is a platform to increase our level of communication to customers but also to get information back from them to understand what the customer wants.”

Q&A

Are there industries or other companies that you compare yourselves against, and from a cultural and organisational change point of view? And how far would you say you are along the continuum of becoming truly customer-centric?

Tom Clewett, VP & Chief Technology Officer, Exelon Corporation: We’re really trying to make the employees and the executives go through a customer journey, focusing on a premier customer experience outcome. If anything you see doesn’t feel like a premier customer experience outcome you have to change it. And one of the examples we anchored ourselves to was Apple. We’re empowering our staff to be able to take immediate decisions with customers that reflect the way you’d want to be treated. For example, the way our customer service representatives are now able to take decisions right away with customers in the context of their credit risk whereas before we would treat all customers the same way, regardless of whether they were a good or bad credit risk.

Deborah Affonsa, VP Customer Service, PG&E: We’re trying to make things really simple for the customer. A US study found that utility customers spend approximately eight minutes a year managing their energy. We have to try and maximise that eight minutes. We are enhancing our digital capabilities by removing the clutter and speed bumps on our web and mobile app. Our ideal ‘digital’ customer experience – three clicks to satisfy a customer inquiry – seeks to make it quick and easy for customers to interact with PG&E. Too much ‘searching’ can leave a customer frustrated. And if a customer gets frustrated they pick up the phone and call the contact centres, resulting in a more expensive interaction versus the lower-cost, higher-immediacy digital option. Digital, therefore, is a key channel in not only reducing costs but driving increased levels of customer self-service and satisfaction.

Niall Dineen, Commercial Director, Electric Ireland: We’re doing a phenomenal amount of segmentation data to understand our customers, so we’re trying to target our customers through the digital medium. We don’t model ourselves

on utilities. We look to other traditional businesses that had to change – banking, telcos, even the holiday sales guys, totally different. We’ve had to change our whole focus. We’re trying to move away from legacy systems to much more agile systems. So the digital space for us is huge in that regard. But we can’t be totally digital because we have a legacy of older customers in Ireland. When the competitors came in they went for the younger, high net-worth customers and we have a lot of the others who like to have their bill and be able to phone in.

On the one hand, we have technologies that emerge so fast that only the younger generation can master them but, on the other hand, we have life expectancy getting longer and longer. How do you reconcile the two?

Affonsa: We’re not an Amazon, we’re not an Uber, we’re not a Facebook or an Apple. We’re utilities and I go back to that eight minutes a year that people spend managing their energy. If you’re young, is energy top of mind? Is managing their energy really going to displace time spent on Spotify, Instagram and Facebook or all the other social things that they’re doing? I think that the challenge for utilities is to put in the right technology in order to enable them to interact while, at the same time, not over investing in something that might be underused.

Chris Womack, President, External Affairs, Southern Company: I agree but I also think that there must be a desire to do more. I think we’ve got to pursue the upside and that upside is greater innovation, greater products and services. I think we can create a story out of energy that kids will want to listen to and hear. I think we’re imaginative enough to do this along with providing the basic service of electricity and gas. You can picture the story in terms of what does a day in the life look like for the customer? You can see them hopping into their electric vehicle to drive to work, getting a price signal about recharging options or a signal that comes to the car through Nest that says ‘prices will be X at this time of the day, wash your clothes at 9pm’.

Delivering digital securely

Security is a pressing concern for power utility companies. In a more connected and more digital age, the security challenges are becoming greater than ever. Introducing the roundtable's session on digital security, Duncan Page, Director, PwC UK, observed: "Much of the challenge comes from the sheer range of assets and activities of a power utility company. Then you add the trends of where digitisation is taking us and you find pretty much all of them can increase the opportunities for targeted cyber-attack against utilities' information, people and assets."

Volker Beckers, Chair of the Advisory Board, Erasmus Centre for Future Energy Business, draws on substantial power utility sector leadership expertise, including formerly being the group CFO and then group CEO of RWE npower plc. He pointed out that the reputational risk to the industry from serious cyber-attack is massive: "As you know, not a single energy minister wants to be famous for a blackout during his or her tenure. Let's be absolutely clear, if there was a blackout or other serious failure from cyberattack, it will be our collective responsibility as an energy industry."

Prioritising cybersecurity

There is a great amount of trust invested in power utility companies. In the UK, for example, Beckers observed that identification procedures revolve around the utility bill: "Identification of a person and their connection is absolutely key. The utilities are seen as central to identification systems and that makes it even more critical as far as data security is concerned."

But, despite the importance of power system integrity and data security, Beckers felt that companies in the sector are not prioritising cybersecurity highly enough: "If I had counted the number of times the words security and safety of IT systems was mentioned here today as opposed to exciting things like creating more value for customers, I would say it was very low in comparison. In the boardroom, other than in the risk management report, it plays a rather diminutive role and is rather event-driven. We need to ensure that the credentials that the industry has for reliable safe operation of assets also transfers into the digital security sphere."

Becker's call was taken up by Andre Blumberg, Director IT, CLP Group: "Our industry rates safety as a number one priority. In our company, we are encouraging a vision where in five or ten years' time cybersecurity is just like safety. Nobody should be questioning it. It should be non-negotiable. It's very critical that cybersecurity is made part of enterprise risk management. So, just like currency risk, liquidity risk, supply risk, fuel supply and reputational risk, cybersecurity should be addressed as a key issue and be mitigated and managed as part of enterprise risk, regularly reviewed, scrutinised by the audit committee and so on."

The need for a better approach

Digitisation makes that all the more important: "As we digitise further, as we move into smart grids and smart operations, the area for impact and the attacks phase is increasing. Every time I hear 'smart' I think 'exploitable,'" said Blumberg. He went on to outline how his company tests equipment using 'good' hackers: "We did it in our own advanced metering infrastructure pilot and half an hour later they came back and said 'I'm done, I've broken it'. I think there's a lot of education needed in the industry and in our supplier base to shift the mindset on this."

Blumberg observed that the industry could benefit by sharing cybersecurity experience more: "People tend to keep quiet about it because it doesn't look good on you and your company. But in some ways that's exactly the wrong way to go about it. As an industry we should be more open about it. Our respective heads of cyber security should talk openly because we can develop more effective improvement programmes through that shared awareness. It's better than reinventing the wheel too many times individually."

Q&A

Do you think that management really believes in this type of risk yet, or are we waiting for the first big incident to happen in the developed economy to really show us it can happen?

Andre Blumberg, Director IT, CLP Group: We have seen examples in other industries of what can happen. It just takes one electricity bill to leak or a minor power disruption and then the hard-won reliability reputation goes out of the window. That reputational risk and reputational damage is a key driver to raise awareness among colleagues.

Volker Beckers, Chair of the Advisory Board, Erasmus Centre for Future Energy Business and former Group CEO, RWE npower plc: I think the headline here is business continuity. That's what you focus on. Yes – protect, prepare and have an effective prevention tool in the organisation. But the key focus is on how do you resume services if they fail or if you have done something wrong, sent out the wrong bill or gave wrong operation instructions to a power station or a grid? You have to train as an organisation and as a management team. I think it is absolutely key.

Smart building and smart homes sound great from a business benefit point of view but what kind of risks do you think are opening up?

Beckers: First and foremost it comes back to something we have learnt when we built power stations: The (supply chain) relationship between the utility, your procurement team, your technical team and your supplier, your vendor, becomes absolutely critical because you will be responsible if you install devices which are not secure. If you build a power station and you have a third party doing the work for you, and somebody gets hurt or seriously injured, it's your responsibility. Similar principles will apply on IT issues, so you will have to focus on that. Secondly, it means more controls, more tests and you need more small hubs in your organisation. So if something happens you can ring fence the problem and then business continuity has to be rolled out.

Blumberg: I think it is important to test and retest and drill if something fails. But we've also got to be aware of the wider supply chain. We are in the process of rolling out demand response to C&I customers. A key issue is that the whole automated demand response (ADR) industry is quite nascent. There are a lot of very small companies that go into this. They don't have the resources of a chief cybersecurity officer or frameworks for secure development. Where I am worried is when we get devices like load management devices for air-conditioned heating coming from vendors who are not applying the same rigour and standards. That is the bit you can't control.

“If there was a blackout or other serious failure from cyberattack, it will be our collective responsibility as an energy industry.”

Digital in the world of the ‘internet of things’

“The internet of things is everywhere, in every industry. Whether it’s automotive, retail, trade, engineering, products, energy or power, the question is who are the companies that are going to smartly put it together and make money out of it?” Kicking off a discussion of the ‘internet of things’ (IoT), Martin Ratcliffe, Senior Manager M2M/IoT Strategy, Innovation & Partnerships, Vodafone Machine-to-Machine, observed that the IoT reached the top of the Gartner Tech Hype Cycle in 2014 but the key issue will be how to really monetise it.

Ratcliffe characterised the IoT as “a broad market vision where in the future all types of assets, machines and things are going to be connected together, communicating with themselves, with their surroundings and with people.” He pointed out that its wider reach distinguishes it from well-established machine-to-machine communications (M2M) and introduces big new challenges: “When you look at the internet of things it necessarily means companies working together, a more complex eco-system, and it does raise questions about security standards and inter-operability as well, so there’s many more dimensions to the internet of things that we’ve only just started thinking about at the moment.”

Smart cars and smart buildings

He went on to describe how connected cars from leading manufacturers are already feeding data back automatically to the factory to inform the production processes for the next generation of cars. “If you think further ahead, the car is becoming more and more connected as part of the IoT. As you approach home, you’ll be able to switch home appliances on,” predicted Ratcliffe. And he foresees “the ‘smart building’ of the future will be like the car of today. You won’t want to go under the bonnet to fix anything, you’ll expect it to be remotely managed.”

This presents challenges and opportunities for power utility companies. Ratcliffe observed: “Companies will have to work more effectively in complex eco-systems. They will have to provide more services to gain a position at the centre of the ‘smart building’ capability and they should learn from the disruption of other ‘networks’ before them. If they don’t take advantage of the IoT then others will.”

Building on existing power technology and know-how

Laurent Schmitt, VP Strategy & Innovation, Alstom Grid, highlighted the considerable experience of the power sector in the technological concepts that provide the power system context for the IoT (see figure 2): “For us the IoT is partly about evolving this technology into the next generation. What is very important in the IoT discussion is that we really set the stage of what is the state of the art today and not to think we need to re-invent the entire system behind it.”

Alstom Grid has 29 strategic innovation projects with power sector partners around the world which are addressing many elements of the IoT. Schmitt gave the example of the development of microgrids: “This is a very strong trend. We have been developing it over the last three or four years. It makes a lot of economic sense. We see it in New York with discussion now on how to integrate microgrid into the existing grid, coordinated with the rest of the system”. On the west coast of the US, with PG&E, Alstom Grid has been putting new state-of-the-art sensors for phaser measurements into the grid. In France, with Réseau de Transport d’Electricité (RTE), the transmission grid operator, it is looking into how to re-digitalise entirely the high voltage substation. Schmitt commented: “Here another element of the IoT has to be plug and play. It’s very important, otherwise we are going to waste a lot of the saving in simply doing integration across the system of systems.”

PwC viewpoint:

“The power utility sector has a strong track record of making interconnectivity work within power systems but the challenge will be to play to that strength in the world of an ‘internet of things’ when potentially everything can become interconnected”.

Steve Mullins, Smart Energy Global Leader, PwC

Figure 2: Evolution of the power system – from centralised to peer-to-peer energy management

| 30 years ago | 5 years ago | 3 years ago | Today | Future |
|----------------|-----------------------|---------------------|----------------------------------|--|
| Grid stability | Renewable integration | Demand response/DER | Smart buildings and smart cities | Next Grid 3.0 An open, flexible, interconnected and interactive model for energy <ul style="list-style-type: none"> • Flow-based markets, DER integration • Integrated grid controls for AC-DC grid • New distribution grid management/microgrids • Further expansion of grid digitisation |

Source: Adapted from slides presented by Laurence Schmitt, Alstom Grid.

Disruptive business models

Back in the world of power utility companies themselves, it falls to leaders like Erwin van Laethem, Chief Innovation Officer at RWE, to judge how best to capitalise on the IoT and other aspects of digitisation. He has led the commercial turnaround of RWE's Dutch subsidiary, Essent, to healthy profitability and widespread external recognition. It's a success story but van Laethem remarks candidly that "our business model is obsolete. Where we earn money today will stop in the future. Our customers are consuming less, saving more and producing more energy themselves. At the same time, we've got targets to become more CO2 neutral as well as overcapacity in conventional generation, certainly in northwest Europe. Our strategic imperative must be to invent and invest in our own disruptive business model before somebody else does that against us."

In 2014 van Laethem was asked to set up innovation for the whole RWE group. His emphasis has been on open innovation and partnerships: "We partner with Nest. It's a great partnership – they learn a lot from us and we learn a lot from them." Another focus is on attracting top talent. In a digital world, the image of utility companies can make this difficult. "So we've established innovation hubs in Berlin, Silicon Valley, and Tel Aviv in order to be there where the innovation takes place and contribute to it," explained van Laethem.

Van Laethem stressed the unique customer insight and energy services advantages that power utility companies have: "We've got huge customer insight just from the data we've got that can be used to sell in adjacent categories, starting with energy saving and energy production. Amazon started with books and CDs, and look at where they are now, each time evolving customer insights and adjacent categories. The IoT will be important to steer the new energy system in a coherent way for the future. In that future, I think even eight minutes a year (see previous Q&A panel on p. 9) will be too long for a customer. They will look to push a button and have someone else do it for them and that's where the digital utilities of the future will be, at least if we succeed in reinventing ourselves."

Digital – an enabler to the core business or is it the core business?

Sunil Garg, SVP and Chief Information & Innovation Officer of Exelon Corporation, picked up on the theme of the extent of disruption that we can expect from digital technology: "Some people are taking the view that digital will be used to reinforce the core business while another way of looking at it is that actually the core business is becoming obsolete and digital is an opportunity to create new businesses. We've been thinking about it more in terms of the former than the latter. We see a lot of value to be had by digital supporting the core."

But, as Garg explained, Exelon is also very alert to the disruption that could come from new business models. "I think with the IoT, with this explosion of data, there are going to be new business models that are independent of providing the electron.

Just look at sectors like the hotel industry. The margins of the big hotel companies have been eroded by online intermediaries and that is not even taking into account competition from newcomers like Airbnb. So, we have to be thinking about who is going to use data in a way that's going to take away our margin and could cannibalise our core business without even offering an electron."

Garg emphasised the importance of a longer-term view: "We're still talking about optimising the customer's experience within the current model – how do I let them know when there's an outage, how do I let them pay their bill a little bit easier? That is going to help us in the short term. But there's going to be other people who are really talking about disruption, data, the IoT and the customer in a whole different way."

Part of Exelon's response has been to put a greater emphasis on innovation. Garg's job role itself combines innovation and IT under a single leadership. The company has also set up an Innovation Peer Group with an officer from every company who now is accountable for driving innovation in their company. Garg went on: "We've identified six major technologies that we're looking at – the IoT, the digital worker in multiple venues, advanced analytics and big data, drones and robotics, additive manufacturing, and cognitive computing." These are being backed up by funding for pilot projects and a stronger engagement with outside agencies, start-ups and venture capital initiatives: "As an industry, we have historically been pretty insular and we benchmark against each other a lot. You have to get outside of your world and understand what's going on out there."

Q&A

The disruption that has happened in other industries – Uber with taxis for example – is not quite comparable with power because the taxi may or may not come but electricity has to come 24/7. Doesn't that wider social and economic obligation make a difference?

Erwin van Laethem, Chief Innovation Officer, RWE: But in the future it can also come from my roof or from the fuel cell or from the wind turbine. If I can provide it myself, I will want to be self-sufficient and, if I become a producer with a surplus, I will want to optimise it or to sell it on to a market if there is still one.

Sunil Garg, SVP and Chief Information & Innovation Officer, Exelon Corporation: I think that one of the most fundamental questions that the industry has to answer is how do we maintain that social compact? If you think about electricity, it's one of the few public goods that a lot of countries have got right – safe, reliable, affordable and increasingly clean. There are few other public goods that we actually get right. We don't get education right, we don't get healthcare right, we haven't got broadband right. So I think it is incumbent on the utilities to be taking the position of the protector of the consumer and thinking about that social contract. But I think the only way you would do that is by being realistic that the change is happening.

Martin Ratcliffe, Senior Manager M2M/IoT Strategy, Innovation & Partnerships, Vodafone Machine-to-Machine: I think it's a key point and it's about getting ahead of the game and engagement with the customer. Whether it's face to face or automated engagement, you need that closeness, that information about what your customers are about to do. Even if you don't like what they're about to do, it's better that you know about it.

What do you see as the biggest opportunity for utilities in this and, in contrast, what is your biggest fear?

Van Laethem: I see the opportunity to really develop a new business model. There are examples where customers buy and sell themselves and where the energy companies provide the software to do that and make a totally fair and healthy business out of that. So, I see it more as an opportunity. Customers want it, technology can do it, it's just regulation holding back. I've got no fears.

Laurent Schmitt, VP Strategy & Innovation, Alstom Grid: We see a lot of sandboxing happening. There is a lot of potential in the demonstration projects that are still in R&D but, of course, there are challenges around how things are going to roll out large-scale. We have been growing double digit in this space for the last three or four years. There is a massive issue of recruitment into our markets. The market for people is extremely scarce and that is a worry.

Ratcliffe: I think the big opportunity for utilities is through better and better engagement with partners across the entire value chain, such as hardware providers, communications providers, data processing, analytics and services providers. Engaging with such partners to come up quickly with good commercial models that are win/win for the parties involved.

Garg: I'm really excited about applying digital to the existing grid. Whether it's advanced analytics, whether it's drones, whether it's mobility, I think there's a huge opportunity. There's a real opportunity for the utilities if they're willing to embrace it early. The thing that keeps me awake at night is the regulatory model is outdated. We're going to get burned by that at some point if we don't start thinking about how we change that regulatory model sooner rather than before it's too late.

In Exelon, how are you trying to spark innovative thinking and how are you holding people accountable for thinking ahead??

Garg: First of all we came up with a definition of innovation. Innovation can be a nebulous term. We define innovation in terms of four Is or four pillars of innovation – Inspire, Ideate, Investigate and Implement. By inspire we mean getting people excited about the change. We do innovation expos. We bring in people from Tesla or Acquion or Solar City, people who are trying to destroy our business model, and let people know that we have to think differently. We give them the permission to think differently. Ideate is about how you actually get ideas from employees and we do a lot of crowd sourcing. Investigate is the piloting and implement speaks for itself. We report on a quarterly basis to our executive committee on how each operating company is doing across those four Is.

Digital wrap up

David Etheridge, Global Power & Utilities Advisory Leader, PwC US

“We’ve talked about mobile, social media, internet, big data and many other aspects of becoming a digital utility. We’ve heard about the challenges like security and the advantages. They include greater reliability, customer satisfaction and engagement, transparency, new product and services development and lower cost.

“I think digital is inevitable for all companies in this sector. The question is who will enjoy and exploit the benefits and who is going to stumble along, waste investor capital and be frustrated? There are big choices you have to make. To name just a few:

Are you going to be an ‘industry leader’ or are you going to be a ‘smart follower’? Or maybe a hybrid of the two depending on circumstances in different markets or parts of the business?

How do you change your culture? That’s the hard part and we heard from a lot of participants that bringing people along and attracting talent is a major challenge.

Do you know what ‘good’ looks like for your business?

Are you sure your vision of what is ‘good’ really fits your business model, your customers, the nature of the solutions you’re delivering, your infrastructure and your regulatory model? If you don’t, can you be sure you can make digital choices reliably?

Do you have a comprehensive enterprise design to achieve your digital vision? Or are you making decisions in a silo fashion where waste can occur and you don’t get the outcomes that you desire?

Are your existing processes and systems able to provide the foundation to support you on this brave new digital mission? Have you rationalised your existing technology?”

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