Reimagining the electric utility
Operational excellence in a digital world

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The roundtable

More than 60 participants from 16 countries and four continents gathered in May 2017 in Rome, Italy, for PwC's roundtable on delivering operational excellence in a digital world. The speakers and moderators were:

Maarten van Beek, *Director Human Resources, Netherlands, ING Bank*

Theo Bunting, *Group President, Utility Operations, Entergy*

Julio Castro, *Chief Regulatory Officer, Iberdrola*

Ernesto Ciorra, *Head of Innovation and Sustainability, Enel*

Mark Dijksman, *Founder, OneUp*

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

Mauro Fanfoni, *Senior Vice President of Marketing and Innovation Europe, Eni Retail Market Gas & Power*

Thomas Flaherty, *Senior Vice President, Strategy& US*

Chris Fynn, *Partner, PwC US*

Jeroen van Hoof, *Global Power & Utilities Assurance Leader, PwC Netherlands*

Dr. Stefanie Kesting, *Director Innovation, Uniper SE*

Luigi La Pegna, *Head of Global O&M, Enel Green Power*

Annmarie Reynolds, *Vice President and Chief of Staff to the COO, AES Corporation*

Niloy Sanyal, *Chief Marketing Officer, GE Power Digital Solutions*

Norbert Schwieters, *Global Power & Utilities Leader, PwC Germany*

Hélène Verbockhaven, *Deputy Director, ENGIE Digital*

Introduction

"The utility sector is at a historic inflection point in its technological evolution," observed Norbert Schwieters, PwC's Global Power & Utilities Leader, PwC Germany. Introducing the roundtable event, he pointed out: *"The range of business models is expanding with corresponding implications for business alignment, core capabilities and profitability. This new business environment means operational excellence is more important than ever. It must serve a new set of business demands and provide a new set of business capabilities."*

But utilities' current business capabilities are often not sufficient to handle the new challenges and opportunities facing the industry. "They are an inadequate basis for operational excellence," Schwieters observed. "Extensive gaps, pain points, disconnects and disparate legacies hinder progress."

The roundtable brought together leading figures from inside and outside the utilities sector to discuss how to reinvent the utility in a new digital world. This report focuses its summary of the roundtable discussion on:

- Digital business strategy and delivery
- Moving to a new level: digital platforms and blockchain
- Addressing operational challenges.

Norbert Schwieters
Global Power & Utilities Leader, PwC Germany

Digital business strategy and delivery

The digital promise for utility companies is immense. As David Etheridge, Global Power & Utilities Advisory Leader, PwC US, explained: "It's a world where companies can say 'I know what I need to do and I know it real-time'. They're able to reach out with 360 degree vision and make the best choices available without the impediment of estimation risk, prediction risk and without the impediment of 'less than the best' information." But getting to that point is difficult: "If you get it wrong, you can be disappointed by the results. Do it right and you get to realise the potential of technologies such as machine learning, robotics, drones, additives and blockchain."

Ernesto Ciorra, Head of Innovation and Sustainability, Enel, explained how his company is making the most of digital innovation and connections: "We are opening a digital door to the customer, using digital to manage assets differently, manage the relationship with employees, connect with start-ups and we even have a digital app to collect ideas from innovators all around the world."

But he said putting digital tools in place without changing company behaviour won't work: "Digitisation on its own is not enough. If you have a digitalised platform but you don't know how to transform this platform into a digitalised platform-based business model, you will not get the best out of it."

Experience-based change

One of the challenges for big, well established companies such as power utility companies is to move away from hierarchy and control to deliver a more innovative 'experience-based' approach to change. Ciorra explained: "We are used to managing companies by controlling everything, but how can I control something that I don't know?"

A mindset change from planning to experimentation is needed which accepts that some initiatives will fail: "If companies think that failure is a problem they will limit the potential of the digital. We have launched 'my best failed programme', encouraging our employees to share failure because, if you make a mistake and you don't share, the company will do it many times. If you make a mistake and you share, the company will learn and not duplicate it. Failure is an opportunity to learn."

Empowering people

Ciorra also emphasised that "companies must evolve from hierarchies to networks. The hierarchical model creates silos but in a connected world we must connect all our employees. We have to move from 'controlling' to 'empowering' people." Enel has created a series of communities of employees, focusing on developments such as drones and blockchain, using digital platforms to connect staff, along

with the ability to dispense with the hierarchy and go straight to the CEO. It is also giving start-up backing to employees with the best ideas: "If your idea is great, then you get the backing to develop it and, if you can prove that it will be successful, then you can be the CEO of it. We are developing around 20 new digital business models with this approach."

Innovation for the 'here and now'

Uniper's business focus is on the critical need to have security of supply and stability in the power system. Uniper's 'backbone role', with its emphasis on large-scale centralised power generation, does not however preclude it putting a strong emphasis on innovation. Examples include digitalising existing power plants, introducing drone and virtual reality technology and developing modular, multi-technology battery storage.

"Innovation plays an important role in our company," Dr. Stefanie Kesting, Director Innovation, Uniper SE, pointed out. "I have a strong and distinct innovation team working on specific projects. In addition, we have ensured that innovation happens at all levels and in all areas of Uniper." Kesting also stressed the need to empower employees and remove hierarchical barriers: "We have changed the way we make decisions and broke up hierarchies. It is now much easier to talk to a board member at relatively short notice and get a qualified feedback on an idea if you need it."

Uniper is also taking existing technologies and exploring their potential to address big challenges. For example, Uniper subsidiary Liqvis is seeking to establish liquefied natural gas (LNG) as a viable fuel for heavy goods transportation and has opened the first publicly accessible fuelling station for LNG in Berlin. Trucks running on LNG are more environmentally friendly than those running on conventional fuels. They not only emit substantially less carbon dioxide, nitrogen oxides and particulate matter, they are much quieter in operation than comparable vehicles.

Making the digital journey

Annmarie Reynolds
Vice President and Chief of Staff to the COO, AES Corporation

Hélène Verbockhaven
Deputy Director, ENGIE Digital

What have been some of the strategic success factors in your digital transformation journey?

Annmarie Reynolds: A key factor in our digital transformation is that it is not being done top-down. Instead how we approach digitisation is organically within our businesses. We have sponsorship at the top levels but we've identified leaders for initiatives at middle levels and asked them to take a lead on pilots and to improve our practices. Enabling a broader audience to take ownership and be part of the solutions we are creating has generated a lot of local enthusiasm and buy-in at all levels.

Hélène Verbockhaven: There are some key success factors. In particular, you need c-executive commitment. This includes dedicated time. Leaders need to give time to provide the vision to your people. It's also important to prioritise the transformation of the IT line. They need to be ready for the new age and enter into a co-construction of the solution with the business. If that doesn't happen, it can lead to confusion and delay because you always need to have IT at the end.

How can you overcome the problems of inconsistent data and inconsistent practices?

Annmarie Reynolds: I'll add 'inconsistent language' as a key challenge we've faced. For example, having the same data but referring to it in a different way can create confusion. We've been working hard on harmonisation as we realise this helps to take advantage of our global footprint, talking the same language in terms of numbers, information and the way we communicate with each other around our business practices and opportunities. In this particular case, the emphasis is on harmonisation rather than standardisation so that we don't lose the value of subtle differentiations that exist within how we operate.

Hélène Verbockhaven: Trying to harmonise data before trying to get value out of the data is a good idea. But you could get to retirement before it's perfect! On a recent project, we had a debate about whether to wait for clean data but we decided to launch with a tool that could allow the data to be updated. Technology nowadays offers so many opportunities for visualisation, it is a way to create harmonisation. Data is a step in the transition and not a prerequisite. When you show people the problem you can move quicker towards alignment.

In a big workforce, how do you get everybody on board with digitalisation?

Hélène Verbockhaven: It's a good question and I'm asking it myself. But as with the level of digitalisation of your personal life, the question is more about how the company can leverage the skills that many people already have. One challenge is people in higher management who are not always so connected and skilled with digital. We are doing some 'retro-mentoring', linking them up with younger people. It creates a bridge between generations and a two-way benefit. Also I think we should be quite clear that digitalisation will dramatically change the type of jobs we have. Many jobs will disappear so there is also a reskilling challenge.

Annmarie Reynolds: It's good to remember that there is security to being part of the solution and the company is looking for those people that are able and willing to find ways to make their work more efficient and more automated. Waiting or choosing not to buy into the direction of the world could mean you get left behind, but jumping in will make you part of the solution.

Moving to a new level: digital platforms and blockchain

Developments such as digital platforms and blockchain are becoming very real for many power utility companies. The power of platform communities and marketplaces has been evident for some time in the consumer internet. For industrial companies and sectors such as power utilities the potential is perhaps even greater with the opportunity that arises to create digital networks capable of transforming both operational efficiencies and market possibilities.

Platform pioneers

Niloy Sanyal, Chief Marketing Officer, GE Power Digital Solutions, told roundtable participants: "Power utility companies were the first creators of a platform economy. The ability to produce electricity and give it to consumers is a classic platform economy. Just like we have seen platform companies transform the transportation industry, the retail industry or the media industry, utility companies need to be platform companies building on their space. Whether or not they own assets that generate electricity, they still have a really important role to play in a dynamic electricity network that needs to be functioning as a machine bringing in affordable and reliable power."

There are many different possibilities for platform development. One of them is for collaboration: "Imagine what could happen in a utility industry if your apps are written not by your employees or vendors but developers anywhere in the world," observed Sanyal. "You could completely transform the innovation cycle."

Although the consumer internet has highlighted the power of platforms, Sanyal pointed out: "You can't just copy and paste what's happened to consumer technology and consider that that will work. The technology required to run Netflix every time on Amazon Web Services is not the same technology required to run a heat recovery steam generator in a power plant."

Becoming a digital company

"If they want to thrive, not just survive, every industrial company in the world has to become a digital company," Sanyal asserted. "And they need to be digital not just for operational excellence. On its own that may not be enough to survive. Digitalisation also has to drive new business models. In the power utilities sector, we spend an inordinate amount of time talking about our assets. What we really need to think about is our customers' assets. We can't just start this conversation with documenting our priorities; we really need to think about our customers' priorities and I would say this is what is different for a digital company and the business model opportunities it presents."

An important step for companies in asset-centric industries, especially utilities, is the creation of digital twins. "Imagine as a consumer when you are going into Amazon or Google, they have 100% information about you," explained Sanyal. "They have a digital twin of you; they can predict what you're going to buy next week, next month, even before you know what you're going to buy. It's the same idea applied in the context of machines. A digital twin can be at a company level, at a machine level, asset level or at an enterprise level." GE is investing substantially in digital twins, starting with wind turbines before moving on to the greater complexity of gas-fired generation and now coal-fired plants.

Blockchain begins to bite

Blockchain technology changes the way we transact, with the underlying transaction model shifting away from a centralised structure (banks, exchanges, trading platforms, energy companies) towards a decentralised system (end customers, energy consumers). Mark Dijksman, founder of OneUp, a company that builds software start-ups, told the roundtable: "It's relevant in any situation in which you want to share data between multiple actors. The data cannot be lost and, at the same time, it cannot be changed by anyone. It does this without the need for a middle man or a centralised authority with the help of a sophisticated consensus model based on cryptography."

Dijksman pointed out that blockchain is already making inroads in the power sector: "A lot of things are currently happening with blockchain in the power and utilities sector. I see a lot of potential in peer-to-peer energy markets as well as for optimising commodities trading and for machine-to-machine applications." Use cases in trading are the most developed so far but Dijksman also pointed out the relevance of blockchain to areas such as asset management and maintenance: "Smart contracts are an important addition to blockchain. They put us in a position to create autonomous machines. Smart contracts consist of 'rules' which can automatically be enforced and executed if certain conditions are being met."

A key strength of blockchain is its decentralised nature, said Dijksman: "Because it's a distributed environment, all the computers that form the blockchain have the same information so, if I want to alter that, I would have to access each and every computer and change it instead of just accessing one central bank or ledger. This gives the blockchain a more truly single source of truth. Everybody has the same information at the same time and, since nobody can alter it, you can trust the data: fuel for the future."

Blockchain is an opportunity for energy producers and consumers*

* PwC, Blockchain: an opportunity for energy producers and consumers? 2016
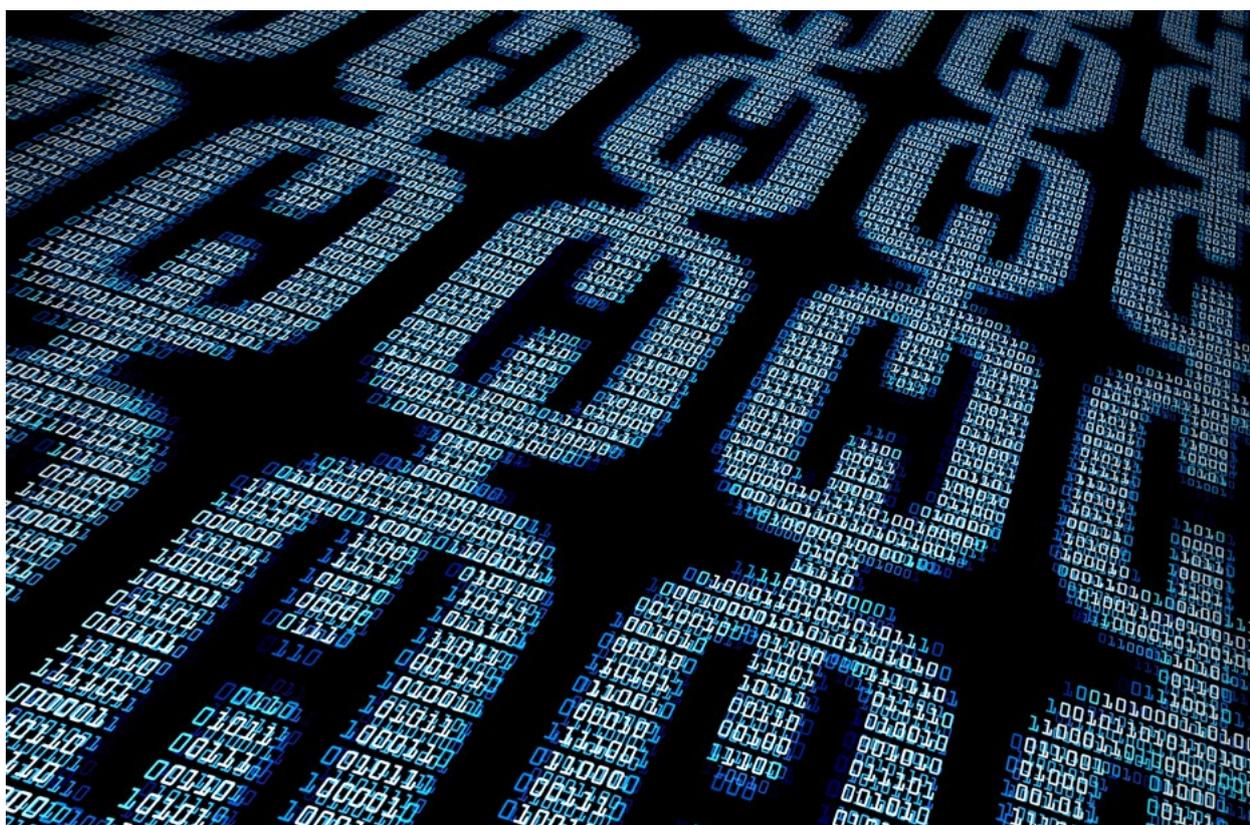
Addressing operational challenges

A range of major issues affects the daily life of utilities – from workforce demographics, commodities prices and infrastructure integrity to tariff reviews, grid modernisation and new types of competition. Regulation plays a huge role and the way companies work is strongly influenced by both their regulatory and historical contexts. This is the reality against which technological and digital transformation is being played out.

Theo Bunting, Group President, Utility Operations, Entergy, recalled a hurricane in 2012, his first in the group president role: "It was the best storm restoration effort we ever had as a company. We won awards for being best in storm restoration but we got crucified in the press. What had changed? Social media. Everybody became a newscaster, filming the damage and posting it online. The ability to do that created so much bad press for us as a company that what we thought was our best effort, the public thought was our worst. It's all about information and our customers want on-demand access to information."

Shaping demand

A key reason why companies need to have the tools to interact effectively with customers is to shape the demand curve: "Traditionally we've done very little on the demand side. Nowadays, because of energy efficiency programmes and the different things customers are doing, it gets more and more difficult to define the right supply level. It's like trying to solve a simultaneous equation by only dealing with one side of the equation. So demand response, energy management and home services become more and more important."

Bunting pointed out that sometimes power utilities are their own worst enemy: "I've often said our biggest competitor is ourselves because it's often difficult for us to identify what we need to change, how we need to change it and actually deliver that change. Our resistance to change really creates barriers for ourselves. That creates an opportunity for other companies to come in and play."

Technological cost reduction, of renewables in particular, is one of the most important trends in the world of energy. Luigi La Pegna, Head of Global O&M, Enel Green Power, highlighted the implications for his company: "We have about 36GW of installed capacity across the world at present and plan to add 5GW in the next three years. That's a huge amount of capacity and 50% of it will be solar. We are not building any more thermal generation plants. At the moment, we are building what will be Latin America's largest solar generation plant." The new plant, in Brazil, will have a total installed capacity of 292 MW and will be able to generate more than 600 GWh per year.

Companies are embracing the new digital world

Regulation and business models

Predictions of a 'death spiral' among power utilities have grabbed the imagination of headline writers but it's an outlook that is firmly rejected by Julio Castro, Chief Regulatory Officer, Iberdrola: "We absolutely do not agree with the death spiral thesis. Just the contrary. What we are facing is a revolution related to technology and social behaviour but there is no 'Kodak effect' happening in the energy business. Digitalisation will be among the triggering mechanisms for having a new business model. But the distributed and the centralised resources have to co-exist. The distributed resources are not killing the centralised ones - they have to live together."

A key factor for Castro is the response time for regulatory change to catch up with technological and social change: "First you have technology, then you have the behaviour of human beings and then you have regulation. The regulation always arrives late but it does arrive." He outlined the measures in the European Commission's Clean Energy Package as an example of regulation that is now responding to issues such as capacity in a future of centralised and distributed energy sources.

Q&A

Changing ways of working

Maarten van Beek
Director Human Resources, Netherlands, ING Bank

Mauro Fanfoni
Senior Vice President of Marketing and Innovation Europe, Eni Retail Market Gas & Power

How are your companies addressing the challenge of changing the way you work?

Mauro Fanfoni: The energy sector is still working at different paces. Even a simple thing like sharing a document can be complex in a large company. Last year we started up our energy services business. We did that on a brand new cloud platform and it provides an example of what 'agile' is. But it was not technology that made the difference. It was about the way people sat together and built a new business model. The challenge for me is to have that way of working throughout the company at all times.

Maarten van Beek: We are transforming the whole bank with a new way of working which is agile. The fundamental unit in our future head office organisation is the 'squad'. 'Squads' are self-steering, autonomous teams of up to nine people responsible end-to-end for their own specific customer-related mission. They are built around different disciplines, different areas of expertise and different backgrounds. Coordination between members of the same discipline takes place inside 'chapters'. We also have 'tribes' which are collections of squads with interconnected missions, such as securities and private banking or mortgage services. Finally, there is one more vital role – the 'agile coach' who coaches individuals and squads and who helps them to grow and prosper.

It's not just the employee base that has to undergo the cultural change: it's the enterprise itself. How do you address the legacy model that has built up within the company?

Maarten van Beek: We took quite a lot of symbolic actions. For example, the management board of the bank got rid of their offices and put one big table on the floor and said this was the new meeting space. Then we did it in the whole building; we didn't have meetings anymore, we had stand-ups. Appointment to the new roles was by peer selection. My team was selected by peers. The only thing I could do is veto the final candidate, but I couldn't pick the final candidate. That is letting go, but it worked. I got a great team.

Mauro Fanfoni: It's very important that it gets lived by everyone and you really have to keep on showing that this is the way you want to work. You have to be confident about a different way of working. It can also be a painful process because you are asking people to think differently from what they have been used to. Not everyone is ready to let go, so there is some kind of natural selection.