

# Digital Vision for Energy and Utilities



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We would like to thank all of the contributors. If you wish to send feedback, please tweet using **#DVfEnergyUtilities** or email: **AtosDigitalVisions@atos.net**

**Editor:** Kulveer Ranger  
**Production team:** Adam Fisher, Charey Ryatt  
**Design team:** Atos Marcom Agency  
**Consultation:** Neil Holland, Richard Barton, Ruth Oakey







Adrian Gregory, Chief Executive Officer, Atos UK & Ireland

## Foreword

We are seeing unprecedented disruption in the UK and Ireland utilities industry. The water market is opening up, renewable energies are entering the mainstream, and gaps in the retail electricity and gas markets are being filled by innovative niche players. At the same time, regulatory frameworks are evolving: companies are required to increase choice and value for customers while leveraging more from their existing generation and distribution assets.

In this context, different types of companies must strive to achieve the same things: the ability to differentiate themselves by getting closer to their customers, achieve vital operational efficiencies and deliver fast, convenient and value-adding services. Industry 4.0 technologies and data are essential enablers to every one of these imperatives.

This industry has always been quick to see the potential of new technology and today's forward-thinking utilities companies can again steal a march. Through digitally enabled transformation, we will see a move from utilities as commodities to high-value service providers at the heart of people's homes and lives. This paper explores the key opportunities and challenges of this exciting time of change. My team and I look forward to working with our customers and partners to make this digital vision a reality.

A handwritten signature in black ink that reads "Adrian Gregory". The signature is written in a cursive style and is underlined with a single horizontal stroke.



Franck Chevalley, Chief Executive Officer, Atos Worldgrid

## Foreword

In the face of global megatrends, every utility is facing significant operational and competitive challenges. For decades, the core business of utilities companies has been centred on complex operations to deliver a relatively straightforward service to their customers. Now, market dynamics, new energy sources and the rapid emergence of game-changing digital technologies are disrupting the landscape.

Today, markets are deregulated while regulation is stiffer than ever; renewables already make up 10% of the energy mix; and smart grids and meters point the way to tomorrow's truly connected homes. And at the heart of this perfect storm, there are unprecedented volumes of data that, until now, have barely been used.

While these shifts bring huge demands, this paper outlines the extraordinary opportunities for companies to grow by reinventing their ways of working and creating new value chains and innovative partnerships. Looking ahead, the successful utility operating models will be those that are data-driven. Major transformation is key to ensuring that companies retain the loyalty of their customers and create strong foundations for delivering this industry's digitally enabled future. This will create the potential for utilities to become key players in connected ecosystems in which businesses and citizens can thrive.

# Megatrends in utilities: the rise of a decentralised energy world



**30%**

of the mobile utility workforce will use augmented reality by 2019



**20%**

of the energy and utilities market will be seized by digital disruptors by 2020



**25%**

of utilities will leverage public Cloud by 2019



**85%**

of utilities will speed up digital innovations by 2019



**\$138bn**

should be spent in smart homes in 2023

\$ = USD



**20%**

of F500 companies will resell excess power by 2020



**\$4.6bn**

will be spent on smart grid data analytics in 2022

\$ = USD



**27%**

of EU energy should come from renewables by 2030

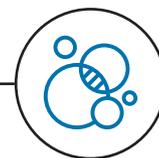


**50%**

of energy providers will become 'convenient lifestyle providers' by 2020







# Utilities market overview: consolidation and specialisation

Recent years have seen unprecedented activity in the utilities market, with more electricity and gas retailers than ever before and an opening up of the water market. Yet just as the emergence of the so-called 'big six' was driven by the need for companies to make economies of scale, so too will the next wave of consolidation. What's different this time is the impact of digital technologies.

Gaining share of this dynamic market requires a strong brand, an efficient operating model and a clear price proposition - particularly with the degree of choice now available both to business and domestic customers. In the electricity and gas markets, we're likely to see a swing back to a smaller number of suppliers, with new kinds of specialist related services such as energy efficiency, for example. For water, the same kind of consolidation and specialisation is likely to occur in the business-to-business space.

In terms of variation between the different segments of each industry - generation, transmission, distribution and retail - most of the consolidation and specialisation will be in retail. New services are likely to emerge targeted at larger businesses; a supplier of electricity, gas and water, for example, could offer bundled services for multi-site business customers.

## New role of digital

So, what is the role of digital technologies in shaping and supporting these changes? With the Industrial Internet of Things, the business of utilities transmission and distribution will be smarter and more data-driven. In the retail space, digital technologies will enable the creation of completely new services, such as sets of services built around electric vehicle ownership, or home energy management, or property services management.

For domestic water customers, we'll see the evolution of simple, dynamic, digital customer experiences, just as we have seen in the power markets in recent years. Across all markets, the digital transformation of service delivery using cloud, automation and artificial intelligence will enable a shift of more customers to digitally enabled self-service for checking bills, monitoring usage, arranging callouts and so on. While many customers will be receptive to this, others, such as those not comfortable with on-line interactions, may not - in which case different business models, or operating companies, will be needed for different customer segments.

## Unprecedented choice

According to industry analysis that drove consolidation utilities retailers need, in general, to target a minimum of five million customers in order to be viable. The use of digital technologies could lower that figure; smaller, digitally enabled companies may be agile and specialist enough to sustain businesses with far fewer customers, just as smart new digitalised businesses have been able to do in the telecoms, banking and insurance sectors.

When it comes to customer choice, utilities is a market in which customers are willing, to some extent, to shop around. What may change is that even more information will be visible to enable people to make choices and the reasons to switch may well become more compelling. This on top of switching which is becoming ever easier. The ability to receive one consolidated bill across gas, electricity and water, for example, plus all the related services that become possible based on all that data, may well attract more customers. And it's these kinds of combined, added-value services that will enhance customer experience and build brand loyalty based on utility companies' ability to demonstrate to their customers that they understand them and their needs.

## Differentiating through value

Responding to these challenges requires utilities companies now to understand and develop clear and robust value propositions, make decisions about which customers to target, and balance these decisions against a portfolio of risk in terms of profitability of particular segments.

They need to identify the specialisms they want to offer and the value that these will bring across different and multiple customer segments and understand where others will be more competitive. Critically, this is about transformation to enhance customer services while maximising operational efficiencies. And enabling that transformation will be revolutionary digital technologies that offer companies new ways to differentiate themselves.



“Companies need to identify the specialisms they want to offer and the value that these will bring across different and multiple customer segments and understand where others will be more competitive.”

**Richard Barton, Energy & Utilities Partner, Atos UK and Ireland**

# Consumer at the heart

## A day in the life of a *prosumer*



The smartphone alarm goes off at 6:00 a.m. in the suburban home of a lady we'll call "Jo". As the sun rises in the sky, her rooftop solar panels start producing electricity and recharging her energy storage panel in the garage. Jo glances at her smartphone to check energy usage at her elderly mother's house across town to make sure all is as it should be, with alerts set to let her know if that changes. She loads her clothes into the washer, which is programmed to run during her peak solar production later in the afternoon. She then heads for the bathroom to shower and get ready for work, knowing that the water she uses will be reclaimed for local irrigation at a centralised community treatment plant.



On her way out the door, she receives an alert on her phone from the local utility letting her know that hot, humid weather today is driving high electricity demand and the utility will pay her a rebate for using less energy during peak demand. With the push of a button on her smartphone, she agrees to participate in the load reduction event, which will automatically set her smart thermostat back in the afternoon when no one is at the house. The security system at her house is activated as she backs out the driveway and she sees the insulated cellular shades on her front windows close automatically to keep the house cool.

## A challenge for utilities - providing a bespoke experience with the consumer at the heart

Utility customers are no longer the passive commodity users they used to be. With the rise of smart homes and smart buildings, more are becoming active in optimising their consumption. They have new usage patterns thanks to smart appliances and electric cars.

The growth of local wind and solar generation means fewer energy consumers and more energy producers or 'prosumers', with intelligent connected devices to an increasing extent handling the relationship with providers.

This evolution nurtures a growing competition with new players too, notably start-ups specialising in consumption optimisation and appliance manufacturers.

To succeed when facing better-informed, savvy and empowered consumers, incumbent providers must provide a better experience along the entire consumer journey. They must also leverage the power of data to offer the best plan prices alongside the best mix of value-added services.

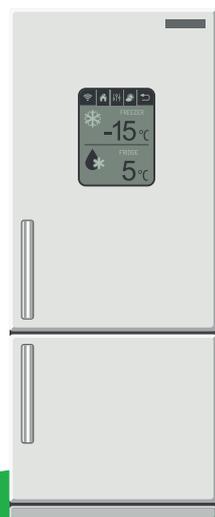
Opposite we look at what the prosumer journey of tomorrow will look like.





As she arrives at work, Jo is directed by an app on her phone to an open parking spot with a charging station for her electric vehicle. She plugs in the vehicle, which is programmed to charge during the lowest cost period of the day, with all EV charging costs appearing on her consolidated utility bill. Later in the morning at her home, the washer begins running on solar energy from her rooftop and her smart thermostat sets itself back six degrees to take advantage of the utility's load reduction program rebate. She receives a message that her home battery is fully charged, and her washer is running off her rooftop solar.

Her home, despite warm weather, is running on virtually zero net energy. At the end of the day, Jo packs up, leaves the office and gets into her fully charged electric vehicle for the drive home. The smart meter at Jo's house retrieves her location information to calculate her estimated time of arrival so that her home automation platform transitions her systems and appliances to "at home" status. Upon arrival at home, Jo checks her energy dashboard to see energy production versus consumption; data disaggregation from the smart appliances; savings from participation in the demand response event; energy and water consumption compared to neighbours; and a calculation of her overall savings for the day and month this far.



That evening she receives an email from a smart appliance manufacturer warning her that the lead shape of one of her appliances and the amount of reactive power it's drawing indicated the motor will likely fail soon, and that a service call should be scheduled, while an RFID (Radio-Frequency IDentification) tag on a food item in her refrigerator alerts her that an expiration date is approaching. Because she already did her laundry, Jo also activated a transactive energy app on her smartphone to sell her excess solar generation to neighbours in her cul-de-sac the next day using a local power pool app running on a blockchain in her smart meter.



# Omni-channel experiences: evolving customer contact

Though change is afoot contact centres continue to play a central role of utility companies' customer engagement strategies, so the effective management of these centres remains a business-critical matter. Customer satisfaction equates to vital competitive edge.

Given that utility regulators assign ratings to how each company runs its contact centres - including an evaluation of customer experience - a successful customer contact operation is relatively straightforward to measure. Low scores are fined, which in turn impacts companies' funding. It's therefore a core business objective to maintain and increase these ratings by enhancing customer service.

## Flexibility and efficiency

At the same time, efficient, lean operations are essential; utility companies typically want to flex their contact centre operations in line with customer demand. This can be a challenge - especially as some companies have grown relatively quickly and, inevitably, may have diverse technology estates. It's for these reasons that many are innovating by moving to cloud-based IT infrastructures, with the agility and flexible 'pay as you go' services that cloud brings.

Taking advantage of the technology available in the contact centre space, it makes sense to take a hybrid approach that can blend private and public and on-premise, in-the-cloud technologies and applications. In some cases, companies outsource their contact centre operations as a managed service to specialist providers who can evolve more streamlined, efficient delivery - even flexing up and down the numbers of customer services agents.

## Digital transformation

It's not just about technology infrastructure. A skilled customer services agent is one of the most valuable resources in a utility organisation. Working with them to create a joined-up customer experience, and backing this up by streamlined workflows and scripting, integrated media, and automated call-routing to different departments are all critical.

Internally, delivering more immersive customer experiences requires organisational and cultural change to think, connect and collaborate

digitally by default. As far as customers are concerned, success will depend on making sure the experience is easy and available to them in whatever channel is right for them. Older people, for example, might prefer phone-calls and printable web pages. Digital natives, on the other hand, are more likely to initiate any communication digitally.

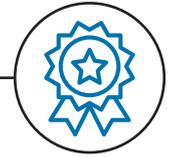
Given the range of contact centre operations, being able to integrate third-party solutions and using open source software and standards is key. This open approach means that operations can evolve in line with business need and underpin a roadmap of digital transformation. Increasingly, this is about creating an omni-channel approach to customer engagement that can incorporate multi-media interactions in an agile, unified way that meets all data governance and compliance requirements.

## Looking to the future

To service and support the connected homes of the future, contact centre operations will continue to transform, incorporating new kinds of omni-channel experiences and delivering ever more proactive, smarter customer communications. The future customer experience will encompass online messaging, multi-media files, video, call-backs, online documents and real-time data - including from sensors via the Internet of Things, for example to integrate with servicing databases that log gas or water leaks in order to arrange call-outs. Digital transformation of contact centre processes will also enable enhanced staff support, such as care for lone workers through mobile apps and sharing of real-time data.

As the utilities market rapidly evolves, prompt access to a skilled customer services agent will always be important to retaining market share. Essentially, success will depend on transforming operations to drive consistently excellent customer experiences and produce deep, real-time understanding of exactly what customers need, and how they interact.



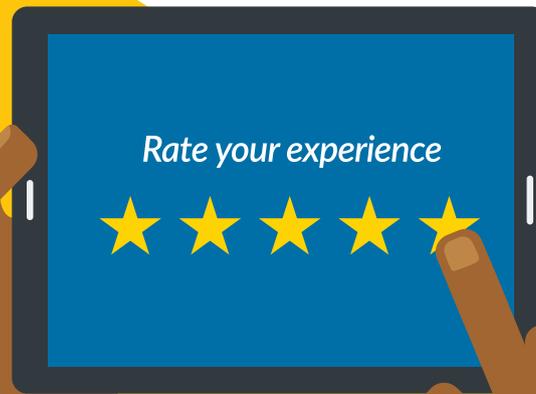


# Eyes on the customer experience prize - winning with the customer experience journey

There are some distinct and revealing parallels between the utilities industry of today and the financial services sector. In both cases, agile new entrants into a highly regulated market are offering innovative services that create extra competitive pressures for incumbents. With customers increasingly able to shop around, winning market share depends in part on offering more personalised and joined-up digital experiences.

A customer experience business means understanding what your customer's need, then designing and delivering platforms, processes, and services to better win, serve, and retain those customers. Additionally, to use digital technology to identify and deliver new sources of value to your clients' customers.

In today's fast paced marketplace, it is more important than ever to stand out. Customer experience is now recognised as the key differentiator over product and price, therefore it is essential for a company to have an effective customer experience strategy.



## Five steps to customer experience success

The good news is that omni-channel and customer service monitoring technology are mature. The opportunity now for many utilities companies is to take a more holistic approach to customer interactions.

### 1. Mapping customer journeys

Holistic change starts with mapping the customer's journey, from communication and fulfilment channels right through to billing, switching and the provisioning of new services. Instead of the more traditional ways of organising processes around existing business and technology, this takes a customer-centric view by looking at the customer journey and then designing processes and technology around it.

### 2. Devising a digital operating model

From there, it's about devising a digital operating model that delivers that customer journey, making the company easier to do business with. This can offer the same customer experience independent of channel and give customers choice about which channel they use - phone, web chat, email and so on. Taking a truly end-to-end view delivers vital process improvements and eliminates waste.

### 3. Delivering two-speed IT

Inevitably, as in the financial services sector, there are a host of legacy systems in operation. A digital operating model can be layered on top of this underpinning infrastructure. This is, in effect, a two-speed approach whereby operational and digital infrastructures can run simultaneously. It modernises and future-proofs the business, making it easier to introduce new technologies.

### 4. Using customer insight

Critically, overlaying a digital operating model enables companies to get a single customer view across multiple systems. This produces intelligence about customers and what they want, which means companies can be more responsive. Using data and analytics helps to segment and tailor services and greatly improve customer experience, for example through more personalised proactive communications. And accurately mapping the customer journey on a website and making an intuitive tool, with all potential barriers to journey end-point removed, is key.

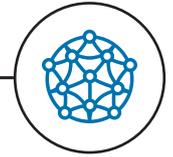
### 5. Embedding organisational and cultural change

This isn't just a technological transformation. It is a shift to a service culture that seeks to build relationships with people who are not just consumers, they're customers with particular preferences, buying habits and so on. This often requires organisational restructuring and cultural change, with staff training in customer experience.

## Synergies with operational excellence

To return to the parallels with financial services, established companies face ongoing pressures to find efficiencies in middle and back-office operations. Billing errors, for instance, are resource intensive, costly and detrimental to customer service. So, for any utilities provider, great customer experience can go hand-in-hand with a cost-effective and efficient operation. Easy, instant digital experiences require lean, cost-efficient processes; there's less friction and less waste because customers get what they need first time. Finding those synergies is key to delivering a compelling offer that increases customer retention and wins vital new market share.





## Jumpstarting innovation through the Internet of Things

With different utilities companies at different stages of digital maturity, there is broad recognition across the industry of the critical role that data will play in its successful evolution. Yet with a vast array of technologies available, there can be confusion for some players about the next steps on their digital journey.

What is the optimum investment profile? How can they bring together data from the field and from the back office? And how do they orchestrate solutions that identify and then sustain real value?

### Rapid connectivity

With the arrival of the Industrial Internet of Things and Industry 4.0 (cloud, automation and artificial intelligence), industry is now at a tipping point. Powerful technologies are converging in a way that enables companies – at scale – to connect real objects to the digital world, aggregate rich data, and turn that data into game-changing insight and value. Along with the automotive industry, the water and energy sectors are thought leaders in this domain.

At Siemens, we are working with utilities companies to harness data to address significant business problems. By integrating streams of data from operational technology and information technology, real transformation becomes possible.

### Transforming processes

One key domain in which data is now being exploited is diagnostics and preventative maintenance of plants and infrastructure. Real-time data from sensors, such as vibration analysis on water pumps, is analysed to identify maintenance and repair issues even before a problem occurs, reducing downtime and improving the overall efficiency and effectiveness of the plant.

Another major area is operational efficiency: using data to analyse a process and identify where any delays are occurring. Extracting and integrating this data – sometimes from a number of different sensors to infer what is happening – produces a picture of the entire process. Being able to integrate that data into business decision-making is a massive step forward for industry.

As far as business benefit goes, using data from sensors, for example, to predict a maintenance issue immediately increases efficiency. Yet if companies can also use information about a vibration change or a temperature increase to uncover a problem either upstream or downstream in the process, the benefits multiply. This kind of real-time, holistic view is unprecedented – and is the reason why new collaborations between different parts of the organisation and between specialist providers are now so crucial.

### Rapid advances

Use of IoT and analytics is developing very fast and we are seeing new innovations every day. Smaller companies are driving a lot of the ingenuity and product innovation, such as new more easily installed battery-operated sensor technologies. Yet the step changes in value lie in the data that these sensors capture – and the ability to spot and act on opportunities along the supply chain, such as offering water quality as a service, rather than providing individual technology and engineering solutions.

Increasingly interventions will become automated and upstream to downstream operational machinery will be self-learning, sharing data back to control. In the meantime, a new realm of engineering is opening up, with an urgent need now to invest in training and competences to develop the engineers of the digital future. We also need to continue developing horizontal agility, with learning and collaboration between partners and colleagues to bring new solutions into the market.

Learning from other sectors is important here, to look at business problems in new ways to deliver truly transformational change. Although this space is very fast-moving, with industrialised, flexible and ready-to-use IoT and analytics solutions already available, now is the time for utility companies to start optimising their data for competitive advantage.





# British Gas - a transformation journey

With more than 70 energy providers now operating in the UK, British Gas understands the challenge to constantly adapt to what our customers want - which is why in 2017, we embarked on a major digital transformation programme.

Transformation across the organisation is in two key areas: quality of customer experience and growth in customer engagement. We're using agile methods to design changes and iteratively test them with customers, with operational efficiencies achieved as a result.

## Forensic understanding

The starting point was to look at 19 key customer journeys such as buying energy, booking an appointment and receiving a customer reward. Workshops with mixed teams of call centre agents, field operations, engineers, head office, IT and others, to gain a forensic understanding of each journey and customer pain point.

A significant volume calls to British Gas contact centres came from customers who had already interacted with a digital channel, so we knew we had to improve the effectiveness of digital in the mix.

## Building the transformation

With essential senior stakeholder sponsorship, the build phase of the transformation, articulating customer outcomes and building the journeys that deliver them. Teams are focusing on three key areas: enhancing customer communications; simplifying and streamlining approximately 2,000 business processes; and improving front and back-end systems.

For the first time, online and traditional journey teams have been integrated in order to develop consistent omnichannel journeys. The aim is for customers to self-serve online and if they need more help, chat bots will be there to support them, then web chat, and finally a call in the case of more complex requirements and for more vulnerable customers.

## Accelerate and personalise

To deliver the required outcomes and resulting operational efficiencies, there are three key priorities: shift journeys online; optimise their performance; and build new functionality. For example, we've improved online help for the hundreds of thousands of customers who would have phoned us to reset passwords; we've also accelerated response times across the board.

While the time it takes to launch the British Gas customer app has been slashed from 25 seconds to just three, the app is about much more than speed. We're testing new versions that are proactive in driving next actions, such as pushing personalised alerts to customers about a meter reading or an annual service. Customers will also get real-time usage and monitoring tools and information.

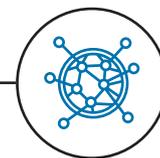
## Act and optimise

The third programme phase will be to act and optimise every component. This means actively promoting digital channels to customers - for instance, an engineer's visit is a great opportunity to show customers how to use the British Gas app to get real-time information about their energy consumption and make better choices. This phase is also about optimising each experience - so, for example, with 75% of visits to digital channels from mobile devices, selected journeys are being optimised for mobile. Similarly, while historically IT maintenance was done over weekends to minimise impacts on the call centres, there will now be a different approach.

British Gas recognises that as the market and technologies evolve, customers are looking for clarity about the value they receive. We want to react and listen to them, show we can respond to the regulator's concerns and create points of differentiation. Our purpose - which is at the heart of all we do - has to be to satisfy the changing needs of our customers.



Overview  
target: £95.00  
Combined Energy  
£23.46  
£83.00 left  
August  
View your spending and set a target



# Utility and IT models: a world in transition

For utility companies, both business and IT models are undergoing massive and irreversible changes. The similarities between these changes are striking.

With utility business models, we are experiencing changes from centralised to distributed models; the reality of renewables and the emergence of viable storage; the electrification of transport; and parallel changes in commercial, customer relationship and regulatory practices.

On the technological side, IT evolution shows strong decentralisation: pervasive cloud delivery; mobile everything; the explosive growth of internet-of-things; the increased adoption of “true” artificial intelligence; and the shift to open application environments and pay-per-use delivery.

These changes to utility IT and business models are not quite chicken and egg. The heritage IT architectures used in the utility sector mirrored old centralised operating models. With considerable effort and important limitations, the new utility environment could probably have taken shape without the parallel IT transformation.

But one thing is for certain. From now on, any company seeking to take maximum business advantage of the new utility business model, will only be able to do so if they embrace the transforming IT landscape in parallel.

## Think three themes: distributed, intelligent, open

If we think about what the new IT stack for utilities looks like from a functional rather than a technology perspective, it will show three clear characteristics – it will be distributed, intelligent and open.

Let's take a very brief look at each of these.

**Distributed** – As new electricity networks move to higher levels of decentralisation, so the control intelligence needs to be similarly distributed if the network is to be optimally supervised. This is about more than creating agile, cloud-based infrastructure models. It's also, for example, about taking advantage of edge computing as control intelligence is required across the network, from the home or workplace, right up to a national or even continental scale. Even the fully decentralised model that Blockchain and similar hyperledger technologies may play a role in this “Distributed Energy Cloud”.

Distribution is not just applied to the electricity network infrastructure – it's for the workforce and customers too. People expect relevant contextual access to information and services, and these expectations become more sophisticated every day. Field engineers who have grown up with gaming, for example, will soon take augmented reality as a given in service tasks.

**Intelligent** – The macro and micro management of complex utility networks demands constant adjustment and this needs more powerful data-analytics. Increasingly, this will be shaped by artificial intelligence and automation, especially as even the tiniest of devices has a contribution to make in the Internet-of-Things.

The continual flow of real-time data is not just essential for intelligent network management and balancing. It also becomes an asset in its own right – particularly as utilities seek to build more extended and articulate business and client relationships.

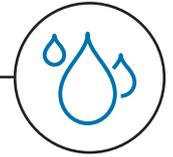
**Open** – For the new utility models to deliver, openness is a prerequisite. This is true from two perspectives. At a technical level, utilities need to move away from traditional proprietary platforms if they are to achieve the interoperability demanded in new and more agile models. Electricity network management must work together with extended Internet-of-Things infrastructures.

## Common vision

But openness also becomes a business prerequisite. Utilities will create new business value through close working alliances with building management, with local urban authorities governing Smart cities, with automotive companies handling bigger fleets of autonomous electric vehicles, and telcos providing services to connected homes. These new opportunities can only become reality if utilities and their new partners can learn to share a common vision and language.

Nobody yet has all the answers, but going back to the chicken and egg analogy, the best thing we can do together amidst this change is to share our experience and vision of the growing interdependence of utility business and IT models.





# Using digital to help weather the extremes

From the freezing and flooding caused by the 'Beast of the East' to the record-breaking hot summer that followed, UK weather conditions in 2018 brought huge operational challenges for the water industry.

Such challenges underscored the complications of operating a physically integrated network of assets that are digitally disaggregated. Implementing a digital operating model means companies can gain a more integrated view of their entire infrastructure, from treatment through distribution and into consumption.

Whether this digital environment is created via one single platform or a data layer implemented over existing systems, it's possible to get an accurate operational profile - with data on demand, per capita consumption, leakage and so on.

Layering this with advanced data modelling capabilities supports better-informed and more timely decision-making, for example, enabling teams to deploy resources and respond to events before they happen.

## Evolving the digital operating model

At Anglian Water, the testing weather was a driver to really test our digital operating model very quickly to gain new insights into how our integrated asset base was operating. The value and opportunity in our digital assets, in conjunction with our physical assets, is becoming more and more important.

Our move to the cloud is well underway allowing us take better advantage of open source product sets which further open the way for data science to continue becoming deeply embedded into the operational psyche of the business. The next step is to industrialise the model and evolve digital platforms to expand and scale-up.

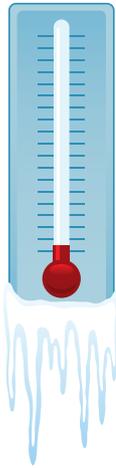
As well as being end-to-end across the product lifecycle, this new level of integration is from the back office right through to the front end.

From our customers' point of view, digital really underpins how we deliver on our promises around communication, availability and ease of access to information; things they've told us that are really important to them.

Alongside this, the regulatory performance mechanisms for assessing customer service essentially compares water companies with other types of service provider - whether those are banking, retail, or mobile phone companies. So the ability to meet the rising expectations of customers, including those for digital services, is essential to success if water companies are to be judged alongside names such as John Lewis or Vodafone.

Climate change and extreme weather conditions continue to signal that the atypical will, increasingly, become more typical; extremes may well become a new norm.

Digital technologies are vital enablers to these and many other challenges, underpinning the water industry's response to delivering essential services and operational efficiency; enabling water companies to deliver the value and level of service that customers expect.





# Fresh challenges require new alliances

The combination of new connected digital technologies with the requirement for the utilities industry to leverage more from existing asset bases is driving new types of collaboration and partnership agreements.

Utilities companies have long partnered with IT providers to introduce new technologies. In contrast, making use of Internet of Things (IoT) technologies requires a broader set of competences. This is because many of the physical assets, activities and people connected through the IoT have traditionally been outside the IT domain. To take one example, using the data from connected devices, engineers can now see what's happening in an underground water-pumping station without having to dig a hole. Furthermore, that station can be viewed and monitored as just one part of a highly complex asset system, with a complete overview of processes from end to end. As a result, as well as IT and business process expertise, engineering knowledge is crucial in using IoT technologies to support digitally enabled working and decision-making.

At the same time, with spending limits set by regulators, companies are having to improve productivity and efficiency and reduce costs by leveraging more from their existing assets. To do this, they need to modernise and transform to make step changes in cost-effectiveness and operational efficiency. As well as a broader skills base, this requires vendors and partners who can work collaboratively and innovatively to meet the challenges their customers are facing - to lower costs, reduce outages and comply with regulators' requirements while providing better customer service.

## Focusing on outcomes

As a reflection of more innovative collaborations, there is a move across the industry towards new types of commercial model built around the outcomes that utilities companies need to achieve. Anglian Water, for example, has developed relationships with a group of alliance partners - of whom Atos is one - who provide a set services, from building infrastructure and installing networks to implementing the next generation of applications to support Anglian Water's business. With a

capital programme in place, these partners devise and deliver projects designed to achieve the company's goals: enhancing customer experience while also meeting the demands of the market.

By drawing on a mix of industry, technology and engineering knowledge and expertise, supply chain partners can deliver added value by not just, for example, providing water pumps, but delivering end-to-end water services and managed solutions on the customer's behalf, using data to manage networks more effectively, efficiently and sustainably. Scottish Water, for example, has appointed a partnership of suppliers to implement an energy management service across its network. Using IoT technologies and integrating data from internal and external sources, this service manages and monitors the network effectively and efficiently end to end, so that events can be predicted and problems prevented.

## Sharing risks and rewards

Partnership agreements that share risk and reward with supply chain partners such as Atos, are becoming increasingly common. What is crucial is that partners understand and invest in the company's overall strategy and can bring the right blend of domain and technological expertise. One challenge for any utility company is the long-term nature of infrastructure projects in comparison to the more rapidly changing digital and business landscape, which is why finding partners who can be agile is so key.

The focus for many companies in the industry is shifting towards how their supply chain can help them achieve transformation at the right speed with the right outcomes. These are exciting times in which partners need to cooperate, enabled and empowered by new relationships and technologies to find different ways of working in line with their customers' vision and the utilities industry's wider context.



“There is a move across the industry towards new types of commercial model built around the outcomes that utilities companies need to achieve.”

**Neil Holland, Vice President, Energy & Utilities, Atos UK & Ireland**



# Prescriptive Security: a new way to safeguard energy companies

## Key challenges

Organised crime groups, often in cahoots with corrupt states, pose a serious threat to energy companies. Hacking and malware have been commoditised, so companies that once thought cyber attacks were only about stealing money have discovered that ransomware, data deletion and other destructive system attacks can damage reputations and bring operations to a grinding halt.

Energy is a highly regulated industry where keeping systems available, resilient and secure is a mission-critical requirement. Companies struggle to maintain and modernise extensive legacy hardware and software, some of it difficult to replace. Rapid implementation of connectivity between industrial control systems means that devices that were never previously vulnerable are now routinely being hacked. Older systems and legacy protocols also make it harder to detect cyber threats.

Energy organisations operate globally, with infrastructure and processes spread across differing geographies and company boundaries. This makes it harder to gain an integrated view of cyber resilience across an organisation.

Such companies don't operate in isolation: they have well-established, complex and flexible supply chains. Attackers use 'supply chain infiltration' techniques to target business by targeting their suppliers and partners. In parallel, the energy sector faces a shortage of cyber skills in the locations most needed to support legacy infrastructure.

Legislation, notably the General Data Protection Regulation (GDPR), means that energy companies must consider security as a Board-level risk by understanding the threat facing their data and make defensible decisions to secure their networks. The UK's National Cyber Security Programme (NCSP) helps energy organisations understand how to build security into the development of next generation of internet-connected services through the 'Secure by Default' initiative.

Finally, businesses often find themselves locked into legacy security products, making it difficult to respond quickly enough to the evolving cyber threat with long-standing, inflexible contracts often written years before security became mainstream.

“To protect their reputation, energy companies must invest in digital ways of working to safeguard sensitive data, not just protect critical national infrastructure as systems.”





## Meeting the challenges

To protect their reputation, energy companies must invest in digital ways of working to safeguard sensitive data, not just protect critical national infrastructure as systems. They need to evaluate cyber risk based on evidence. That evidence comes from security monitoring systems capable of spotting suspicious behaviour with actionable intelligence about threats.

Prescriptive security stops breaches from happening by using big data analytics techniques to provide earlier visibility of threats before they become incidents. Automated incident response procedures can contain data breach information – thereby reducing time to react and recover operations.

Evidence-based decisions are key to reducing cyber risk as business outcomes, not individual security products, alongside solutions that integrate monitoring technologies with automatic response procedures. This is cyber resilience-as-a-service and removes the need for organisations to resource this themselves.

Happily, we have arrived at a best of breed integrated solution that leverages investment from recognised global cyber security leaders combined with deep internal talent, meaning CIOs can sleep soundly.

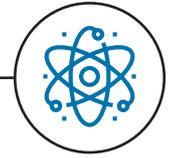
## Looking to the future

Energy organisations need to effect a change in mindset. Whereas traditionally security was perceived as a blocker to change, it should instead be viewed as a powerful enabler for digital transformation. Investment in cyber security also offers energy companies an opportunity to achieve their digital ambitions by unlocking the hidden value of data siloed across legacy infrastructure.

Our research has shown that consumers expect energy companies to deploy effective and proportionate security to safeguard their data, not just critical national infrastructure. Consumers will vote with their feet by switching from energy suppliers who fail to meet their obligations. New market entrants operating greenfield infrastructure based on renewable energy will continue to disrupt the market unless established players overcome the cost/risk of legacy systems.

Energy as an industry has safety at its heart: its safety-first culture surrounding the core product is integral to everything it does. Safety and security go hand in hand – the risks of one affect the other. Effective cyber security is a critical component of a digitally enabled energy market and is the responsibility of everyone involved in the industry.

Atos has partnered with Siemens to provide a solution for converging information technology with industrial control systems to spot security trends across legacy infrastructure. This solution uses analytics to diagnose patterns of anomalous behaviour hidden in old protocols for manual investigation or remediation which can be subsequently automated for onward processing based on real-time interpretation of risk.



# Case study: a digital transformation exemplar at Sellafield

Sellafield has embarked on the most significant transformation journey in its history, with the mission to deliver one of the world's most crucial environmental clean-ups, safely, ahead of schedule and for lower cost.

## A clear aim, a clear roadmap

Sellafield has made commitments to the Nuclear Decommissioning Authority and Government to reduce spend by at least £1.4 billion by 2029 - and, in fact, to bring this forward to 2020, with further savings of £1.4 billion by 2029.

To deliver its mission, Sellafield must operate as a new kind of extended enterprise. This journey is about transforming the whole of Sellafield's operations to create a unified, smaller and more agile enterprise.

This redefined organisation will act as the 'intelligent customer', leveraging capacity and capabilities across the supply chain and creating a value-led, high-performance culture.

Achieving this demands more intimate, integrated relationships with the supply chain- and different ways of thinking and organising. We have great ambitions for a digital Sellafield.

The plan is to create digital-to-digital interactions with the supply chain, with a shared, single version of reality that fosters a culture of immediate collaboration. This would include more flexible, easy-to-use digital tools to speed up decision-making and help people work in completely new ways.

This would accelerate business cycles, leverage innovation and increase productivity - resulting in improved cost efficiency and better value.

Sellafield and Atos are working in partnership to build this new digital ecosystem and create a catalyst for change across the extended enterprise.

This will then deliver the pace, performance and characteristics needed for the future state, with ICT as a vital enabler on the journey to Sellafield's transformation.

## Meeting the challenge with digital innovation

The ambition for a digital Sellafield is to have an integrated set of digital tools and services that enable a resilient enterprise to work collaboratively and innovatively, increasing efficiency and performance whilst accelerating the Sellafield mission.

The digital twin would be a digital duplicate of Sellafield plant from design, build, operation, maintenance and decommissioning as needed, potentially spanning a life of over 100 years.

Bridging the physical and digital worlds, the constantly-evolving virtual plant would collect and archive any changes to its physical counterpart in real time.

This detailed model would list out the lifecycle of every component, reference design, supplier information, and inspection history, to provide a biography of every piece of equipment.

It would ensure the same approach to current and legacy asset information, regardless of format - proactively managing asset maintenance, stores, utilisation and performance, and ensuring effective control on current and future costs and resources.

## New solutions for a new world

Today, data is dispersed with islands of information, applications and technology spread across the supply chain, each with its own culture and ownership. As a result, finding a reference, working on a design or cross-checking information all take time.

Our plan is to bring these together so it can be digitalised, modelled and indexed into a Common Data Environment. Years of experience and knowledge will be brought together in a single, secure database, accessible by trusted partners.

In just a few clicks engineers, designers and operators could effortlessly travel back over the history of every single plant component. Direct access to the right information at the right time drives optimal performance and efficiency.

An Enterprise Information Management landscape could then be established with governance and control over assets, supporting information asset owners and the business-wide adoption of information-driven policies.

The ultimate aim is that every day, a wealth of data is generated across the extended enterprise from connected machines and sensors, to the connected supply chain. With Industry 4.0 technologies, this data will be analysed and transformed into smart business outcomes, triggering actions and even pre-empting problems before they happen. Data-driven predictive maintenance will transform asset lifecycle management by minimising downtime that, with real-time monitoring of mission-critical systems, maximises operational efficiency and reduces costs and risks.

This is the goal.

## A truly digital workplace

An engaged and efficient workforce is important to Sellafield. The way we work is changing, and the workplace has not always kept pace.

The Sellafield Digital Workplace will be a flexible, personalised and intuitive working environment. Colleagues will stay connected wherever they're working. 'Digital personas' are aligned to specific digital toolkits so that colleagues have the right tools and information to do their job. Augmented and virtual reality will play a key role and be used to take engineers out of harm's way.

Digital Sellafield will constantly evolve yet have one common focus - to underpin and accelerate Sellafield's transformation and the delivery of its mission.





# The energy market is in its most intriguing place, but is it changing fast enough?

Change is a must and time is of the essence for new and exciting services to be developed. At the same time, the Government is taking steps on the requirement to remove barriers to smart technologies such as storage and demand-side response, to fully enable smart homes and businesses and to improve access to energy markets for new technologies and business models.

## System not keeping pace?

The system however, is designed for the traditional business models of yesteryear, and because its primary function was to keep the lights on and provide safety of supply, many of the licences, codes and legislative instruments have not kept pace with change in the industry. In an effort to diversify, new entities and disruptors are marking their mark, but there are barriers to testing and most of all scaling up new products such as peer-to-peer trading, community energy supply, new dynamic energy tariffs, or vehicle charging. The old system largely wants to change too but is stuck due to inertia, regulation and uncertain return on investment. At the same time new actors are needed in this digitally enabled world but their responsibilities are still unclear.

In an effort to boost innovation Ofgem, the UK energy regulator, has created a regulatory sandbox for companies to experiment. And while it helps innovators to understand the playing field, we are yet to see how these 'test beds' are to be scaled up beyond the initial trial. Would those innovators for example, achieve market access, when the energy sector is opaque, and the infrastructure does not always align with aspirations for new services?

The Clean Growth Strategy has been an exciting piece of the puzzle; it clearly demonstrates that economic growth is not hindered by decarbonisation, and other means of generation such as renewables are not going to make energy unaffordable or less secure. The Industrial Strategy's clean growth grand challenge puts innovation in the energy sector front and centre. Although we see a movement in the right direction, we still need a clearer framework.

## Primed for the opportunity

According to the International Energy Agency, one billion households and 11 billion smart appliances could participate in interconnected electricity systems by 2040 thanks to smart meters and connected devices<sup>1</sup>. With the massive amounts of data collected, distribution network operators will be infinitely better armed with knowledge and accurate tracking of electricity demand, to be able to ensure energy is provided on a real consumption basis. As rational as that sounds the network still needs a vast change in order to accommodate and create these services that integrate and interact with the consumer so to be able to take part in demand-side response (DSR) schemes through the provision of time-of-use tariffs.

Lessons can be learnt from other industries and their innovators in tackling some of the industry's challenges in data management, even if some solutions cannot be repurposed for the energy sector. Open banking, for example, is a system that provides a user with a network of financial institutions' data using application programming interfaces (APIs). Essentially, a variety of different providers can access consumer data safely. It forces large, established banks to be more competitive with smaller and newer banks, ideally resulting in lower costs, better technology, and better customer service<sup>2</sup>.

<sup>1</sup> International Energy Agency <https://www.sms-plc.com/insights/blogs-news/digital-technologies-set-to-transform-energy-sector-report/>

<sup>2</sup> <https://www.gov.uk/cma-cases/review-of-banking-for-small-and-medium-sized-businesses-smes-in-the-uk#final-report>

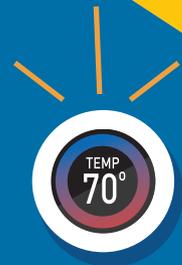
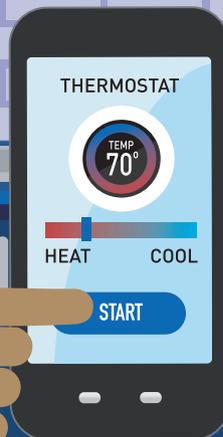
“The Industrial Strategy’s clean growth grand challenge puts innovation in the energy sector front and centre.”

**Teodora Kaneva, Programme Manager,  
Smart Energy & Utilities and IoT, techUK**

### Keeping bills low

Utilising the commitment to smart meters may prove to be a gateway to a similar approach. Energy data, although not as sensitive as other private data, must be handled by numerous parties in their effort to managing the system such as billing, settlements, or providing the right tariffs to consumers. Developing extra services for data management and sharing will be costly and may involve setting up third-party management which will impose higher costs to consumers. We must strive to innovate, not only to provide more flexibility, but also to lower the costs to consumers as well as the costs to the network.

The good news is that industry and Government have realised this and are taking steps to a more collaborative and synchronised approach. Just how fast that change will come, remains to be seen.





# Transforming models of energy consumption and supply

The mass deployment of smart metering is underway at the same time as the drive to make it easier to switch energy providers, as well as the launch of intelligent home devices into the mainstream. Together, these developments bring synergies that are shaking up the utilities market.



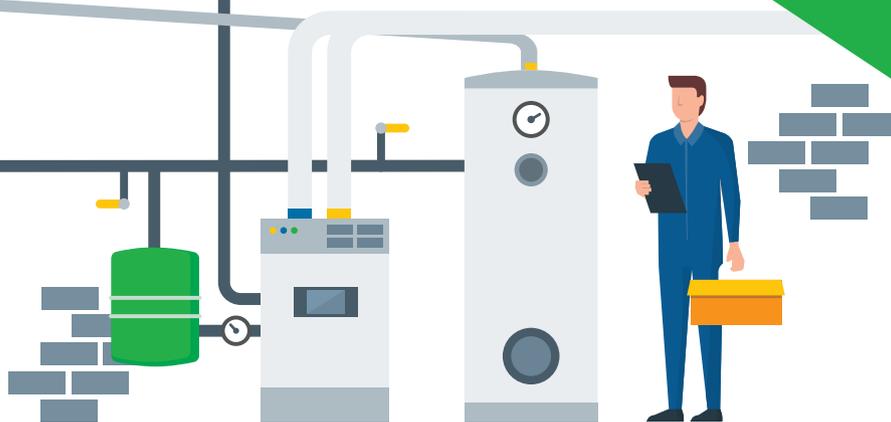
## Smart meters and 'better switching'

Smart metering is being implemented with the concerted desire by the regulator, Ofgem, and the industry to generate a clearer, real-time view of energy consumption that helps consumers to make better-informed decisions.

One of its impacts is likely to be a shift away from fixed energy tariffs towards much more dynamic pricing that incentivises consumption at particular times of the day or month depending on availability - with obvious implications for competition in the market.

In parallel, Ofgem has established a programme to improve the process of switching energy providers for consumers. This programme involves several technical and commercial components, improving the quality and accuracy of the data and reducing potential for errors and creating a central switching service that will strengthen competition by empowering householders who want to save money or receive enhanced service.

“Converging technologies will create a vast new network of energy demand and supply, all at the consumer’s fingertips.”



With much of this new processing automated, within a couple of years, lead times for switching providers could fall from 21 days down to next-day switching – and potentially, even next hour or next minute. In future, it will include a facility whereby independent brokers will manage the supply of energy on behalf of consumers.

### Intelligent homes

Meanwhile, connected home technologies are advancing fast, with some energy companies now embedding devices such as intelligent plugs, thermostats and security systems that enhance the adjustment of energy around a household.

In four or five years' time, and with competition from the digital giants, these kinds of intelligent technologies will give consumers everyday real-time control of their energy via their smartphones and car dashboards.

### Profound shifts

Until now, the technological infrastructures for these three inter-related changes have been discrete. In the coming years, however, we're likely to see a coalescence between them as they mature, with profound implications for the industry.

If there is more movement between suppliers and greater flexibility with pricing, the balance between the demand for and the generation of energy becomes more complex. Contracts and charging mechanisms for energy generation are based on relatively long-term planning,

infrastructure and capital investment lifecycles. In contrast, if customers want to switch from one supplier, to another, to another, within a short timeframe based on cost, this will require changes to the way in which demand versus capacity to supply is brokered.

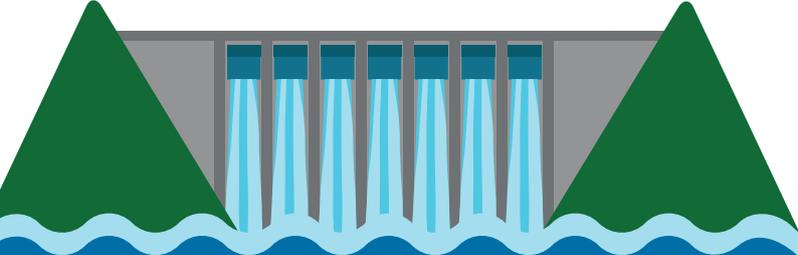
All of this means that the whole relationship between demand and supply could be turned on its head. Instead of resting with the largest organisations with the most capacity, the advantage will tip towards companies who are great at customer relationship management and data analytics to predict consumption and deliver more responsive services.

### New value chains

In essence, these converging technologies will create a vast new network of energy demand and supply, all at the consumer's fingertips. Add battery-powered cars into the mix, for example, and it's easy to see potential for new market entrants, such as car manufacturers or fleet owners, to take advantage of such a connected infrastructure and become part of a new value chain.

Back to the householder who wants to save money on their energy bills. In just a few years, he or she could walk through the door at home and hear from their connected home management system that they've moved their energy supply from supplier X to supplier Y based on a saving of 3% for the next year. Such a scenario isn't too far away given this period of rapid and widespread change. In 2017, around nine million consumers changed their energy supplier; we're looking at a layer of choice and simplicity which could very soon see that number double.

# Industry developments



## A strategic partnership with technology and innovation at the heart of Scotland's water supply

Within a rapidly evolving digital landscape where customer expectations are higher than ever, Scottish Water will work with digital transformation specialists to deliver IT services which will provide technology solutions to help the utility manage its country-wide activities.

Rob Mustard, Scottish Water's Director of Digital: "To ensure that Scottish Water continues to deliver in an ever-changing world, we are delighted to be entering into an exciting new technological landscape with world-class digital partners. We want our networks and systems to be as reliable, resilient and as secure in a world where digital technology has become the cornerstone of everyday life for billions of people.

"Data, information, analysis, digital applications and processes are critical to how we deliver over 1 billion litres of water a day and treat 945 million litres of waste water. They are key elements of how we continue to play a vital role in the life of millions of customers - at home, in business and at play - every day, around the clock.

"Our partnership will see a full integrated approach with Scottish Water through our Digital Directorate. This will improve not only how we use technology to produce and deliver water but also enhance our customer insight to ensure what we do is as effective as possible and that communities continue to get the best possible service, of which they can be truly proud.

"As we continue to consider the future of water and waste water services over the next 25 years, through the Shaping the Future public consultation, it's clear that being a digitally-enabled organisation will underpin our performance. Matching our delivery against the needs and expectations of our customers has never been so important - our new partners will be instrumental in helping Scottish Water get there."

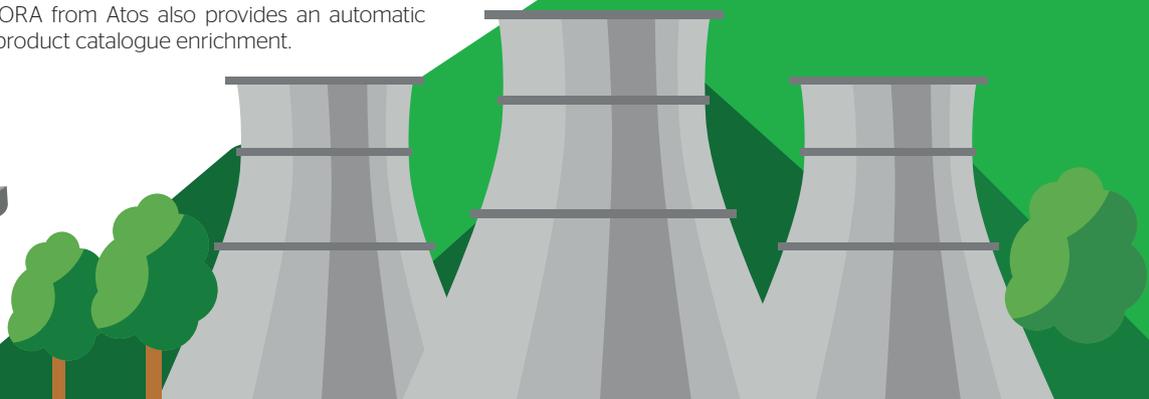
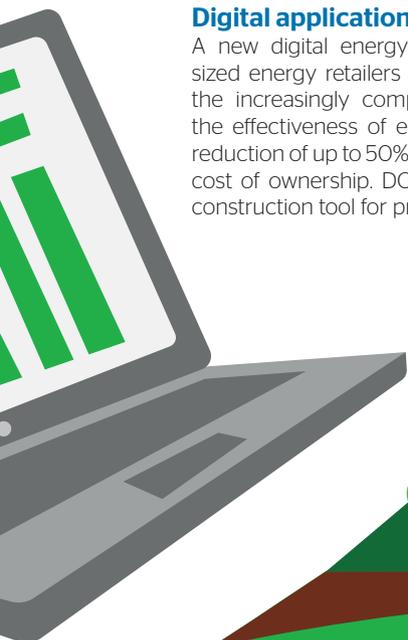
A wide-ranging portfolio of services will be produced across Scottish Water from delivery of customer-focused IT services to its core IT infrastructure and applications.





### Digital application suite for energy retailers

A new digital energy platform has been created enabling small and medium-sized energy retailers to achieve agile and secure digital transformation within the increasingly competitive market landscape. The platform maximises the effectiveness of electricity and gas sales processes and enables a reduction of up to 50% on time-to-market as well as a reduction in total cost of ownership. DORA from Atos also provides an automatic construction tool for product catalogue enrichment.



### Machine learning & natural language processing for EDF nuclear power plants

As part of its nuclear power plants lifespan expansion plan, EDF, one of the world's leading providers of electricity, is making the work of its employees simpler and safer by optimising processes through digital innovation.

The standard process for operating or incidental or accidental procedures update is to engineer the procedure update then test the new procedure using a full scope simulator and a team of operators.

To do this one requires access to a simulator and a team of operators. Both are scarce resources and therefore testing delays are common.

A solution has been developed that enables EDF engineers designing pressurised water reactors to simply and automatically

test operating procedure changes on simulators, thanks to machine learning and natural language processing technologies.

The solution, named Antares, allows the testing of the procedure using a fully automated tool with high availability which can be done at any time.

A key challenge for Atos was to identify natural language semantic content in those procedures, which up to then had been in paper format only.

The solution reinforces security behind all EDF procedures but at a lower cost, while time is freed up for EDF agents to concentrate on core activities.



# The digitally determined utility

The radical transformation of utilities across the world is taking place despite different regulatory regimes in markets across electricity, gas, water and waste businesses. Technology is changing, for instance, how energy is produced, transported, consumed, and conserved. Customers are not just raising experience expectations, they are becoming ‘prosumers’, taking an active role in energy markets. New business models are emerging. And digital is a key constituent of the utilities evolution.

Digital transformation means going beyond digitisation. It’s not simply about applying new technologies to old processes. It is using digital to evolve the business, adding new business models and revenue streams, as well as carving efficiencies out of their core operations, with data as the pillar of innovation.

As several IDC studies demonstrate, this is not an easy journey and most companies are facing execution challenges. Siloed initiatives, the lack of transformation governance, reflect the inability of companies to govern and orchestrate disparate change initiatives across the organisation. Limited expertise: data scientists, IT architects, coders and digital strategists are but a few of the roles utilities expect to have trouble recruiting in the immediate future. Weak roadmaps are responsible for transformation deadlock: while a growing number of utilities have built a vision around transformation, several seem to struggle in prioritising the use case journey. The inability to scale up innovation, and finally, the use of outdated KPIs which cannot fully capture a company’s performance in the digital business, are all slowing down the journey.

IDC classifies organisations in two macro categories: digitally distraught and digitally determined: 59% of utilities still belongs to the first group (Figure 1).

Digitally distraught utilities are either running digital as an impromptu effort; running multiple digital strategies initiated by the line of business; or operating with a short-term perspective. It should not surprise that

these organisations are distraught. It is difficult to accomplish a major transformation when efforts are not orchestrated at corporate level.

At the other end of the spectrum, the digitally determined utility has digital embedded in the enterprise strategy. It does not have a separate digital strategy since the strategy is digital. It has developed an agile enterprise roadmap which is modular – breaks the effort into chunks, delivering immediate business value and thinks carefully through how the roadmap will evolve – and accommodates changes as they develop. The digital determined utility builds a digital platform which integrates digital innovation and the enterprise-wide systems together in a single platform. This platform enables digital products, services, and experiences while modernising and integrating the internal IT environment.

The digital determined utility is better at covering key human capital requirements, capable of sourcing talent beyond traditional recruitment, leveraging collaboration with the ecosystem and crowdsourcing. It maps success along the journey by integrating traditional performance indicators with a new set of KPIs., measuring innovation rate, customer and employee advocacy, data valorisation, business operations, work and labour supply.

Is your company digitally distraught and digitally determined? Either way, you are at the beginning of a profound transformation journey. Executed well, you will deliver value to customers, employees, shareholder and society.



“The digital determined utility is better at covering key human capital requirements, capable of sourcing talent beyond traditional recruitment, leveraging collaboration with the ecosystem and crowdsourcing.”

**Roberta Bigliani, Vice President, Head of Energy, Government and Health Insights - IDC EMEA**

A unified digital strategy yet to break through in utilities

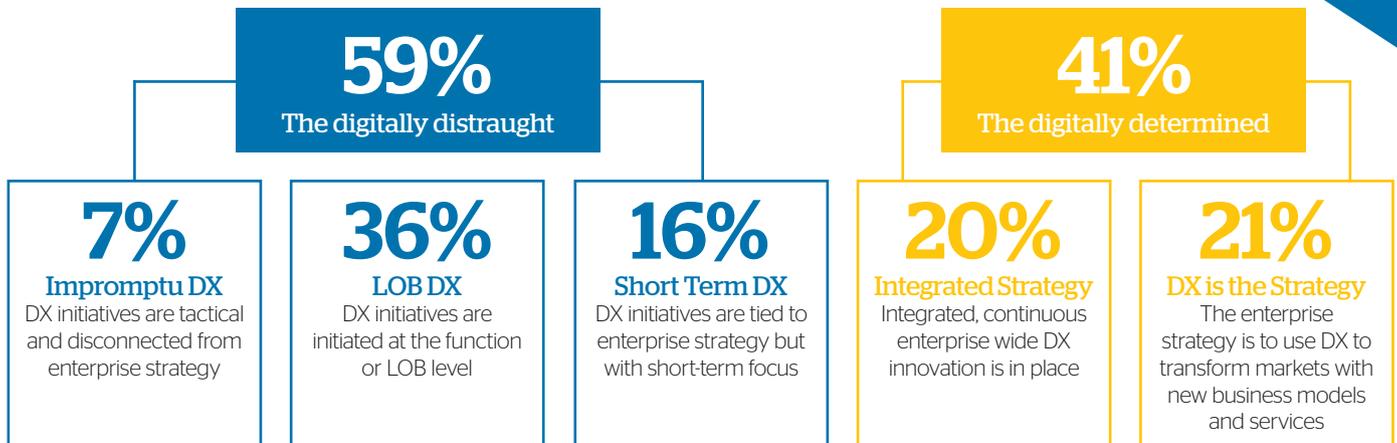
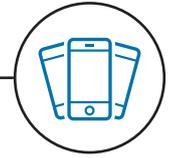


Figure 1 - Mapping out Utilities' Digital Transformation Strategy\*

\* Source: IDC 2018 International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications, and consumer technology markets



# Mobile working in the new era of utilities

For certain aspects of a utility, one could be forgiven for thinking what all the ‘digital transformation’ fuss has been about. After all, there are a plethora of sensors, alarms, control and monitoring systems looking after critical parts of our networks, that have been in place for decades and certainly much longer than digital initiatives.

It is also true that foundation technologies that support digital including mobile, social and multi-channel customer service are now reasonably embedded and delivering the benefits associated with streamlined business processes.

But as digital technology matures, we are starting to see the core business (IT) systems begin to converge with the usually ring-fenced operational technology (OT), including telemetry and SCADA systems. Interesting new technologies are now available that blur the lines between the enterprise systems within the traditional scope of IT and the event-monitoring and control systems which are the remit of OT.

With machine learning, AI, blockchain, augmented reality, IoT and robotics and process automation underpinning Digital 2.0 - it can be overwhelming to consider how an enterprise can best identify, test and deploy the most suitable digital solutions to a mobile workforce.

Let’s consider some specific, practical examples:

## Digital Sites

The opportunity to move to digital sites can offer many benefits, for example, digital substations use less copper cable, offer better interoperability of components and easier maintenance. Further benefits can be achieved through the rich data now available via an IoT platform, making data widely available to asset managers, operations and mobile engineers in the field, and therefore facilitating better decision making and a shift to preventative and proactive maintenance.

## Future Networks

Presently, there are a range of smart network technologies such as sensors to monitor pressure and detect leaks within water networks, that offer more insight than ever before into network performance. Over time, the use of specialist AI to monitor a variety of network sensors will enable enhanced proactive maintenance through the early detection and warning of failures allowing interventions to be made by mobile engineers to prevent failures and minimise the impact of any unplanned interruption.

## Closing the knowledge

Utilities have complex business systems to manage interactions with their consumers which have been extended to provide multi-channel communication. Digital transformation initiatives, particularly with mobile working technology, have had much impact already in areas such as appointments, notifications and general communication. Unlocking the next level of benefits requires these successful digital initiatives to become more integrated, further connecting operations with the consumer using near real-time communications to share the progress of, for example, a service restoration using status updates from mobile engineers.

Activated successfully, each of these examples can be compelling in their own right, but the real potential is fulfilled when consumers and assets are brought closer to a utility’s core business. Improving their proximity helps to unblock inefficient processes, become more proactive to prevent failures and keep customers informed in the event of interruptions.

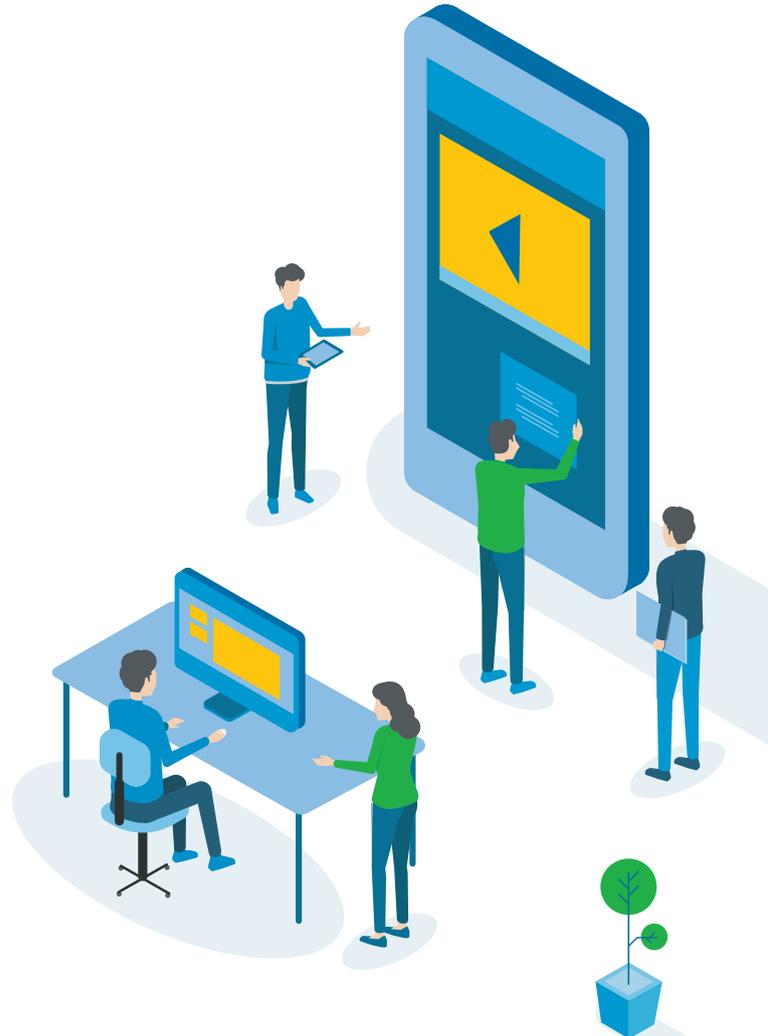
Mobile technology has been crucial in enabling the first stage of digital transformation within the utilities industry. Low-cost mobile technology can already be used to digitally map the environment where work is being completed and even support business processes such as digitising new connections, thereby minimising the need for complex geospatial systems.

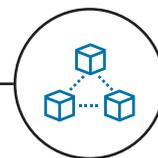
The marketplace is seeing innovative and fully integrated digital mobile working solutions increasingly incorporating AI-based scheduling which enables reactive, dynamic schedules based on demand, skills, location and availability, advanced analytics and a comprehensive IoT platform to respond to real-world events.

The utilities industry is increasingly aware of the benefits of technology for its workforce. Now is the ideal time to make this awareness work for the industry and for mobile working to provide new wide-ranging benefits, from reduced costs, increased capacity, improved compliance and consistency of service.

### **About Totalmobile**

Totalmobile provide solutions that help utilities organisations to optimise their workforce and transform how key services are delivered. Mobile working apps, dynamic scheduling and operational analytics empower organisations to increase the capacity of their workforce, reduce costs and improve compliance.





# Is blockchain relevant for energy and utilities?

Purchasing my first Bitcoins back in 2011 was a career-defining moment. Costing me around a hundred euros for three, after a few days of hard maths and complex theories, my hundred-euro investment had led me to a new passion: the revolutionary 'chain of blocks' connecting those digital assets.

While this interest in Bitcoin did not make me a crypto millionaire, fast-forward seven years and I stand by my original assertion that the underlying blockchain technology actually outvalues the new currency; in fact, it could change the world. So, why do I say that? Let's look at some applications and examples of blockchain in financial services.

## Blockchain applications

Blockchain is the first technology that offers a way to fully manage digital assets in a trusted, traceable, automated and predictable way. What distinguishes blockchain is that each 'block' is linked and secured using cryptography. Trust is distributed along the chain, eliminating the need for a trusted third party to facilitate digital relationships.

Bitcoin was an early and famous application, for managing digital assets. The second application of blockchain are 'smart contracts' whereby contracts can be maintained and managed entirely digitally between participants.

This ground-breaking technology does, however, come at a price, because the whole network needs to invest in it to achieve the necessary levels of trust to make it secure. Given Bitcoin's particular profile and less reputable associations, other blockchain innovations have emerged that have trust built into the network through the power of reputation. The result is a third application of blockchain: the digital ledger. This is a simple distributed database where an undeniable sequence of events can be logged, possibly as a foundation for automated business process handling.

Blockchain is beginning to be used as a catalyst for a reduction in energy consumption by some of the larger European utility companies, further enabling the digital transformation of the industry.

Given that blockchain is a versatile, automated solution that can be applied to a broad range of business processes, value chains and even business models, its value as the final piece of the puzzle towards fully digital transformation seems clear.

## Challenges to address

If blockchain is such a great and unique new tool, then why isn't it a mainstream service yet? There are two key challenges that need to be addressed for blockchain to enter the mainstream.

Firstly, interoperability. There is no one blockchain to serve all purposes and requirements. And, on top of that, if the financial services industry has taught us anything, it's that there is great value in creating networks of service providers rather than multiple platforms.

The second challenge is sustainability. There is no way that a consensus protocol like the one used for Bitcoin can offer a long-term solution to high-volume transaction processing because of the huge amounts of energy it consumes. This makes it too slow, resource-intensive and difficult to scale up. While some work has been done in developing alternatives, there is not yet one that has gained enough traction.

Blockchain is clearly a promising technology that needs more time in real life business applications and less time in the lab but we are already seeing how this technology is being applied even if the full reveal is still a little way off.



### **Blockchain application**

**asset control** for digital asset management

### **smart contracts**

for automated agreement fulfilment

### **shared ledger** of

immutable data/records

### **Early adopters**

Australian power grid network

Brooklyn Micro grid

Municipality of Rotterdam

Ericsson

### **Examples of key applications for energy & utilities**

Self-governing power grid network for pinpoint issue identification

Small consumption energy contracts, self-sustaining community for energy consumption using blockchain

Energy marketplace

Predictive maintenance, creating a ledger of live events blockchain and IoT

Smart meter integrity, to authenticate smart meter read-outs

*Summary of blockchain applications*

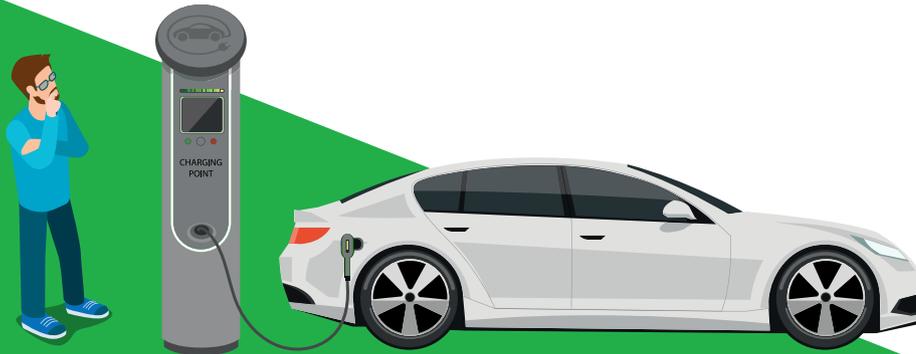


# Digital transformation: the view from *disruptors*

"It is now possible to measure and monitor machine behaviour at such a granular level that we can identify invisible flexibility in the way we consume power, enabling our demand for energy to interact intelligently with supply and in turn pave the way for a system powered entirely by renewable energy. Artificial intelligence enables us to orchestrate this demand flexibility at scale - coordinating industrial processes, local generation, battery storage and electric vehicle charging—to give rise to an autonomous, self-balancing grid which operates incredibly cheaply. By automating and optimising distributed energy resources in real-time, we can create an affordable, zero carbon energy future."

**David Hill, Commercial Director, Open Energi**

*Open Energi create advanced technology to deliver an affordable, zero carbon energy future.*



"We know that more and more consumers and businesses want to play their part in a greener future but it's up to us all in the energy industry to make it easier for them to do it. I believe that access to additional data will drive a revolution in our sector.

At the moment, tracking how much energy you're using isn't straightforward. New smart meters will give us up to 48 meter readings a day - and that level of data will be key in helping people understand how much energy they use and importantly, how they can use less and be more energy efficient. However, they won't be able to do this on their own. There needs to be a major shift to more of an advisory focused customer service to help realise those savings and this is already starting to happen."

**Jonathan Kini, Chief Executive of Opus Energy, Drax Retail**



"Digital transformation has emboldened consumers and "prosumers" to use emerging technologies to problem solve in new ways. New technology is shaping tomorrow's energy environment by empowering these prosumers to be in charge of their own energy destiny for the benefit of a greener planet. Companies like Nuvve can add value by making electric vehicles (EVs) more affordable and by stabilizing the grid through EV technology."

### **Marc Trahand, Executive Vice President of Marketing, Nuvve Corp**

*Nuvve has a mission to lower the cost of electric vehicle ownership while supporting the integration of renewable energy sources like solar and wind.*



"For us, digital is a strategic enabler, enhancing the way we work and our customers' ability to do more with us online. The way we are structured gives us the scale to invest in our systems and processes – both customer-facing and for our employees.

In a competitive market with low margins, excelling operationally is vital and this requires flexible, scalable systems that can easily be adapted to respond to market developments. For businesses like ours, in a new market, a digital-first strategy is key. Customers want to access more of what they need, when they need it. The innovative use of data analytics also brings opportunities to understand and predict customer behaviour and their expectations."

### **Andy Hughes, Chief Executive of Water Plus**

*Water Plus is a business water retailer that provides billing, account management, customer service, water efficiency advice and more for businesses across the UK. It employs around 400 people and has more than 350,000 customers.*



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# About Atos

Atos is a global leader in digital transformation with 120,000 employees in 73 countries and annual revenue of € 13 billion. European number one in Cloud, Cybersecurity and High-Performance Computing, the Group provides end-to-end Orchestrated Hybrid Cloud, Big Data, Business Applications and Digital Workplace solutions through its Digital Transformation Factory, as well as transactional services through Worldline, the European leader in the payment industry. With its cutting-edge technologies and industry knowledge, Atos supports the digital transformation of its clients across all business sectors. The Group is the Worldwide Information Technology Partner for the Olympic & Paralympic Games and operates under the brands Atos, Atos Syntel, Unify and Worldline. Atos is listed on the CAC40 Paris stock index.

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Let's start a discussion together



For more information: **AtosDigitalVisions@atos.net**

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