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ANALYST REPORT

SMART ENERGY

Regulation, utilities, cleaner & greener

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Smart energy
A market picking up momentum

The strong impetus for smart metering remains regulation as it has from the very beginning. Various countries have thus put in place targets for the nationwide deployment of of smart meters, although the approach differs from country to country. The utility incumbents are also crucial for the development of smart metering, particularly with the choice of technologies and the approach of implementation.

Although some delays have been observed in a number of deployments, the overal targets are expected to be met as planned. The global installation of smart meters will grow at a stable pace, up from roughly 550 million in 2014 to a total of more than 1.6 billion – across electricity, gas and water – in 2020, at a CAGR of 19.6%. The electricity sector is identified as the core industy for deployment.

As the energy domain is transforming itself to adapt to new challenges such as renewables, electric vehicles and decentralisation, the evolution of smart metering will be seen in various use cases with smart grids. Smart grids, the energy networks that coordinate supply and demand, imply new possibilities both in terms of technical capacities and business offerings, including real-time reconfiguration of the topology of the energy network and alternate pricing mechanisms.

Market development

Overview

Most countries have announced plans for rollouts – although they may not have started yet, with most setting a target of 95% or more meters to be made smart. This rings true for most EU nations, although some – such as Poland and Finland – have targeted 80% which is the minimum requirement set by the European Commission.

Table 1: Summary of smart meter rollout targets for select countries

Country	Targets	Regulation-led?
Austria	Electricity: 95% by 2020	Yes
China	Electricity: 300 million by 2015 (State Grid Corporation of China)	No (but State Grid Corporation is state owned)
Denmark	Electricity: 100% by 2020	Yes (but 60% already smart before regulation)
Finland	Electricity: 80% by 2020	Yes
France	Electricity: 96% smart by 2020 (35 million) Gas: 95% smart by 2020	Yes
Germany	Electricity: 15% to be made smart	No (market liberalised)
Greece	Electricity: 100% by 2020	Yes
Ireland	Electricity: 100% by 2020 Gas: 100% by 2020	Yes
Italy	Electricity: already 96%	Yes (although Enel rolled out before regulation)
Japan	Electricity: 59 million by 2020	Yes (based on liberalisation)
Netherlands	Electricity: 100% by 2020 Gas: 100% by 2020	Yes
Norway	Electricity: 100% by 2020	Yes
Poland	Electricity: 80% by 2020	Yes
Spain	Electricity: 13 million by 2018	Yes
Sweden	Electricity: already 100%	Yes (indirectly)
UK	Electricity and gas: 100% by 2019 (53 million)	Yes
USA	Electricity: 45 million deployed so far, 100% by 2020	Yes (varies according to state)

Source: IDATE

Germany stands out as rather different in comparison to the other nations. Whilst most countries have set national targets close to 100%, Germany has no such targets but is rather relying on utilities' own initiatives as the market has already long been liberalised. There is, however, regulation in Germany that all new buildings must be equipped with smart meters, and that actual consumption readings must be made available if requested, although a cost may be charged.

It is also worth noting that the development of smart metering is highly heterogenous across different utility markets. Electric smart meters are the priority for most countries, with many having plans for electricity but fewer for gas. For most, water meters are barely on the agenda. The UK is a rarity here with plans to roll out both electricity and gas meters to connect to the same communication hub within households; this is largely possible due to the same dominant utility, British Gas, being able to provide both electricity and gas.

In summary, two main factors decide on the development of smart metering, which varies from one country to another: regulation and the utilitiy industries' states. Should regulation exist, then there is no alternative. If there is no mandatory rollout by regulation, then the choice comes down to the utilities themselves whose decision will be based on costs and area characteristics.

Regulation-led development

There is a close connection between regulation and smart meter rollouts. This is in particular the case with the electricity meter market in Europe. According to the Electricity Directive (2009/72/EC) of the European Commission, at least 80% of consumers have to be equipped with smart meters by 2020, subject to positive economic assessment of all the long-term cost and benefits, to be carried out by each member state. The majority of European countries thus established the government plans.

Sweden and Italy are two exceptions that have completed the smart electricity meter rollout without direct pressure from European Commission regulation. Sweden turned its electricity meters smart, subject to the Electricity Act that enforced monthly readings for all customers from 2009; while in Italy, Enel completed the installation of 27 million smart meters back in 2006, to minimise the level of electricity fraud in addition to the expected cost-cutting benefits.

Regulation also impacts the choice of smart metering technologies in some coutries. There are a variety of possibilities available for connectivity technolgies, allowing smart meters to communicate directly with the utilities and remove the need for human intervention. In a nutshell, the connectivity in smart metering is generally structured in two tiers:

- **HAN/Last mile**: data collected from the smart meters is aggregated at a local point or HAN (home area network) because this connectivity involves frequent collection – hourly, per minute or per second – and in small-size packets which is poorly suited to direct WAN (wide area network) transport because of pricing issues.

- **WAN/Backhaul transport**: the data aggregated through the last-mile connection is then transported over the WAN to the centralised automated meter management information system of the operator, often referred to as a concentrator.

In the UK, regulation has now been introduced for all electricity and gas meters to be made smart by 2019, with the technologies and providers to be used being specified: Zigbee for the HAN, the Arqiva long-range radio solution for WAN in northern Britain and the Telefónica/O2 cellular solution for WAN in other regions.

By contrast, in Germany, there are no specific regulations, as of yet, regarding the technology to be used, and no regulations which require replacing current dumb meters with smart ones either, meaning various technologies are used for both HAN and WAN. Only the latest amendment of the law concerning the economy and energy, known as the EnWG Law, requires that all new meters installed since 2010 are smart, but this is not compulsory.

When it comes to the USA, The American Recovery and Reinvestment Act (ARRA), more commonly known as the Stimulus Bill, was signed into law by President Barack Obama on 17 February 2009. It was intended to provide a stimulus to the US economy in the wake of the economic downturn. Within the US$787bn of this ARRA, a US$4.5bn stimulus fund was specifically reserved for smart grid projects, with a further US$90bn potentially available for

any projects which involve energy and may contribute to the realisation of a smart grid. In addition, the USA has different regulations and policies in place in individual states. However, there is no one universal regulation on how the connectivity of smart metering needs to be implemented, and it is up to the utility industries to decide.

It is worth noting that the gas and water distribution markets, as they are much more fragmented than electricity market, are not equally influenced by regulation, but mainly based on regional operations and municipal activities.

Utility industries' stakes

The regulation sets the objective and timeframe for the smart metering development in most countries, whereas the approaches of implementation is very much up to the incumbent utility industries.

In the case of France, regulation has been introduced for electricity and gas meters, but the technology and provider specified is very much decided by the dominant players. This stems from the fact that in France electricity distribution is 95% dominated by Electricité Réseau Distribution France (ERDF, now ENEDIS), and gas 95% by Gaz Réseau Distribution France (GRDF). It is thus their respective technologies that have essentially been selected: ENEDIS has deployed its own proprietary technology – Linky, while GRDF has adopted a smart metering technology provided by Ondeo Systems. Both solutions use a concentrator which firstly collects data directly from the smart meters. The data is then sent from there to its information centre via the cellular network.

In contrast to the domination of electricity and gas markets, the French water market is characterised by the fragmentation of distributors – there are 14,000 water distributors in France and three main suppliers, Veolia, Suez and Saur, have started their own deployments with different technologies.

When it comes to the German utility market, where it is fragmented, it is very much market driven as opposed to regulation driven. For instance, in the electricity industry, the big four of RWE, EnBW, E.ON and Vattenfall have notably higher shares than the rest. Out of the many (at least 50) smart meter pilot projects in place, one of the largest-scale ones is by RWE in Mulheim an der Ruhr, with 100,000 smart meters for electricity. As demonstrated in the figure below, RWE is trialling different technologies suited to the environment of smart meters – for example, concentrated within high-storey flats, or out in the suburbs. The smart meters first connect to the multi-utility controller (MUC) using technologies such as wireless Meter-Bus and RS232. The MUC then transmits the data to the RWE Information Centre via either GPRS, PLC or DSL depending on the suitability of each technology. Started at the end of 2013, the RWE 'Project Smart Meter Rollout' will install a total of 4.5 million smart meters by 2017.

In the USA, since each state has its own regulations and policies for energy markets, it is up to the utilities to go ahead with the rollout of smart meters. Around 46 million US households, which equals 40% of the total, now have smart electricity meters installed. This is in fact ahead of the initial schedule foreseen by the government, with the expectations of reaching 40 million by 2015. Gas and water have received neither as much attention nor funding as compared to electricity smart meters. It is thus up to the utilities to invest and deploy the rollout of smart meters.

In the UK, regulations have specified smart metering technologies to be deployed; there is therefore no decision for the utilities to make. However, as both gas and electricity are distributed by energy providers, led by British Gas, the rollout of smart meters of the two utilities are synchronised – both electricity and gas meters are connected to the same communication hub within households. The rollout of smart metering will involve the introduction of a range of new equipment into customers' premises:

- Gas and electricity meters with smart functionality
- An IHD (In-Home Display) for domestic customers
- A wide area network (WAN) module to connect to the central communications provider

- A HAN to link different meters within customer premises, the WAN module and the IHD and potentially other consumer devices, such as microgeneration and load-control devices.

This equipment represents the smart metering system within each customer's premises. The industries, working with the government, expected the mass rollout to start in early 2014 and to be completed in 2019, and up to 4.7 million meters could be installed prior to the mass rollout stage.

Market analysis

Regulation driven

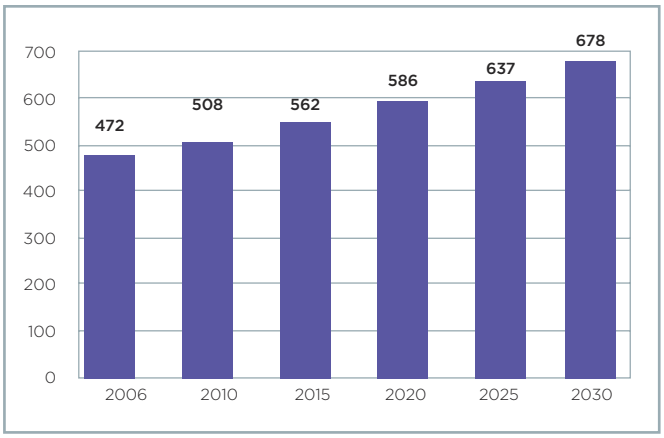
The regulatory mechanism remains the most powerful driver of smart meter implementation. This was true even for the early nationwide smart meter adopters such as Italy and Sweden; it was merely a case of their regulation being in place before most other nations. In Italy, whilst Enel did indeed implement 27 million smart meters of its own accord in 2006 – without regulatory pressure, it was also in 2006 that regulation was introduced in the country to target 95% smart meter coverage by 2011.

The ever-increasing energy demand and the digital age

According to the US Energy Information Administration, worldwide marketed energy consumption is projected to grow by 44% between 2006 and 2030 as economic recovery spurs future demand growth. With such increases in demand, action must be taken in order to make the supply side able to meet this demand, and smart meters – and the ensuing smart grid – are seen as a key solution to this.

The technology to cope with such rise in demand on the whole already exists. In fact, most countries are suffering from an aging infrastructure anyway. The average hardware age in the USA is 40 years so perhaps it is not surprising that blackouts occur; the infrastructure needs upgrading anyway. It is a matter of bringing the energy industry into the modern technology age, and thus the building of a smart metering infrastructure will be more about modernisation and evolution combining current communication and IT technologies.

Figure 1: Global energy consumption, 2006 to 2030 (Quadrillion Btu)



Source: Energy Information Administration

For a cleaner, greener environment

Many nations are committed to tackling climate change: for example, there is the European 20-20-20 target for the year 2020 (20% cut in greenhouse gas emissions, an enlarged share (to 20%) of renewable energy in energy use, and a 20% improvement in the EU's energy efficiency); the smart meter would be a huge step towards achieving this. It is hoped that smart meters will make consumers more aware of their consumption and lead to more efficient energy use, and smart meters will form the basis for integrating renewable energy into the energy system.

Savings on their energy bills for consumers

From a consumer perspective, the main selling point of smart meters is that they should be able to make savings

on their energy bill. According to the European Council, the UK-based AlertMe pilot project, which allows customers to turn off appliances by web interface or mobile, showed that energy savings can be up to 40%.

Standards and interoperability needed for a mass deployment

In a nutshell, the whole system will hardly be smart if there is no interoperability between the devices and technologies to provide a simple plug-and-play experience from end-to-end. Without standards, it is very difficult for any party involved to make large-scale investments in the development of smart meters. It could turn out that after making heavy investments in certain technologies, a different set of technologies goes mainstream; thus without a set of standards to act as a guide, there is a big risk that the market will not move forward on a large scale. Conversely, once such standards are set then it will be much easier for all players, since they can invest and deploy the chosen technologies with confidence. In this respect this is related to regulation, which specifies the standards and technologies to be used, reinforcing the importance of regulation as a driver.

Future-proofing to support a long-term objective

The smart meter is actually only the beginning of a longer term objective for the smart grid. It is a long-term vision and thus care needs to be taken to be able to support future developments on the grid, otherwise the players will continually have to rebuild. Should such future-proofing not be taken into account, the players involved will need to redevelop their systems from scratch which is both time and money consuming and hardly efficient.

Questions around consumer acceptance

There are concerns over the security and reliability of smart meters with lawsuits already underway especially in the USA. Moreover, doubts remain over whether consumers really feel the need for smart meters, especially if they have to pay for the services in the end through their bills. This problem was highlighted by the exit of Google and Microsoft in mid-2011, each citing disappointing user traction as their reasons for pulling the plug on energy management services.

Hemmed in by the business model issue

In effect, with the current model, utilities are being asked to sell less electricity and therefore reduce their revenue. This calls for a new business model, based not on how much electricity is generated and sold but rather on how much has been saved.

Looking to the future, it is possible that utilities will start to introduce more dynamic pricing whereby the cost of energy reflects the demand – more expensive during peak demands, with prices varying per hour, for example. In this way, utilities will be able to better predict their users' consumption demands and thus produce accordingly, and charge a higher rate for those who consume during peak periods. It should be noted, however, that introducing such prices is likely to take time in many countries, as it is not simply a case of the utilities deciding by themselves; often regulators and even governments can be involved in such decision making.

Market sizing

In modelling the forecast for worldwide smart meter deployment, the following assumptions have been made:

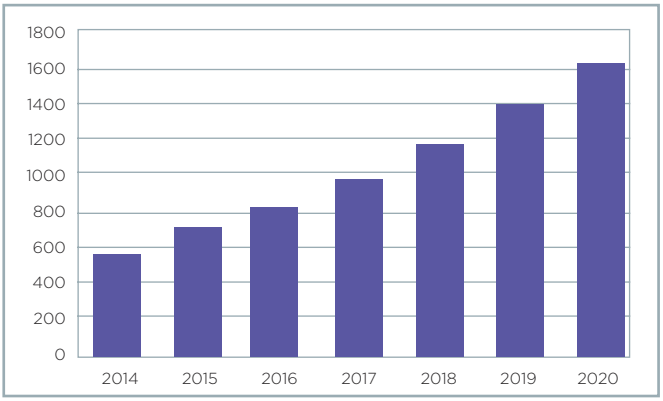
Country regulations/targets will be met. This report has seen that various countries have put in place targets for the deployment of nationwide rollout of smart meters. Our forecasts assume that these targets will, on the whole, be met without major troubles and interferences. However, we take into account the fact that numerous deployments have been delayed.

Electricity meters to lead the way, gas to follow and gradual involvement of water meters. We have seen that in the main, it is electricity meters that are being made smart as the priority, with gas also receiving attention depending on the country. Thus electricity meters will be

the main source of smart meter deployment, whilst water will only start to become heavily involved once electricity and gas have been widely trialled and accepted.

Taking the above assumptions into account, IDATE forecasts that there will be a total of just over 1.6 billion smart meters (electricity, gas and water) deployed worldwide, up from roughly 550 million in 2014; a CAGR of 19.6%.

Figure 2: Worldwide smart meter deployment forecast (electricity, gas and water), 2014-2020 (Million)



Source : IDATE

Prospects: some future paths

Opportunity beyond simple smart meter connectivity

Looking further ahead, smart meters are in fact the first steps of building a national electrical smart grid, on top of which various services and applications can be built. The smart grid, in one simple sentence, is a two-way communications and controls system for a nation's electricity grid.

Historically controlled by state-owned operators at national levels, organised as centralised networks and controlling all aspects of the energy sector from production and transport to distribution, the domain is now evolving toward a more decentralised and liberalised vision.

The way energy is generated is also itself evolving, switching increasingly to renewable energy sources. Current estimates indicate that 14% of European energy comes from renewables but this figure should increase to 50-80% by 2050. The switch to renewable sources is expected to bring decentralised and energy production and increase the complexity of production forecast. The development of electric vehicles is also impacting the grid, opening increased demand, unpredictable charging behaviours but also new possibilities in terms of electricity storage.

To summarise, the driving forces behind the development of the Smart Grid trend are:

- The liberalisation of the energy market
- The increasing switch to renewables with unpredictable production behaviour
- The increasing unpredictable demand of consumers

To answer those needs, the smart grid concept proposes to integrate intelligent behaviours at all levels of the energy grid and to allow bidirectional communication between all layers of the network. The concept of the smart grid is to double the energy network and to manage both demand and production of energy by using the communication layer.

The challenge of managing the grid increases too. The unpredictable production and consumption can create emerging behaviours that can turn into systemic failures. Decision making has to take place with incomplete information which in turn requires greater reactivity and adaptability to ensure resilience of the system.

EU policies and funding in smart grids

Regional and national regulation and policies are supportive of smart grids, particularly arising from the need to tackle increasing energy demands and to curb

CO2 emission. To advise on issues of smart grid deployment and development, the European Commission set up the Smart Grids Task Force in 2009. Phased projects cover five expert groups with each focusing on a specific area, including regulatory recommendations for privacy and data protection, regulation for smart grid deployment, smart grid infrastructure deployment and implementation of smart grid policies.

On top of the reglulatory support, funding plays a crucial role in smart grid development. €300m coming from the EU budget was invested in around 300 Smart Grid projects across member states during the early stage in 2011. In January 2016, under the Connecting Europe Facility (CEF), an EU funding programme for infrastructure projects of common interest (PCIs), Member States agreed on a Commission proposal to invest €217m in key trans-European energy infrastructure projects, mainly in Central and South Eastern Europe.

The development of electricity and gas infrastructure will benefit from CEF financial assistance. It will contribute to the completion of a European energy market and the integration of renewables into the electricity grid. This also includes environmental and engineering design studies for the Germany-Denmark interconnection which will help supply Nordic electricity to Central Europe.

However, the government support and private investement in smart grid is quite limited. 90% of the projects have received some form of public funding and more than 50 % of the total smart grid budget originates from four countries: France, the UK, Germany and Spain. In Eastern Europe the highest percentage of funding still comes from the European Commission (EC).

Infrastructure deployment

With current investment in the domain getting larger and larger over the years, the projects are moving from early research and development phases to demonstration and deployment problematics. However, national rollout of smart grid, in the majority of countries, has only just begun. More likely, smart grid rollout on a national scale is more in the timeframe of 2020 and beyond.

Nevertheless, as the development of Smart Grid is supported by several initiatives in Europe, according to a study by the EC Joint Research Center, 459 projects with a budget of more than €3.15bn were addressing the smart grid trend in Europe in 2014.

The projects cover a great variety of use cases from network management, to customer behaviour energy optimisation, the integration of electric vehicles, and distributed energy resources in the grid, and smart metering initiatives.

Although France, UK and Germany lead in number of projects, smaller countries such as Denmark and Slovenia seem to invest strongly in smart grid technologies.

More specifically, numerous on-going pilot projects are studying new Distribution System Operation (DSO) planning and operational tools, to monitor and dispatch distributed energy resources to ensure optimal grid management. Nice Grid, Grid4EU, Venteea and E-Energy E-intelligence are several examples of European pilots for smart grids.

Nice Grid, among those pilot projects, is the first smart solar-energy demonstrator project to be conducted in the southern French town – Carros, supported by the local municipality and a broad range of stakeholders, including ENEDIS, EDF, GE and RTE (Réseau de transport d'électricité). Using Linky smart meters installed in the homes of volunteer participants, Nice Grid is testing the Smart Grid concept by integrating a high proportion of solar panels and individual energy storage batteries to the existing electrical infrastructure. An energy management system is being developed in expection to optimise the

balance between energy consumption and generation at a secondary distribution network level.

Another earlier example in the UK, UK Power Networks has established a bilateral contract with the aggregator Enernoc for the demand response service in London since 2010. As part of the UK Power Networks' Low Carbon London project, Enernoc applied its DemandSMART application and services in selected grid areas, in order to limit power congestions and avoid reinforcements. Benefits included flexibility of distributed resources during peak hours occurring from Monday to Friday, increasing energy efficiency and improving energy supply transparency. UK Power Network's business plan forecasts savings of about £40 million (€52m) from this scheme from 2015 until 2023, on the basis of successful trials carried out so far.

About IDATE Digiworld
Since 1977, IDATE DigiWorld's teams of specialists have earned a global reputation for independent, high quality analysis of digital industry markets, through three closely linked areas of activity:

- DigiWorld Institute: a European think-tank for members, policy-makers and players of the digital transformation
- DigiWorld Research: a global observatory of digital markets and innovation
- IDATE Consulting: bespoke market research and consulting solutions

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Founded in 1986 and headquartered in London, Telit is a global leader that offers the industry's broadest portfolio of products, platforms and services to enable IoT deployments for a wide range of industries. Specific to smart metering, its portfolio of modules addresses cellular communication technologies with all flavours from 2G, 3G to CDMA450 to LTE Cat-1 evolving to Cat-M and NB1 tomorrow, short range modules (WMBus, Zigbee, BT, mesh) as well as LPWA modules like Sigfox and LORA.

With the emerging interest in and activities around smart cities, Telit also has IoT connectivity plans and a platform that serves as the underpinning to applications and solutions that support more than metering. Critical to support and maintain infrastructure, the platform can be used to support multiple applications, and acts as the OSS (operating support system) for related solutions such as smart metering, smart lighting and smart parking. What makes Telit unique is that it has module level integration that ties into a communication agnostic platform used as the IoT on-ramp for devices either aggregating sensor data, or connecting directly to programmable logic controllers actually controlling key elements in electricity, water and gas infrastructure.

Utilising the IoT connectivity plans and platform, Telit positions itself as a leader in cellular smart metering deployment. Plenty of deployments of cellular-based projects around the world demonstrate its success, including the first and second phases of the SMIP programme in the UK, the first and second phases of Dutch deployment, the Italian Gas project and the Linky project in France. More recently, a Telit partner, M2M Engineering is currently negotiating for over 300,000 utility end-points in the United States, powered by Telit hardware, Telit connectivity, and the Telit IoT Platform.

What can be observed from the global footprint of Telit is that the momentum is there now, although it is always taking more time to deploy than expected. Electricity is leading with nationwide roll-outs, followed by the gas sector. Water has always been regional and fragmented in terms of technology, but it represents a huge market for LPWA technologies. Nevertheless, much of what has been deployed for water, gas and electricity metering deployments are often silo solutions that have bandwidth limitations and are not well suited to address multiple business use cases. Often these lack the ability, particularly, to scale and support related solutions that are popping up in smart city initiatives.

In spite of that, utility industries are still paying huge attention to smart metering, in order to meet the severe challenges of decentralisation, decarburisation, renewable energies momentum and COP21 measures. Regarding the deployments, according to Telit, the utility providers either build a communication network to make their own meters smarter when implementing PLC or private RF technologies, or rely on partners like CSPs (communication service providers) to manage that part of the smart meter mainly based on cellular networks.

With the deployment proceeding, CBA (Cost Benefit Analysis) is being conducted in each of the EU member states to check the return on investment (ROI) of smart metering, implying that very few were not positive. If added to smart cities solutions that could be managed from an IoT platform that supports more than metering, the ROI becomes extremely accelerated.

The positive results can be largely due to the new business opportunities coming with smart metering. These include: operational cost reduction by avoiding sending people for index reading, accurate and real-time consumption information for accurate invoicing, switching on or off subscribers when a new tenant enters a flat or house or for prepaid metering, reducing energy theft.

As smart metering is at the edge of the electricity consumption, it is therefore the first step; however, to get the full benefit, smart grids must complement meters to have a complete smart energy network and to be able to micro manage locally the energy and balance the load as well as proactively anticipate issues on the network such as outage management. To drive smart metering to the next stage, it is more than necessary to explain better to the consumers the gains they can have in better managing their energy consumption. Meanwhile, many other challenges are yet to be overcome, including funding, complexity of large roll-outs, as well as standardisation for future proofing solutions.

Having been consistently doing connected businesses for more than 40 years, MultiTech designs, develops and manufactures communications equipment for the industrial internet of things (IIoT) – connecting physical assets to business processes to deliver enhanced value.

Its IoT communications solutions encompass a range of embedded devices as well as gateways, routers and modems that address connectivity across a variety of technologies including analogue, ethernet, cellular, PAN and LPWA. MultiTech also provides an extensive portfolio of M2M communications services covering engineering, design, development, manufacturing and support. Meanwhile, MultiTech has a processed certifications service to smooth the path to enabling communications for IoT and M2M applications, reducing the time, cost and risk associated with regulatory and industry certifications, and carrier approvals.

With more than 22 million products actually performing essential duties for businesses around the globe, MultiTech has earned a reputation for quality and reliability. The customisation and flexibility coming with fast and agile development also differentiates MultiTech from its competitors. MultiTech is providing what it claims is the first commercially deployable LoRA-based suite of communications devices.

Getting down to the smart metering business, the key component of its smart city strategy, MultiTech is committed to connecting the utilities and distributors to their assets to facilitate: tank and pipeline monitoring, automated meter reading, dynamic demand response, environmental monitoring and emergency alerts.

According to MultiTech, with Europe really leading the way, smart metering has been in active deployment for the past five years or so, but is still not ubiquitous. Limiting factors to deployment have included lifecycle needs – the minimum is ten years and the ideal is 20 years, communications technologies, such as cellular, Zigbee, Wi-Fi and others, consumer privacy concerns and, ultimately, the inability to rapidly recover and monetise the investment required to overhaul existing utility infrastructure.

To begin with, since the early stages of smart metering, the utility industries have not come to complete agreement on the question of which technologies are most likely to last throughout the life of the equipment. Whichever they chose or choose, replacing existing infrastructure has been and will continue to be expensive. Today we are seeing the reason for their slow and deliberate decision process. Utilities are now wondering how often the consumer-driven march of network progress is going to cause them to incur these costs again and again.

Further, utilities that have rolled out smart meters are indeed gaining efficiencies and saving money, as they were able to impact consumer behaviour with pricing incentives designed to encourage off-peak consumption. However, with this model, the utilities are being trapped with how to go beyond cost savings to actually monetise a great deal of data. They missed a few steps executing on their hopes of becoming the home gateway, owing to privacy concerns. In addition, to fulfill the promise of data in terms of demand response and distribution automation through smart grids, they need to invest more. This is a tough argument given most are operated by cash-strapped cooperatives and municipalities – who have yet to prove the payoff from that last huge meter-driven investment.

Looking forward to the evolution to smart grids, smart meters need to be integrated in a broader network. With energy infrastructure around the world, aging rapidly after its first hundred years, there are many more critical end points to connect and much to be gained from true M2M automation that can enable dynamic demand response. Utilities already headed down this path to find much faster ROI, reduction of service interruptions and the ability to better prioritise equipment maintenance.

The future path will still face challenges linked with funding, as well as the merging of metering data with wider grid and operational data. Nevertheless, the emergence of low power wide area (LPWA) technologies hold many promises to address some of the hindrances of development, including battery life, low data rates and cost. Certain technologies like LoRa even enable the utility to create their own network or leverage public networks. As these technologies get mature deployed, they will significantly change the ROI equation and likely drive a new wave of adoption across the entire grid.

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