The EMEA Smart Grid Rollout

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Foreward

With the Smart Grid being heralded across Europe as a key weapon in meeting the EU's 20-20-20 targets to reduce the regions environmental impact by 2020, how prepared are utilities in reaping the benefits that the Grid brings?

While all countries in the region understand the potential of Smart Grid technology and the implementation of Smart Meters, due to the recent uptake in individual markets, countries and energy providers across the European Union (EU) have very different challenges to overcome in order to make this a reality.

To examine where utilities are in implementing Smart Grid infrastructures, Oracle Utilities undertook research into the progress made towards a full roll-out and whether the benefits of these intelligent networks are being realised. The research, which surveyed 50 senior executives from electricity utilities across Europe, Middle East and Africa (EMEA) found that they still have a long way to go to implement a fully integrated Smart Grid infrastructure despite the substantial progress made in many countries.

In the report we explore the findings in detail, as well as look into how the Smart Grid will benefit both utilities and their customers through smarter and more efficient energy use and billing, among others. We also examine what changes need to be made to current IT systems in order to give the flexibility needed to scale to the full potential delivered by Smart Grids and Smart Meters in the long term.

The research assesses factors such as the prevalence of Smart Meters, and the advances in meeting operational and infrastructural requirements to give you the complete picture of where EMEA is in adopting a Smart Grid infrastructure, while also allowing for comparisons between countries in the region.

An Overview of the Findings

The research highlights that while utilities across EMEA have made progress towards the adoption of Smart Grids and Smart Metering, there is still a long way to go to harness all the benefits available to them and their customers.

While many realise the necessity for Smart Grid and Smart Meter technology, many are either not exploring or simply unable to take advantage of the full benefits and capabilities of the technology available to them.

The research also found that many utilities have adopted or plan to adopt Smart Meters but they are likely to be unable to gather and utilise the intelligence created by the technology because their IT systems are unable to cope with the amount of information Smart Meters produce.

Key findings include:

- The majority of utilities have already deployed, have begun or plan to begin a phased programme for the adoption of Smart Meters. 56% of utilities expect to have Smart Meters rolled out within five years
- Over half of utilities are concerned that their current IT applications will not be able to scale to their needs
- Nearly half of respondents (45%) expect to achieve return on investment (ROI) from Smart Meters in five years, whereas nearly a quarter don't know when this will be achieved
- When asked what Smart Meter features utilities will use, 74% of respondents said they will be using Smart Meters to remotely turn power on or off to a customer (connect/disconnect)
- 18% of utilities do not have in place a communications plan to educate customers about the different aspects of Smart Meters. However, 62% of utilities are informing customers about why Smart Meters are being installed
- 35% of utilities already have in place new systems able to store the additional data from Smart Metering and extract intelligence from it, and 36% expect to have these installed within five years (15% in one year, 12% in three years and 9% in five years).
- However, 12% have not yet begun to assess the systems they will require to extract intelligence from Smart Metering data and a further 12% have no plans to put this in place
- 67% already have fully funded projects in place to implement Smart Meter projects to make the most of the technology
- 53% of respondents have started planning and are evolving their IT systems to optimise operational efficiency of field operations (including maintenance management, field forces management)
- Despite the rise in electric vehicle (EV) adoption, utilities have made little preparation for this. In fact, 47% of utilities have not planned to use Smart Grids for EV adoption and 80% of utilities do not consider EVs to be a priority for them at this time

THE ORACLE PERSPECTIVE:

Smart Grids have the capability to improve power distribution efficiency and reliability, in addition to reducing the need for expanded grids by providing correctly sized transformers and other distribution equipment. But for utilities to make the most of these benefits they need to make some fundamental changes to their infrastructure.

It's positive to see that utilities are taking active steps towards planning and implementing their Smart Grid roadmap. Despite the vast range of new possibilities the majority of utilities are not leveraging the process innovations and intelligence available to them through the Smart Grid infrastructure.

Harnessing this information has the power to maximise improvements being made to their business and their ability to enhance efficiencies such as providing new customer offerings, improving field operations and supporting renewable generation. The utility industry is only at the very beginning of uncovering the disruptive evolution available today.

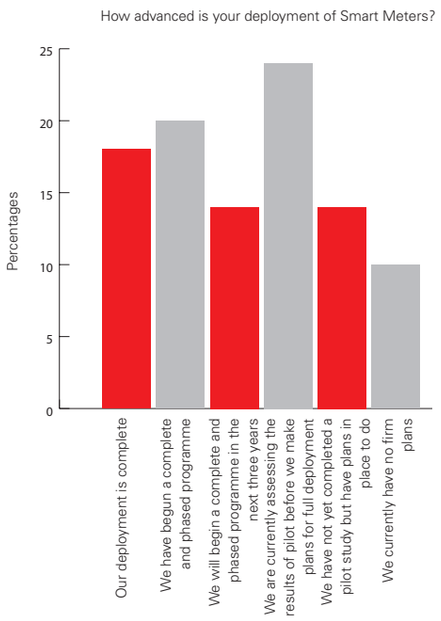
Utilities Yet to Utilise the Full Capabilities of Smart Meters

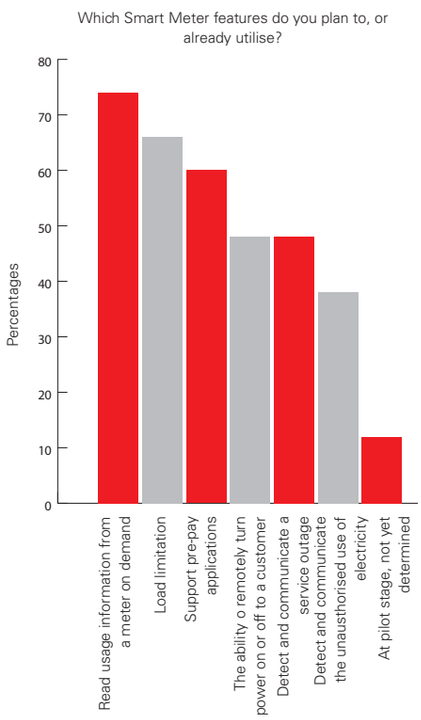
The research revealed that utilities across the region have made positive steps towards the implementation of Smart Meter programmes, with 38% having either completed or begun a phased programme to install Smart Meters in households. Additionally, over half of utilities have plans to implement Smart Meter programmes in their countries over the next five years (52%).

However, the study discovered that utilities are not exploring some of the key capabilities delivered by Smart Meter deployments, as a large percentage do not plan to make use of the following:

- Detect and communicate the unauthorised use of electricity not highlighted (62%)
- The ability to remotely turn power on or off to a customer (52%)
- Detect and communicate a service outage (52%)
- Support pre-payment applications such as remotely changing the meter's billing plan from credit to prepay, as well as from flat-rate to multi-tariff, remotely crediting (40%)
- Use Smart Meters to read usage information from a meter on demand (26%)
- Change the maximum amount of electricity that a customer can demand at any time (34%)

Similarly, utilities are not communicating the full benefits delivered by Smart Meters to their customer base by not having in place communications programme to inform customers about the service benefits delivered by the technology (60%), the impact this will have on their billing (50%), why Smart Meters are being installed (56%), and the security and privacy implications involved (62% and 78% respectively).



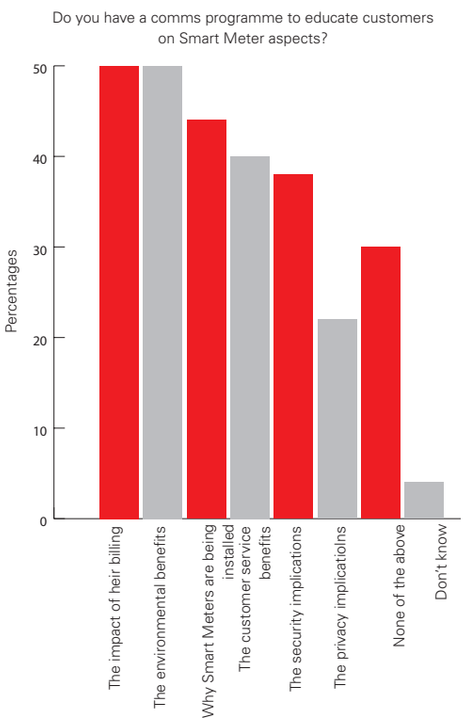


Utilities Yet to Utilise the Full Capabilities of Smart Meters

THE ORACLE PERSPECTIVE:

It is encouraging to see that more than a third have already taken positive steps to making the benefits of the Smart Grid a reality. While two thirds are yet to take that step, most are carrying out pilots to ensure that a full roll-out is feasible. Utilities tend to take an engineering point of view to fundamental change to the way they operate. A prime example is both the implementation of Smart Meters, utilities like to undergo pilots in order to fully understand how a roll-out should take place and how to extract maximum benefits from it.

There are many challenges associated with Smart Meters, the main one for retail utilities being who bears the cost of the network. Because utilities are unbundled, the network operator is responsible for the majority of the cost related to Smart Grid networks and without the same benefits achieved by retail utilities, there isn't the incentive to implement it. There needs to be a shift from the regulator in the cost responsibility to ensure that investment in the network matches the outcomes for the operators and utilities alike for adoption to become more widespread. The UK is an example of where regulators have got it right – the retailer bears the cost of Smart Meters and in turn are the ones that benefit from them.



In addition, the pressure by governments and customers to implement Smart Meters is not the same in all countries. For example, in France there are only a few regions where there is the need to manage aspects like peak loads, flexible rating and offer pre-pay options. Most regions have good payors, an excess of energy and network capacity along with Carbon Dioxide free energy so the benefits of Smart Meters are not the same as they are in the Middle East where demand far outweighs capacity.

Other challenges that are holding back the implementation of Smart Meters are the need to provide prudent grid security, the ability to manage massive data volumes and transactions, and the adherence to regulatory standards all while staying competitive. The benefits of Smart Meters to customers also need to be communicated so they are prepared for the changes that will take place, like more complex billing structures. Benefits like fewer power outages, faster repairs and lower costs, far outweigh these changes but without explanation and the chance to ask questions many will look elsewhere for their energy supply.

Utilities not reaping the full benefits delivered by the Smart Grid

In order to combat the increased levels of data created by Smart Metering, the majority of utilities are planning to put in place new software and hardware systems capable of storing and extracting intelligence from data within the next five years (72%). Of these utilities, 70% have or plan to put in place a staff programme assigned to coordinate and introduce the Smart Grid across all areas of the business (54%).

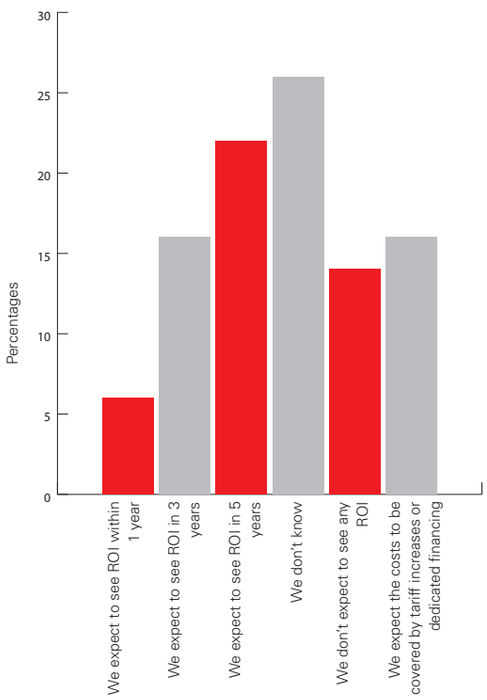
Although a large percentage of utilities plan on taking these steps, 14% of respondents have not yet begun to assess the systems that will be required to tackle this and a further 14% have no plans to put in place new systems to extract the intelligence from Smart Meters.

The study also found that 26% of utilities don't know when ROI will be achieved from their Smart Meters programmes, and a further 14% don't expect to see any ROI delivered.

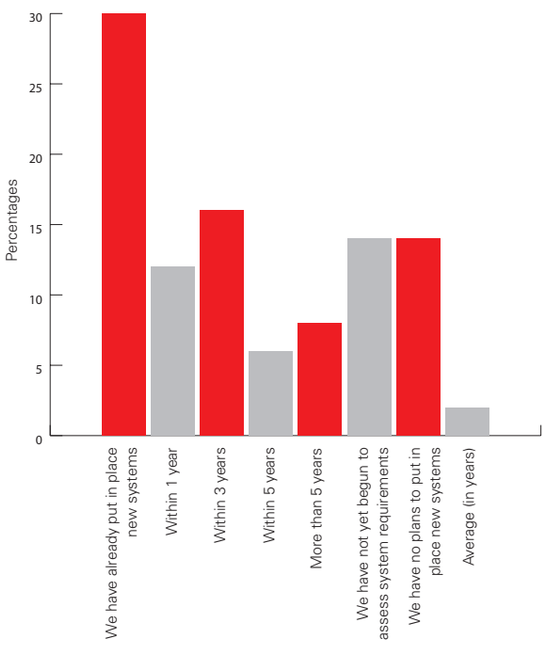
The reason for this can be attributed to utilities not reaping the full benefits delivered by Smart Grid and Smart Meter programmes. When asked what components of the technology will be key to them achieving ROI over the next five years, respondents replied:

Developing demand response and energy efficiency programmes (including real-time pricing options)	66%
Streamline metering operations (assets and data)	38%
Optimising operational efficiency of field operations (including maintenance management, field forces management)	34%
Improving service reliability	30%
Optimising existing customer centric business processes (collection, start stop service, including governance and compliance, multi-channel self servicing)	28%
Support an increasing level of renewable generation	28%
Support differentiation of offerings and commercialisation of new services (energy supply centric or not)	26%
Delaying network infrastructure investments	24%
Support beyond the meter services related to home automation and home services	12%
Support microgeneration adoption	6%
Support Electric Vehicle adoption	2%
Developing demand response and energy efficiency programmes (including real-time pricing options)	

When do you think you will achieve ROI from the project?



When will you have in place the systems able to store and analyse the data from Smart Metering?



Utilities not reaping the full benefits delivered by the Smart Grid

THE ORACLE PERSPECTIVE:

While many utilities are taking steps toward a Smart Grid future, it is important to recognise all the benefits that can be achieved through the intelligent network. Utilities need to assess these benefits and ascertain which they should invest most in based on their country and what matters most to their customer base.

Not all of the capabilities listed in the previous page can be realised at once, and in some cases are not even realistic in certain countries, therefore utilities need to spend time assessing all of the possibilities and begin by implementing systems and processes that will deliver the most benefit to their business and to their customers.

For example, Smart Metering enables the deferral of new electricity plants, so a country with limited space will benefit greatly from the implementation. It will also help utilities avoid building new transmission and distribution infrastructures by reducing peak-demands and the related capacity constraints. This reduces not only the huge infrastructure costs but also such negative environmental effects of energy use as greenhouse gas emissions and landscape-damaging transmission. For countries where renewable energy already plays a large part in distribution, this capability may not be as much of a priority as improving service reliability.

Harnessing the information from Smart Meters has the power to maximise improvements being made to a utility's business and its ability to enhance efficiencies such as providing accurate customer billing, improving field operations and supporting renewable generation. For example, accurate billing in the UK is an issue because of the system set up in the country. By providing bills that reflect and explain to customers the complex pricing models will encourage them to shift optional electricity use to off-peak hours therefore, controlling demand and capacity on the network.

IT Systems Unable to Support Smart Grid Intelligence

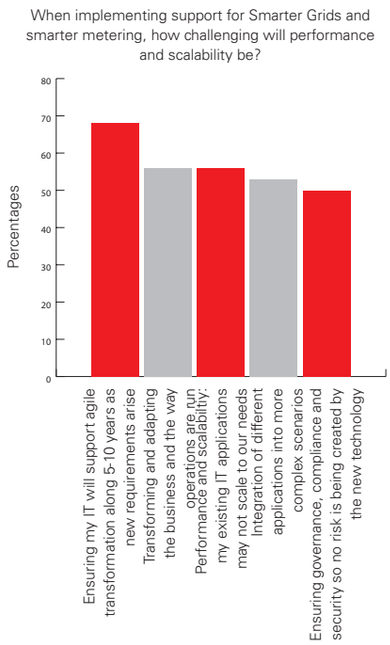
The study reveals that utilities are not taking the necessary steps to plan for transformation and prepare their IT systems to extract intelligence from and support all areas of the Smart Grid. Utilities have not yet begun planning in the areas of microgeneration adoption (50%), electric vehicle adoption (56%), support in the differentiation of offerings and commercialisation of new services (56%) and beyond the meter services related to home automation and home services (58%).

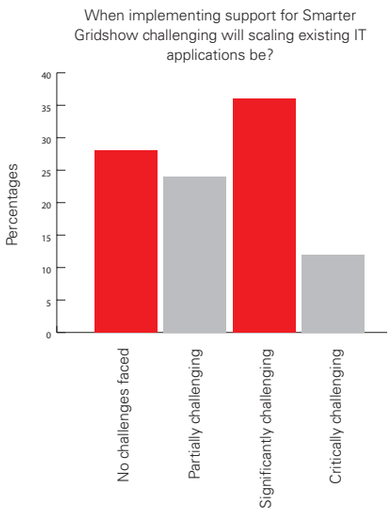
Conversely, some progress in planning has been made to improving service reliability (90%), optimising operational efficiency of field operations (84%), developing demand response and energy efficiency programmes (70%), supporting increased levels of renewable energy (66%), adjusting network infrastructure investment (62%), optimising existing customer centric business processes (60%) and streamlining metering operations (58%).

Despite this, utilities are concerned their IT systems may not be able handle the demands of the Smart Grid. The most critically or significantly challenging activities for utilities are:

- Ensuring their IT will support agile transformation along 5-10 years as new requirements arise (68%)
- Transforming and adapting the business and the way operations are run (56%)
- Performance and scalability concerns related to existing IT applications not being able to scale to their needs (56%)

In addition, the study found that only 14% of utilities have fully integrated their Meter Data Management systems with energy sourcing management, 18% with forecasting services and energy supply contract pricing and rate design, 42% with customer care and billing, 50% with self service applications, 36% with asset management and 32% with network management.





THE ORACLE PERSPECTIVE:

The Smart Grid is fundamentally revolutionising the delivery of electricity from suppliers to consumers, and will enable utilities to detect and remedy problems faster than ever before, as well as allowing consumers to be active participants in this new bi-directional Energy Supply Chain. It is therefore critical that utilities plan for the future now by architecting and implementing an open and agile IT infrastructure that is able to cope with the imminent flood of data that both present and next-generation Smart Grid components generate.

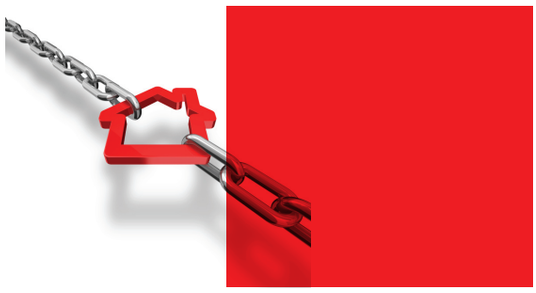
Smart Grid integration brings with it an exponential growth in the amount of data that must be gathered, verified, stored and transformed in near real-time for intelligent decisions to be made. Unfortunately, the majority of utilities are just not prepared for the mass adoption of Smart Meters and Smart Grid technology, and are unable to cope with the amount of data that comes with it.

A rip and replace approach is not necessarily required when it comes to their IT systems but a comprehensive review of their infrastructure is needed to isolate their current environment as much as possible. This will allow for pre-filtering of Smart Meter information so that only relevant and condensed information needs to get passed the existing environment.

Utilities also need to decide what their end goal is with Smart Metering before they look at making changes to or replacing their existing infrastructure. The first step for all utilities is for the Smart Meter information to be accessible to the core corporation in an enterprise wide Meter Data Management (MDM) system.

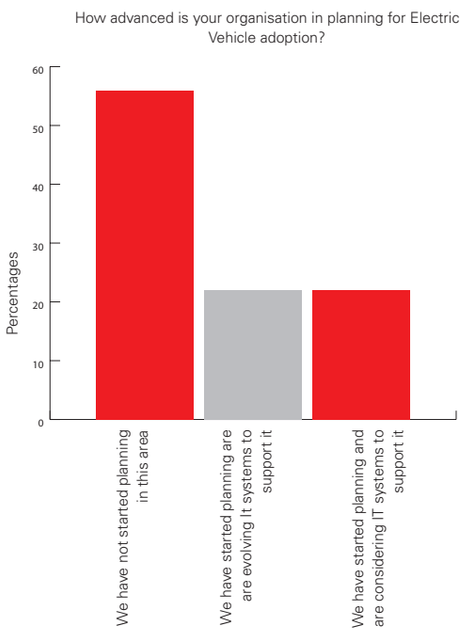
As this integrates a lot of hardware technologies, utilities need to consider a Smart Grid gateway to go on top of the physical hardware in order to isolate it from the business processes. These are architectural structures that will help them to be open, intuitive and at the same time, give them an infrastructure to design processes that are not dependent on the physical hardware.

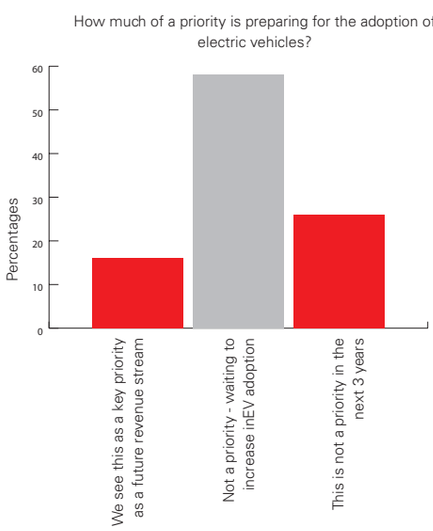
Electric Vehicles Not a Priority for Utilities



The survey also questioned executives about the preparations they have made for the increased adoption of EVs. 84% of respondents stated that this is not priority for then right now, of which 58% are seeing how adoption levels of EVs increase before any plans are made.

Utilities which are making some preparation for this are doing so by working with industry transport bodies (38%), investigating charging models (30%) and working with central and local government (24%). Yet, only 12% are factoring EVs into their plans for transition to the Smart Grid.





THE ORACLE PERSPECTIVE:

EVs represent a completely new value chain to Utilities with significant opportunities. The utility retailer can reach a whole new client segment, increase the stickiness with their customers and at the same time, offer a new set of bundled lifestyle products to differentiate themselves.

The network company on the other hand, has new network equipment to help balance the network, pooling EVs to larger virtual storage and optimising the use of renewable energy. This can only be achieved with the necessary infrastructure, the right information and the correct process platform in place to support a whole set of new customer, billing, energy and analytical processes. EVs introduce a new set of challenges when it comes to billing, and utilities need to be prepared to break down costs by aspects like parking times, charging models and refuelling station location.

The Smart Grid is a fundamental enabler but it is the responsibility of the utility to start now with planning and implementing the required IT infrastructure to prepare for the widespread adoption of EVs in the coming years.

With many major car manufacturers introducing EVs for consumer transportation and analysts predicting that EVs will take over 5-8% of automobile sales by 2020 and 15-20% by 2030, this is an area that utilities can't afford to not explore.

Conclusion

In our introduction to this report we said we wanted to understand where EMEA utilities were in planning for the implementation of Smart Grids and Smart Meters and it is encouraging to see the progress that has already be made. More than a third are already well on their way to reaping the benefits of the technology, with many more undertaking pilots. In saying that, utilities need to understand that there is still a long way to go in order to reap the full potential of the Grid.

Given the intelligence provided by Smart Meters and Smart Grids, it is not simply a case of implementing meters and synching these up to IT systems and processes to capture the data. Smart Meters, by their nature, provide far more intelligence than current systems and as such, the data needed to be stored and consequently analysed is huge.

In order for utilities to make the most of Smart Meters and deliver ROI, they need to put in place a transition plan by first stating what exactly they want to achieve. There are many features available through the use of Smart Meters but not all are relevant to all countries and regions. Utilities need to examine their marketplace and take a staged approach to adoption based on the most immediate needs, and what will deliver most benefits and ROI in the short term.

For example, in some regions EVs are at the forefront of the minds of Governments and car manufacturers, who are pushing for mass adoption. In others, there is very little awareness or advancement in an EV network and therefore, this may not be an immediate priority for utilities.

A fundamental part of any Smart Meter adoption is having the required IT system in place to store the data produced, and more importantly draw the intelligence from it. It is this analysis and intelligence that can enable utilities, and ultimately customers, to make better decisions when it comes to energy consumption. Through the ability to provide more detailed billing to customers, they can understand when certain activities can be moved to off-peak times or even cut out completely, cutting costs and reducing carbon emissions.

Smart Grids and Smart Meters will play a large part of any utilities future and it is imperative that they continue with the progress already made to ensure they are ready to take advantage of all the opportunities that the technology brings.

Methodology

In October 2010, Vanson Bourne surveyed 50 senior utility executives in Western and Eastern Europe and the Middle East. The research surveyed five utilities in the UK, Germany and Spain, four in France and Italy, three in The Netherlands, Belgium, Denmark, Sweden, Poland, Czech Republic and Middle East and Africa, and two in Ireland and Greece.

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