

# pathway 08

**smart grid as a service**  
transforming the utility  
business model

## from the editor



There's practically no other industry in which business agility is as essential as it is in the energy sector. In our constantly changing political and economic environment, demand is increasing for infrastructure that can handle decentralized power feeds as well as offer solutions for new concepts such as eMobility or energy storage.

Responding rapidly to these changes does not mean losing sight of your long-term business model but rather concentrating on what's essential: your core business. Smart Grid as a Service – the topic of this issue of 'pathway' – enables energy companies to follow this path to the future with optimized investment and effort as well as minimized risks.

Smart metering and smart grids are not only technological challenges, but also an opportunity for companies to build a more dynamic interaction with their market partners and customers, enhancing competitiveness with new products, streamlined processes and future-proof business models. In this issue, our industry experts and contributors take a closer look at all these various aspects and share their insights into Smart Grid as a Service.

Business agility is more than a question of technology – it's also about entrepreneurial spirit. For more than a century, Landis+Gyr has been driving change in the energy sector with innovative products and services. Smart Grid as a Service will be the next evolutionary step, and we'll be honored to guide our customers on their journey of discovering the benefits of new flexible business models, like Managed Services.

Enjoy the read!

**Oliver Iltisberger**  
Executive Vice President EMEA,  
Landis+Gyr

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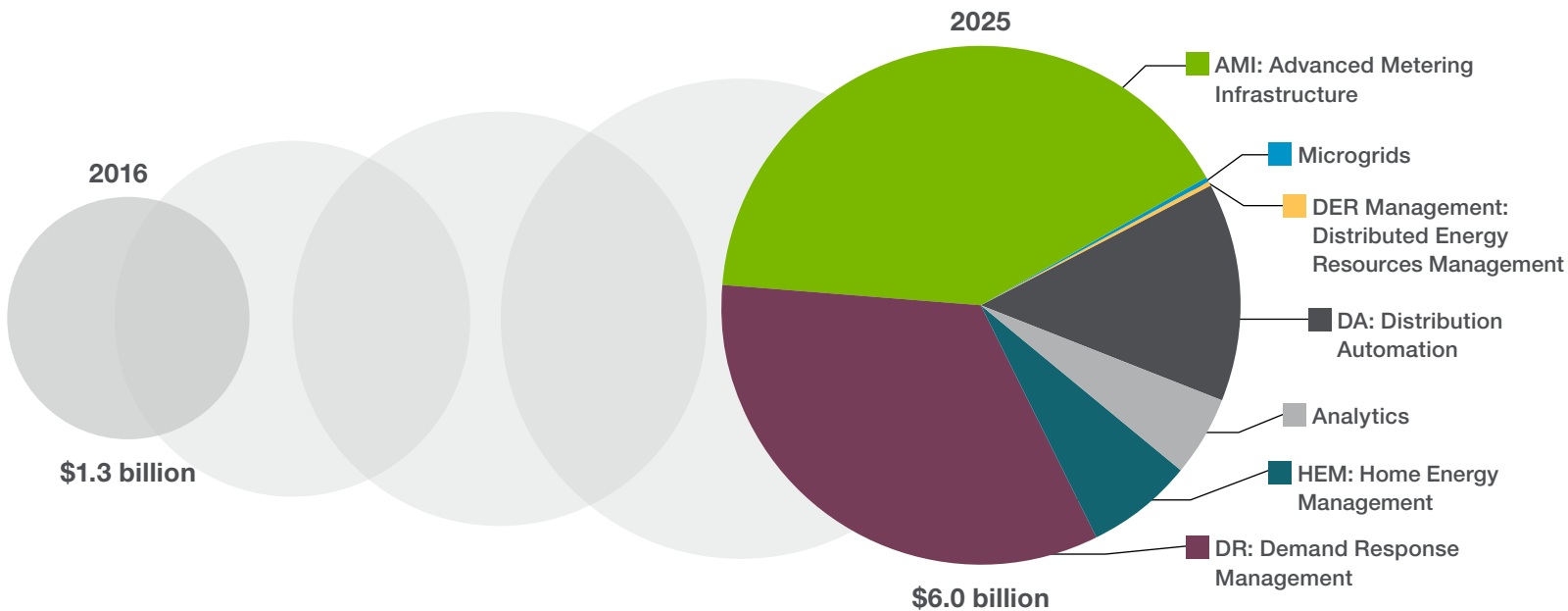


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# how will smart grid as a service drive your business?

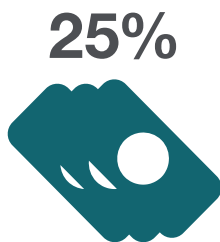
The global Smart Grid as a Service market will increase from from \$1.3 billion in 2016 to \$6.0 billion in 2025. The most lucrative SGaaS market will be AMI: a 1-year, fully managed, multimillion-meter contract will be worth 100 times as much as a fairly sophisticated data services contract for the same period of time.



## What Managed Services do for your business:

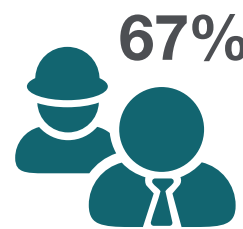


**90%** Focused expertise: 90% of IT managers lack confidence in their companies' ability to detect problems



**25%**

Savings: 46% of managed IT service users have cut their annual IT costs by 25% or more



**67%**

One solution: 67% of companies worldwide hire Managed Services providers to simplify their network and IT operations

## How to choose the right Managed Services Provider (MSP):

- ✓ Can they support my needs?
- ✓ How good is their track record?
- ✓ Are they a stable and secure company?
- ✓ Do they provide the right technology tools and people?
- ✓ Do they have core competency and expertise in network management?

# managed services as a cross-industry trend

Research on market trends by ISG Momentum shows that there are five industries that are particularly well positioned to make major gains when it comes to purchasing hardware, software and the specialist competencies traditionally regarded as the domain of the companies themselves. These industries include consumer durables, oil and gas, insurance, banking, and utilities.

Of the industries identified, utilities have the greatest potential to increase their adoption of outsourcing due to their willingness and ability to invest. In addition, utility companies are moving toward new operating models because customers, regulators, competitive markets, new skills and disruptive technologies have changed the market landscape to the point where it has become necessary to change their way of thinking in order to remain competitive. Purchasing services rather than investing in the hardware, software and skills required to manage them in-house enables organizations to better tackle risk, cash flow and growth.

The opportunities held out by Managed Services apply to all of the industries mentioned above. Cost, compliance and speed of implementation are key drivers for all and Managed Services enable them to rent better capability with no up-front investment. No less attractive is the ability to select the right service to help achieve regulatory compliance in a timely manner. Gains can also be made by outsourcing low-level data management to take pressure off overburdened internal resources.

Banks, in particular, are looking at Managed Services for cost reasons and the ability to transition back to core services. The Managed Services Model also allows businesses to improve economies of scale. This can result in a significantly improved Total Cost of Ownership (TCO) over the longer term, i.e. investment in Managed Services may well be far more attractive than allocating resources for infrastructure upgrades, hiring in-house expertise, and ongoing maintenance costs for systems that will likely be obsolete within 5 years in any event. Security and compliance will also improve when outsourcing to a qualified Managed Services Provider (MSP), because the customer can rest assured that the risks associated with consumer data and sensitive competitive information are minimized.

The consensus among affected industries appears to be that Managed Services offer a faster time-to-market as well as a reasonably static cost base, but the truth is that this can sometimes be at the expense of the service not fitting exactly with a firm's infrastructure. Further challenges include the fact that some industries are not entirely ready to give up their legacy systems; banking being a case in point. In addition, it is difficult for firms in all industries to simply hand over data management to an unknown and unproven entity, which is what causes some to adopt a "wait and see" approach. ■



# smart grid as a service – transforming the utility business model

Traditionally, utilities have acquired their own physical assets as well as the software, expertise and data storage required to manage those assets. Today, in line with a cross-industry trend, more and more utilities are turning to service-based delivery of smart grid operations to make their business processes more flexible, mitigate technology risks, and have reduced and predictable cost.

Today's utilities face multiple challenges, including financial constraints, declining revenues, rising consumer expectations, volatile commodity prices and increasing regulatory pressures. More and more utilities are moving to service-based delivery models to help make their business processes more flexible, reduce technology risks, and minimize costs. Competition is also an important driver because making use of Smart Grid as a Service, or SGaaS, can accelerate the time-to-market of new end-user services offered by utilities.

SGaaS typically includes cloud services, smart grid operations and related consulting services, all of which can be outsourced to specialist suppliers, or Managed Services Providers (MSP). Specifically, cloud services include Software as a Service (SaaS), Infrastructure as a Service (IaaS) and Network as a Service (NaaS). In turn, smart grid operations cover deployment, optimization and maintenance services, while related consulting services include audit services, business process services and enterprise architecture services.

### **A significant growth opportunity**

The utilities industry has plenty of room for outsourcing growth. According to Navigant Research, many utility companies now use service-based delivery for enterprise applications, such as Customer Relationship Management (CRM), billing systems, and asset management. By contrast, technologies that deal with grid operations tend to remain in-house.

Utilities are either currently adopting or have the possibility to adopt several different flexible options to embed SGaaS:

- **Data services:** the collection, storage, and analysis of data in the cloud.
- **Cloud-based software:** the delivery of software as a service (SaaS) or enterprise-hosted software.
- **Fully Managed Services:** the delivery of physical assets and business processes as a Fully Managed Service.

Many organizations recognize the inherent value locked away in their data and are actively seeking ways to maximize the return on data discovery projects. The cloud is potentially the most attractive way to unlock this value. Cloud-based analytics can help reduce costs up-front and the elasticity of the cloud model can help utilities to manage the changing data center requirements as well as to overcome internal analytics resource constraints. Furthermore, companies in this sector want MSP that, among other things, can help them develop applications to enhance customer loyalty and employee engagement.

### **Key drivers of SGaaS adoption**

The potential impact of SGaaS on utility customers is made still clearer in a recent report on Cloud Managed Services by Frost & Sullivan. They point out that, rather than building and managing services in-house, enterprises stand to realize many advantages by purchasing them externally. This potentially enables investors to:

- Minimize capital investment in IT infrastructure and the need to expand data center facilities.
- Eliminate the need to hire or train specialized IT staff for each application and system.
- Ensure consistent, predictable application performance.
- Protect data with security measures that might not be affordable in a private data center.
- Align costs with usage, avoiding over-provisioning for peak times.
- Manage against Service Level Agreements (SLA) to ensure the desired outcomes.

These key findings not only hold true for Cloud Managed Services. They also apply to smart grid operation services such as field deployment, meter reading, etc. "Utilities prefer to concentrate on their core competency, which is delivering quality service to their customers under the constantly tightening regulatory framework, and therefore adopting SGaaS is a sensible choice for them," says Mauri Patrikainen, Customer Solution Consultant at Landis+Gyr.

What makes these services particularly attractive is that costs are predictable over a given regulatory reporting period so, for example, SGaaS customers might look to leasing equipment rather than financing or purchasing it outright. Adoption is also strongly driven by competition. Not least because the risk exists that the additional value created by disruptive new smart grid technologies could be snapped up by new entrants. Utilities are under pressure to develop new services rapidly to counter these potential new entrants.

### **Doing more with less**

The pervasive challenges utilities are facing are pushing them to be more nimble, agile and technically sophisticated. They are looking for experienced service providers that can help them meet these challenges with proven solutions and enjoy all the benefits of a smart grid system without assuming the full financial,

## Landis+Gyr's services in numbers:



15 million+ meter endpoints under Managed Services



Consistently delivering over 99% billing meter reads via Managed Services



20 million+ meter reads delivered every day via cloud services



Discover Landis+Gyr's services offering:

<https://hubs.ly/H08CnCHO>



technical or operational risks of the investment; allowing the utility to focus on their core business activities.

The companies can do more with less and provide an efficient service while keeping costs down and developing new revenue streams. “We believe the way forward is to partner with our utility customers to enable the smart grid at a competitive and predictable cost, making it simpler to operate. We help to improve the efficiency and reliability of customer’s energy network by making all the necessary information timely available,” says Patrikainen.

To enjoy reduced costs, improved visibility, universal access, greater end-user productivity and improved agility, utilities need infrastructure and applications that are elastic and scalable, highly accessible, usage based, secure and compliant.

### SGaaS in practice

Data services enable utilities to manage IT and resources, while adapting to the changing requirements of end consumers. Any business software imaginable can be provided as a service and, for example, might include Customer Relationship Management (CRM), payroll and book keeping applications. Most Software as a Service (SaaS) providers host and maintain systems on their own servers, which customers then access via the Internet. However, SGaaS goes beyond IT services in scope. “It’s not just about providing the software service operations and management of that. It concerns the entire infrastructure: from production of the field devices to logistics, and installation all the way through provision of top-level services,” explains Mauri Patrikainen.

As the name suggests, Fully Managed Services offer much more. They might, for example, include the complete outsourcing of information technology functions which are more traditionally maintained in-house, and a full range of managed field services including:

- Installation/deployment planning
- Materials planning for forecasting and procurement
- End device testing, configuration and installation
- End device field maintenance and troubleshooting
- Inventory management
- Troubleshooting device communication issues.

Fully Managed Services include the full spectrum of necessary devices, communication networks, software and meter data management applications, plus any additional grid operations services that a utility might require. The Austin Energy project described on page 10 of this issue is a case in point.

### Clear responsibilities and optimal use of resources

The key benefits of a Managed Services model are clear responsibilities – ideally, only one partner responsible for providing full service – and optimal utilization of resources, which brings cost savings. Single, specialized service providers can offer organizations a “one-stop-shop” solution that would include better integration of services, and superior cloud and IT infrastructure. This extends to the provision of library of infrastructure and application services, and standard-based automated processes (ITIL). Effective implementation requires access to best practices in identifying, planning, delivering, improving, and supporting IT services. This makes a sound understanding of ITIL essential. Equally important is that all process design is based on what happens in the real world: so, while ITIL is a great framework, it must always be tailored to reality and adapted accordingly.

So, why should organizations opt for a Managed Services Model? And should they entrust their Smart Grid Services to a single dedicated partner or go with several different vendors or, for that matter, an in-house solution? There is no “black and white” answer to this question.

“Obviously the change from buying individual solution components to Managed Services is a big shift, which requires very different thinking from customers,” continues Patrikainen. “Instead of defining lots of technical details on how everything should be executed, questions of what information and functions are needed to run utility business efficiently become more important. But I would encourage them to do it because there are significant benefits to be enjoyed. It really enables utilities to concentrate on their core business while the ever-growing complexity of future technological environments is taken care of by a specialized service provider.”

See also page 14 of this issue, where our invited industry experts discuss the financial considerations and business advantages of Cloud Managed Services in the round table interview. ■



# Landis+Gyr to operate AMI for Caruna in Finland

Landis+Gyr has signed a Metering as a Service contract with Caruna, Finland's largest distribution system operator (DSO). Landis+Gyr will be responsible for operating Caruna's 650,000 smart metering points for at least 6 years, starting in autumn 2018.

Caruna has been a pioneer for smart metering implementation in Finland. Most of its existing metering infrastructure was installed in 2014 and since then it has been operated under a Managed Services Model. Caruna's existing smart metering solution is fully based on third-party technology.

With their existing contract up for renewal, Caruna decided to identify their future service partner through a public tender. Landis+Gyr, with more than 15 million metering points in Managed Services, was rated highest in the process and was awarded the contract, which was signed on June 16, 2017.

"We want to provide excellent service to our customers and strive to meet their needs today and in the future. Reliability of AMI operations is the basis for empowering our customers to follow their energy consumption and improve their energy efficiency," says Katriina Kalavainen, Head of Customer Relations at Caruna. "Landis+Gyr is a strong player in the energy industry with a full focus on AMI technology and services. We look forward to our collaboration and partnership over the coming years."

The service offering includes full operational responsibility of smart metering. Landis+Gyr will collect and manage the hourly consumption and power quality data of 650,000 residential meters, funnel the data into Caruna's post processes and manage alarms and remote switching. The service scope also covers management of data communications and activation of field work operations. Preparations for the takeover and integration of the current meter park into the Landis+Gyr service platform begins immediately. The transformation will be fully completed by autumn 2018 when Landis+Gyr will take over the responsibility for AMI operations. ■



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## About Caruna

**Caruna** is the largest company in Finland dedicated to the distribution of electricity. It provides power to 669,000 private and corporate customers in the regions of North Ostrobothnia and Lapland, Ostrobothnia, South Ostrobothnia and Satakunta, Southwest Finland, Häme and Uusimaa, and in the city of Joensuu. Caruna employs approximately 280 employees and contracts directly 2,000 additional workers all over Finland. Caruna is investing heavily in the construction of a weatherproof network and, in addition, invests about EUR 200 million annually in the development of its electrical network. Caruna is owned by the Finnish employment pension companies Keva (12.5%) and Elo (7.5%) and by international investors in infrastructure, First State Investments (40%) and OMERS Infrastructure (40%).

For more information: [www.caruna.fi](http://www.caruna.fi)

# taking AMI to the next level in texas

Austin Energy, founded in 1895, is the 8th-largest publicly owned electric utility in the US, serving more than 460,000 customers and more than one million residents in the capital city of Texas and outlying areas.

Austin is one of the fastest-growing metropolitan areas in the United States. The city enjoys cultural diversity and a vibrant economy: in a state once known for black gold and baron dynasties, Austin is home to major global corporations and many technology giants that have their roots in Silicon Valley. All of that is reason enough for Landis+Gyr to be on the scene with smart grid solutions that enhance Austin Energy services in the region.

## Early adopter of innovative smart metering

The relationship between Austin Energy and Landis+Gyr started more than 15 years ago, as the trend toward smart solutions was just beginning with Advanced Meter Reading (AMR). Today, the company relies significantly on metering and grid infrastructure products from Landis+Gyr. The foundation of the current smart grid at Austin Energy was laid down ten years ago and now the utility company serves one million consumers and 5,000 businesses within an area of 437 square miles. About 500,000 hardware devices, including meters, computers and servers, support the network comprised of some 12,000 miles of distribution and transmission lines connected with 74 distribution and transmission substations. This network technology enables real-time energy data online or by phone, remote service for power activations and deactivations, and billing models – and all of that in addition to smooth energy distribution with practically no outages.

In 2002, Austin Energy embarked on a critical project to provide Advanced Metering Reading (AMR) throughout one-quarter of its service territory. This project was then extended in 2006, when the utility chose to upgrade the remaining territory into an Advanced Metering Infrastructure (AMI). The Landis+Gyr mesh network then extended to more 420,000 endpoints throughout 437 square miles of service territory. “Austin Energy has always been very active with emerging technologies and was in a good position to benefit from Landis+Gyr’s first two-way deployment,” says Charlie Estes, Program Manager Operations at Landis+Gyr North America.

By taking this early step toward AMI, Austin Energy has been able to gain better supply control and load balance, not to mention achieving better overall network performance transparency. The utility was aiming to improve their customer service and drive energy efficiency through business models that would help consumers manage and reduce their energy costs. Austin Energy’s use of the GridStream® radio mesh for distribution automation has also driven carbon emissions and labor costs down by reducing the number of vehicles and field engineers making on-site calls.

## The next big step

Today, Landis+Gyr delivers Fully Managed Services to support the complete AMI environment at Austin Energy. The key to ensuring outstanding utility service is having a wealth of operational and AMI data that can be effectively analyzed. Over the past five years, digitization has given utilities the tools needed to gather and process huge volumes of data. Furthermore, the development of in-memory processing has brought greater precision and granularity to data analytics thanks to big data applications. These advancements, along with the latest strides made in mobile and data communications, not to mention the Internet of Things (IoT), are giving distribution system operators (DSO) new opportunities for optimizing their business operations.

## Making a vital transition to service provisioning from Landis+Gyr

Austin Energy has invested in its smart grid for more than a decade and is committed to delivering customer value through innovative technology. Austin Energy chose to engage with Landis+Gyr in a Managed Services Agreement to enhance the level of access and data required of a true two-way AMI network. Faster AMI asset communication and more granular meter data can benefit a utility in many areas, including customer facing, customer outage restoration notification, better control over personal energy



“We aspire to create more value for our utility customers, which in turn can be passed on to their end customers in the form of even better utility services and consumer empowerment programs.”

Charlie Estes, Program Manager Operations at Landis+Gyr North America

use and improved energy efficiency by leveraging the data and access benefits delivered through an AMI system, all done with a trusted partner like Landis+Gyr through a Managed Services Agreement. The core of the solution is built around the Gridstream® MDMS (Meter Data Management System), along with the Command Center HES (Head End System) for managing AMI data.

These solutions, along with Landis+Gyr hardware and software products, are all delivered and managed as a Service.

The Austin Energy Distribution Automation (DA) solution leverages IWR radios on the “production” RF mesh network. These are used in Distribution Automation and Demand Response applications. Austin Energy has implemented an Advanced Distribution Management System (ADMS) which utilizes DA information to monitor distribution voltage on the grid and remotely issue commands to devices such as switches, reclosers and switchgears. Furthermore, S-610 line sensors are currently being piloted for monitoring to support service quality and fault location.

Austin Energy owns the data and information, but Landis+Gyr is responsible for all data readings, communications, analytics and IT tasks – with most processes being conducted off-site. All of the data collected within the Austin Energy smart grid – pertaining both to equipment and operations as well as select pieces of consumer information – is communicated via secure channels to the Landis+Gyr Network Operations Center in Kansas – 720 miles away! The data center is staffed by IT professionals and equipped with the most advanced system platforms available to guarantee data integrity and high-quality analytics. Security is also assigned the highest priority, and all operations comply with local, state and federal directives governing data privacy and protection. Furthermore, data analytics is conducted using a number of security options, including proprietary algorithms developed by Landis+Gyr to bolster security and support compatibility with all Landis+Gyr analytic management solutions. All operations are performed in real time.

When the data processing results are communicated to Austin Energy, the utility has a complete overview of its service territory from a metering perspective. Charlie Estes and his team work together with Austin Energy on evaluating the results and taking measures that might be necessary to improve service. The data professionals and data modelers in the team are also tasked with interpreting the data in ways that will anticipate relevant future trends that could be of relevance. Status reports about grid assets can be examined to anticipate potential weak spots so that outages can be prevented before they occur. Instances



where new Landis+Gyr developments can enhance the smart grid can be identified, allowing Austin Energy to set up pilot projects to test new devices in a real-life environment.

“Our value proposition is quite clear: the team serves as a trusted partner, ready to assist the utility at any time, and by educating the customer about the options available from Landis+Gyr that will ensure business success. Today, the local or regional utility companies may not have all the understanding, resources, expertise and real-world experience required to keep energy distribution running smoothly in a digitized world. That’s where we come in and help. Offering Managed Services via the cloud or similar outsourcing models is a win-win situation for both parties,” says Charlie Estes. This contributes to customer satisfaction and peace of mind. Above all, Managed Services from Landis+Gyr reduce CAPEX and improve OPEX, which are both very significant parameters for public utility companies. “We will continue to gradually enhance this Managed Services Contract with new functions and features. Our aim is to create more value for Austin Energy, which in turn can be passed on to their end customers in the form of even better utility services and consumer empowerment programs.” ■



Watch the Austin Energy videos here:

[youtu.be/MUXdsk3HLjc](https://youtu.be/MUXdsk3HLjc)

[youtu.be/6MpEb2qT1ro](https://youtu.be/6MpEb2qT1ro)





# software as a service: how it works for customers



Centralized yet customized business applications such as Software as a Service solutions are not-so-secret weapons anymore for utilities needing to keep pace with accelerating technological developments driven by ever-shifting infrastructure needs. Energy companies must adapt to increasingly complex integrated application environments with shorter implementation cycles, which comes at a significant cost.

Software as a service (SaaS) is a software distribution model in which the software is provided by an independent third party and made available to customers online, typically for a monthly service fee rather than a one-off purchase price. Generic examples of SaaS could include trading software, metering software, customer information and billing systems, or any traditional office software. In the past, organizations usually purchased perpetual licenses for this software, which was hosted onsite. They also paid anything up to 20% a year in addition for maintenance and support. By contrast, SaaS lets buyers pay an annual or monthly subscription fee that covers the software license, maintenance and support. Associated costs include expenses for the respective IT environment.

SaaS allows organizations to spread costs over time, meaning they need no longer to invest in servers, hardware, software licenses, databases, or the competences required to maintain the software in question. In addition to smoothing cash flow, SaaS can reduce costs over the longterm due to the economies of scale that multiple customers make possible in centralized applications. Additionally, SaaS significantly

improves the performance and value added delivered by software because it is maintained and administered by expert providers with top-class competence.

## Examples of SaaS services:

- Software licenses including proprietary and third-party applications
- Infrastructure services
- IT maintenance and updates
- Monitoring and management
- Security (physical and logical)
- Disaster recovery
- Software maintenance
- Software upgrades



### Typical SaaS support services

Software services can also include elements like an onsite application support team with program management and dedicated technical support to proactively monitor systems. Technical support would cover the data interfaces that ensure data delivery, analysis of exceptions and data anomalies related to daily operations processes, as well as data collection and delivery, system performance metrics and SLAs.

Where SaaS is core to an organization's competencies it might choose to supplement it with Managed Services that include daily operating of the system, maintenance scheduling and planning, identifying field-related activities and communicating and coordinating activities with the field team. Managed Services could also cover event and error tracking as well as manage application and OTA (over-the-air) updates for a network and end devices. Apart from standards such as regular product updates, application configurations built around customer business needs or the resolution of anomalies onsite are likely to be included.

### A closer look at SaaS advantages

In addition to the cost and cash flow benefits already mentioned, software services enable utilities to focus on business process optimization while the SaaS provider takes care of daily system maintenance and risks associated with technology updates and deployment. If a utility owns the software, it must run additional software components like the operations system, database, and virus protection as well as backup management. All this means that there are numerous parties involved. The clear responsibilities of a SaaS solution ensure that organizations remain current and enjoy faster software solution delivery than typically possible without specialized external support. SaaS vendors effectively augment their customer's capabilities with their experience and expertise in the relevant software. As a result, the customer organization gets full and uninterrupted value from the software. The fact that no one inside the customer organization has to acquire new skills also reduces barriers to change.

### What utilities should look for in a SaaS provider

Any utility looking to benefit from SaaS should ensure they find a supplier that can offer a solution properly matched to their needs. Rather than focusing on the software itself, organizations purchasing SaaS should clearly specify the desired outcomes.

In addition to the functional fit between a SaaS provider's services and customer needs, one also needs to consider the type of security and data recovery plan that is in place, as well as the competencies and capabilities needed to maintain the software. Data security and privacy are particularly important issues and must meet ISO 27000 security certificate requirements to be compliant. Moreover, economies of scale make it possible for SaaS vendors to invest in state-of-the-art security systems ordinarily beyond the scope of small to medium-sized companies. This enhanced security is further underpinned by the fact that most SaaS vendors undergo stringent security audits that validate data center security levels.

Finally, the good news for customers is that all they need to implement a SaaS solution, is a secure communication channel between the service provider's hosting center and their own utility network. This, and all the other advantages of SaaS, explain why it is becoming an increasingly popular means of software procurement, especially where such software requires sophisticated maintenance and support to function at maximum effectiveness. Even where this is not the case, the sheer ease and simplicity of SaaS implementation and, not least, the significant cash flow advantages it offers, will no doubt see SaaS becoming the predominant method for organizations to purchase software in the future. ■



# opportunity

## the financial implicati

In this round-table discussion, **Farah Saeed**, Principal Consultant at Frost & Sullivan, discusses the financial implications of Cloud Managed Services with **Philippe Vié**, VP at Capgemini Consulting, and **Peter-Georg Koller**, VP Product Management Energy Solutions at Landis+Gyr. Together, they look at the extent to which Cloud Managed Services are the optimal financial choice for a business and assess the advantages of these services from a financial and a business standpoint.



# knocks:

## ons of cloud managed services



**pathway:** *How can Cloud Managed Services have a significant financial impact on a utility business?*

**Philippe Vié:** I believe cloud-based services are of interest to everyone in the utility sector. Managed Services in particular can add value to utilities across the entire value chain. This includes the improvement of generation, transmission and distribution, as well as retail and services. The great thing about Managed Services is that it allows you – as a utility – to increase your capacity as your organization expands: it can be a “pay-as-you-grow” service, if you will. This frees utilities from having to worry about rapidly changing areas of specialization and lets them focus on developing their markets. This also reduces risk and limits the level of employed CAPEX.

**Peter-Georg Koller:** Cloud services are a very cost-efficient way to build capacity in cases where utilities need to increase capacity or are undergoing a change, because no large up-front investment is required. The cloud offers a professional and secure data-hosting environment with the ability, for example, to optimize server capacity based on demand. This translates to clear cost savings. Beyond basic IT infrastructure hosting, Cloud Managed Services enable utilities to increase their operational efficiency and offer new services, both of which offer significant financial benefits.

**Farah Saeed:** The bottom line is that Cloud Managed Services perform and support functions beyond just delivering accurate billing, and operational efficiencies such as remote disconnect and even remote reading. Many utilities are looking to use them to provide better services to consumers and to manage their own operations in a more efficient manner.

**pathway:** *What benefits can a utility company expect to enjoy from Cloud Managed Services?*

**Philippe Vié:** The main benefit is in the creation of new revenue streams with better margins than were enjoyed in the past. This is not so much about cost cutting as it is about opening new streams of revenue that would effectively add value to both the consumer and the company.

**Peter-Georg Koller:** As discussed, with the Cloud Managed Services utilities always have the capacity they need and can scale it up as customer demand grows. This increases utilities’ flexibility and agility to react to new challenges. In addition, there is no need for utilities to hire specialized technical operators and IT experts in-house, as this expertise is provided by the cloud service. For example, state-of-the-art security mechanisms can be deployed that are not dependent on a utility company’s own security know-how.



### Farah Saeed

Farah Saeed is Principal Consultant and Global Program Leader for digital grid content with the international growth consulting firm Frost & Sullivan. She has a deep understanding of the business issues facing mature and emerging energy markets, particularly transmission and distribution with an emphasis on grid modernization. She began her career as an analyst in 1999 with a focus on embedded power supplies and batteries used in both consumer and commercial applications such as data centers. In 2009, Farah took over research on electrical transmission and distribution for North America and is the author of several market insights on microgrid, smart grid, AMI, demand response, and Voice of the Customer (VoC) analysis.

**Farah Saeed:** Data analytics as a Managed Service can enable businesses to improve efficiencies and make better decisions without having to outlay significant capital investment. For example, it can help manage supply and demand, and capacity gaps on a grid. The latter is particularly relevant when integrating renewable energy sources into a grid while retiring others, like coal and nuclear. By way of specific example, proper analysis and management of fluctuations can prevent the need to turn on a peak power generator and this leads to direct savings.

*pathway: What are the key criteria businesses should consider when choosing Cloud Managed Services and a Managed Services Provider (MSP), respectively?*

**Farah Saeed:** Perhaps the first thing for them to consider is what risks they would encounter for not modernizing their infrastructure. Based on that, they can decide on what would be the best approach for upgrading infrastructure as well as who would be best to work with.

**Peter-Georg Koller:** I would say, it varies case by case as there is no “standard utility.” One common evaluation criterion is to gain a clear view of evolving business processes and technology needs. Then assess the initial and ongoing capabilities needed to leverage maximum benefit from these new processes or technologies. When deciding on leveraging Cloud Managed Service, the key factors for choosing the right service provider are technology and utility business process knowledge combined with services capabilities and references. The cloud service provider should also be committed to the utility business and be large enough to meet and guarantee required service levels for the foreseeable future.

**Philippe Vié:** I would recommend that the first thing to do is to look at the business case rather than the technology itself. The obvious first question is whether the new technology will add more value than existing services in terms of revenues, margins, and improved efficiencies. One should also consider that the new services will not only provide new revenue streams

and better margins, but also differentiation through more effective customer engagement and improved customer loyalty. Again, the value created here should be assessed against the cost of creating new services and the associated integration efforts.

**Peter-Georg Koller:** Depending on customer requirements, data location might also be an important factor, especially if there is sensitive information like customer contact information or consumer metering data to be considered. Nowadays cloud service providers can guarantee the geographical area where data will stay such as, for example, in the EU or within a specific country. Businesses should also ensure a provider has recognised ITIL (Information Technology Infrastructure Library) certifications in place along with a cloud service configuration library and the other tools needed to manage a cloud service.

**Philippe Vié:** Obviously, wherever possible, utilities should start with the most valuable migration and then work down from there, bearing in mind their capacity to integrate a service with related software. In addition, they might want to consider how they will work with partners and suppliers of managed solutions down the line, even to the point where they might consider taking equity in supplier organizations, or buying them out entirely. Also bear in mind that cloud servicing is not always suited to global rollouts and should rather be applied at the local level on a situation-by-situation basis.

**Farah Saeed:** Agreed. There is no one answer because every utility has different requirements and different interpretations of how to approach the subject. Many service providers offer consulting services to help customers make the best possible decision. These services are sometimes even offered on a “vendor neutral” basis from companies that offer Cloud Managed Services.

*pathway: What is the best approach for evaluating Total Cost of Ownership (TCO) and, more specifically, what does TCO look like when comparing Cloud Managed Services to traditional services?*



## Philippe Vié

Philippe Vié, Vice President at Capgemini Consulting, is an expert in Digital Utilities Transformation. He began his career as an information engineer and consulted on the use of new communication technologies. He joined Capgemini in 1997 and, over the years, has developed an in-depth knowledge of the challenges and opportunities facing utilities and their markets in a constantly evolving regulatory and technical environment.



**Philippe Vié:** This is a tough question and it largely depends on integration capabilities when it comes to migrating from the traditional approach to the cloud-based one. This challenge needs to be considered globally and include things like change management, the transformation of architecture, and so on.

**Peter-Georg Koller:** It is important to understand the total cost of ownership structures of traditional services, say, your own server park or hosting service and the operating costs of a business, so that you can properly compare them with Managed Services. The dynamic nature of the services you require must also be clearly understood in terms of a supplier being able to meet a business's need for flexibility.

**Philippe Vié:** For me, the main advantages of Cloud Managed Services are that you have no need to take care of platforming or communication because these are offered by the cloud service provider, with the possible exception of security, which should be carefully examined when taking the decision to migrate to the cloud or leverage cloud infrastructures. The second major advantage is the "pay-as-you-grow" model we already discussed, while the third significant benefit relates to time-to-market. When you use a cloud service provider you can drastically improve time-to-market because there's no need to develop things from scratch, as is the case for utilities that follow the classical approach.

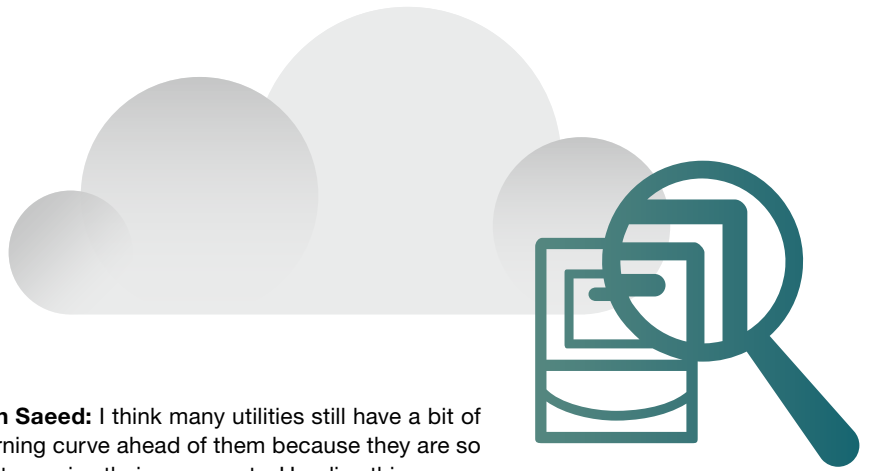
**Farah Saeed:** Indeed. So many technological changes are happening – IoT, 5G and neighborhood networking, to mention a few – that it can be extremely difficult for utility companies to keep up. The entire technological environment can change drastically in just five years. Managed Services make it possible to keep pace with the changes and enjoy the considerable benefits they offer while keeping associated costs entirely predictable.

**pathway:** *How do you see the future of Cloud Managed Services in the utility sector?*

**Farah Saeed:** I think many utilities still have a bit of a learning curve ahead of them because they are so used to owning their own assets. Handing things over to a third-party provider is going to take a while for them to get used to. The challenge is how to better educate them on the advantages of Managed Services, especially in the lower-tier utilities.

**Philippe Vié:** When it comes to the more established market players, I don't believe we will see them moving all their applications to the cloud in one fell swoop. Rather, they will tend to migrate services when appropriate as new opportunities arise. Nevertheless, cloud solutions will no doubt become predominant over time. They are certainly the best option for utilities wanting to push the reset button and there are many utilities wanting to reinvent themselves these days. This is a great way to do it. Obviously, the same applies to new players coming into the sector; in which case it makes sense to go with a full cloud-based solution from the word go.

**Peter-Georg Koller:** Agreed. For new players, leveraging cloud-based services is the obvious choice. For established utilities, it is a much more step-wise approach with selected business processes and services first. In the mid-term, the need for gaining speed and the ever-increasing demand of specialist knowledge will make cloud-based services more dominant. In this transition, it is essential to set up a long-term trusted partnership with the service provider if the utility wants to create maximum value from using Cloud Managed Services. Partners with a strong knowledge of industry-specific processes are key to achieving these long-term targets. ■



## Peter-Georg Koller

Peter-Georg Koller is Vice President Product Management Energy Solutions at Landis+Gyr. He is responsible for the portfolio of smart energy solutions ranging from smart devices and software systems to total smart metering solutions and services in Europe. He holds a degree in engineering and business administration and has many years of international leadership experience in the telecommunications, IT and smart metering industries.



Home batteries used to store electricity generated from photovoltaics (PV) can play an important role in balancing national and international power grids. Using Tesla's Powerwall and SolarEdge inverters, the Dutch utility Eneco has kicked off a project called CrowdNett that could serve as a blueprint for sustainable load balancing for energy companies throughout Europe.

In a first step, a network of 400 batteries will provide reserve capacity for network operator TenneT looking for an eco-friendly alternative to traditional power, while a licensing model for third-party customers in the Netherlands and other countries is already scheduled for 2019.

Fluctuations in load mean that utilities' distribution grids need substantial reserve capacity, and network operators are looking for flexible and sustainable alternatives to reserve power from conventional power plants. Private PV owners, on the other hand, are

knowing that they're now competing with conventional power plants in making the country's energy supply more sustainable.

#### New revenue streams

CrowdNett will initially be rolled out within the Eneco Group and with Lichtblick in Germany, but Eneco's business plan also envisages licenses for utilities that could acquire concessions for a fee. CrowdNett has also added other battery systems to their portfolio, like LG Chem (in combination with SolarEdge). Just like any



## creating value in front of the meter and behind it

### Eneco's sustainable backup for national grids

*Prosumers substantially reduce their energy costs and compete with conventional power plants.*

searching for an affordable way to store electricity generated from their solar panels. CrowdNett – launched by Eneco in cooperation with SolarEdge and the Swiss start-up Ampard, using Tesla's Powerwall – offers a smart solution for both issues. A network of Tesla's Powerwall home batteries connects to a utility's virtual power plant; the CrowdNett setup consists of a battery, inverters and is easily integrated into any smart metering environment. The optional CrowdNett app, available for Apple and Android, enables real-time monitoring of remote charging and discharging of solar energy production.

#### Turning homes into power plants

Within the CrowdNett network, individual batteries in the homes of private solar plant operators – prosumers – can charge or discharge, as required, to supply reserve capacity to the national power grid. If the electricity production dips below 50 Hz, the batteries start feeding in, above 50 Hz they store the excess energy. The target numbers for the first installation phase are promising: 300–400 batteries with a peak power output of 3–55 kW would be sufficient to meet the TSO threshold of 1 MW. In return, the prosumer receives an annual loyalty fee and a significant discount on the solution package – as well as the satisfaction of

other virtual power plant, it compels all parties involved to rethink their business models. “We’re not selling energy in the literal sense anymore. Instead, CrowdNett is creating value in front of the meter and behind it,” says Dirk-Jan Middelkoop, Innovation Manager at Eneco and co-founder of CrowdNett. “An average end consumer normally can’t benefit from most in-front-of-the-meter revenue streams that, for example, are generated in balancing markets.” A virtual power plant like the CrowdNett concept provides prosumers with access to the balancing and secondary markets, but it also strengthens traditional sources of income for them. “Behind-the-meter prosumers can increase their self-sufficiency due to the large capacity of the Tesla batteries, and thereby substantially reduce their energy costs.”

In turn, grid operators can replace backup capacity provided by physical power plants with energy from the CrowdNett virtual power plant. Utilities, on the other hand, will be able to reduce energy production costs by sharing battery capacities and to attract more long-term customers with a new model. “Sustainable reserve power, substantial benefits for the end consumer and increased customer loyalty among utility customers is a ‘win-win-win’ situation for all parties,” says Middelkoop. ■

“Home-battery-based virtual power creates a win-win-win situation for consumers, utilities and grid operators.”

Dirk-Jan Middelkoop,  
Innovation Manager at Eneco

# NB-IoT: low power – high efficiency

## NarrowBand IoT communication for smart applications

The Internet of Things poses many challenges to utilities and service providers, safe, reliable and efficient data transfer being undoubtedly one of the hardest. Specially designed for machine-to-machine connectivity, low-power wide area networks (LPWAN) provide a cost-efficient communication infrastructure that combines long range with low energy consumption.

Although operators of telecom infrastructures pursue different strategies in realizing the IoT concept, not all of them adapt equally to the needs of smart grid and smart metering applications.

The new, SIM-based, narrowband radio technology NarrowBand IoT (NB-IoT), standardized by the 3rd Generation Partnership Project 3GPP for deployment in cellular networks, has what it takes to facilitate the most exciting use cases in the energy sector, including smart manufacturing sites and smart homes. Whereas LoRa (long range), another LPWAN technology standardized by the LoRa Alliance, is based on new hardware and the unlicensed (ISM) frequency band, NB-IoT can be operated in GSM networks using the existing hardware. It uses licensed frequency bands for a seamless connection between the base station and a virtually unlimited number of sensors. With a high average data rate of 200 Kbps, a minimal latency as well as a deep indoor coverage and low power consumption, NB-IoT ideally meets the requirements of smart power, gas and water metering – particularly in remote areas with poor mobile coverage and a battery-powered hardware environment. Utilities already using GSM (2G) for data transmission can deploy NB-IoT to significantly improve indoor coverage, thereby ensuring a reliable data flow into remote areas of the house or cellar where meters are typically installed.

“NB-IoT is a more efficient adaptation of traditional communication technologies, which delivers significant benefits across multiple industries,” confirms Alex Lorette, Director Enterprise Telco Solutions at Proximus, the Belgian telecom operator that is currently actively engaged in developing a variety of IoT applications. NB-IoT shows its flexibility when it comes to its data throughput, by enabling sensors to send either a continuous stream of data or simple messages, whatever is best suited to the hardware deployed or the specific use case. Apart from smart metering, these include public street lighting, mobile payments and smart building applications. Business-critical applications relying on a continuous data flow particularly benefit from the increased reliability.

With its specifications frozen in 2016, the technology has already gone far beyond its experimental stage. German-based Deutsche Telekom has already carried out a successful NB-IoT trial in its mobile network – a fully up-and-running commercial NB-IoT smart parking system – and has recently launched the first end-to-end NB-IoT network in Germany, Greece and the Netherlands. Proximus is conducting a trial in 2017, with a view to running LoRa and NB-IoT networks in tandem to serve distinct elements of the Internet of Things market and partnering with Landis+Gyr in developing a NB-IoT solution for a large-scale smart meter rollout in Europe. “From an operator perspective, LoRa and NB-IoT are complementary approaches rather than competing technologies,” sums up Alex Lorette. “From a utility perspective, both allow customers to benefit from better services and a more comprehensive coverage with smart applications. But NB-IoT is now a new kid on the block that, with its unprecedented flexibility, will help utilities and vendors to meet the challenges presented by the Internet of Things in a different way.” ■

### Low-power wide area networks

	LoRa	NB-IoT	GSM (2G)
Data throughput	Messages of 51–250 bytes (up to 200 kbps) and messages	Continuous connection (up to 200 kbps) and messages	Continuous connection (up to 200 kbps) and messages
Energy	Biggest impact is the network quality	Biggest impact are the possible high peaks	Biggest impact are the possible high peaks
Network	Deep indoor coverage (heavily dependent on the density of the network)	Deep indoor coverage (advantage of a reusable network)	Deep indoor coverage (lesser penetration signal)
Connection	Moving objects	Non-moving objects	Real-time moving objects

Source: Proximus

# minimizing risks through the best value approach

how utilities can leverage vendors' expertise in the procurement process



Anneke van Abeelen is Best Value Trainer and co-founder of the Best Value Experts Academy, based in the Netherlands, licensed by Arizona State University Technology Transfer and approved by the creator of the Best Value approach Dr. Dean Kashiwagi.

The comprehensive Best Value concept has the potential to revolutionize the sourcing and project management processes of the energy industry. What has already been successfully applied in construction and IT organizations, means nothing less than a paradigm shift in the fundamental purchasing and project management framework – a focus shift from price to value, from control to performance.

In a procurement process, both clients and vendors face complex tendering procedures and high project failure costs. The Best Value approach aims to mitigate the risks involved and to improve project performance by utilizing the vendors' expertise. The client's decision-making and management, direction and control are replaced with the identification and usage of the vendor's expertise. In our conversation, Best Value Expert Anneke van Abeelen provides insights on how utilities could benefit.

**pathway:** What exactly is Best Value and what distinguishes it from a conventional tendering and project management approach and risk management?

**Anneke van Abeelen:** Best Value and the Performance Information Procurement System (PIPS) are elements of a (procurement) strategy that considers both price and performance. The Best Value approach transfers project control from the client to the expert vendor and thus extends beyond procurement to project and risk management and thus covers the entire supply chain. In a smart metering rollout, for example, the utility will customarily manage and control not only the procurement process, but also the project execution. From the Best Value perspective, it is more cost-efficient for them to focus on identifying and utilizing expertise in the market. Research shows that more than 85% of all project deviations are caused by the

“Best Value Performance is not a purchasing trick or a sales

0  
Pre-qualification

1  
Selection

- Dominant
- Simple
- Differential (non-technical performance measurement)

client's decision-making and micromanaging the vendor. The decision-making processes are simplified by letting the vendors use "dominant information" such as performance track record or other metrics to show they deliver Best Value.

Best Value is about transparency and measurable expertise that helps clients eliminate the liabilities created by micromanagement and decision-making. To put it simply, minimizing thinking mitigates the risk. Vendors, on the other hand, need to start using their expertise, become proactive, have a clear plan that everybody understands, reduce the risk they do not control and measure the performance on their projects. Both vendor and client have to start communicating in terms of metrics.

**pathway:** *What are the benefits of the Best Value approach in respect of efficiency, quality and performance compared to a price-based environment?*

**Anneke van Abeelen:** If vendors are pressured into giving a lower price, this will decrease the overall level of performance. In a Best Value environment, the client identifies his expectations but the final scope and requirements are defined by the Best Value vendor who competes in terms of cost and level of expertise. This will also lead to increased efficiency of the entire supply chain, regardless whether a utility is purchasing hardware technology or Managed Services.

Projects in the Netherlands, like the one with the Dutch Ministry of Infrastructure and Environment, in which the concept of Best Value was first introduced in 2008, have demonstrated promising results. The procurement process was twice as fast compared to conventional tendering, the customer satisfaction level increased to 98%, and the overall project efficiency was significantly higher. What has also emerged in more than 1,400 cross-industry projects so far is that

value and price are not in conflict with each other. In 57% of cases, the best value vendor has also proved to deliver the lowest price.

**pathway:** *How can utility customers adopt the Best Value mindset within their organization?*

**Anneke van Abeelen:** Buy performance, not technology! Use performance information: metrics that are documented and verifiable. And let the expert do the thinking and planning! The vendor can anticipate how the project will end. There are no technical prerequisites or other constraints, the best way to adopt Best Value is to start applying it to the underperforming contracts. The results of those projects should show clear improvements. Building a positive business case on those results will logically lead to further application in procurement and in other areas such as human resource management, and eventually extend to the entire supply chain. ■

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"Best Value is about transparency and measurable expertise that helps eliminate the liabilities created by micro-management and complex decision-making."

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## About the Best Value approach

The Best Value approach is a comprehensive business strategy most commonly used for procurement optimization, utilizing a new procurement model – the Performance Information Procurement System (PIPS). PIPS is a procurement system in which both price and performance are considered in 3 phases and an optional preselection phase. Developed by Dr. Dean Kashiwagi and the Performance Based Studies Research Group (PBSRG) in 1991–2010, it was first applied in construction and IT where high project failure costs lead to a parliamentary inquiry in the Netherlands. This created a sense of urgency to move away from a price-driven industry to a value-driven industry in which the expertise of vendors is being utilized to minimize risk on projects, therefore lowering cost and increasing efficiency.

PIPS is a Best Value structure that is licensed out of Arizona State University. It is based on a foundation of Information Measurement Theory (IMT), and deductive logic.

**gimmick: it is a different method of supply chain collaboration”**

## 2 Clarification

- Clarification
- Technical review
- Detailed technical schedule

## 3 Execution

- Risk management
- Quality control
- Quality assurance

# green news: all about energy



## Record-breaking renewables

Several projects are about to push the boundaries of renewable energy sourcing. In June, turbines for the world's first full-scale floating wind farm have been launched in Scotland. Unlike fixed-bottom turbines, floating farms can be placed in remote areas or steeply shelved coastlines irrespective of water depths or seabed conditions.

In Abu Dhabi, the construction of an independent solar plant with a capacity of 1,177 megawatts has begun. As one of the world's largest solar plants, it will produce enough electricity to power 200,000 homes. Completion is scheduled for the second quarter of 2019.

The drilling of the deepest-ever geothermal well has been completed in Iceland at a depth of 4,659 meters. With temperatures exceeding 400°C, the hot steam at the bottom will provide a source of geothermal energy. The operation took 176 days since the commencement of drilling in August 2016.

Sources: [www.theguardian.com/business/2017/jun/27/hywind-project-scotland-worlds-first-floating-windfarm-norway](http://www.theguardian.com/business/2017/jun/27/hywind-project-scotland-worlds-first-floating-windfarm-norway)  
[www.reuters.com/article/us-abu-dhabi-solar-financing-idUSKBN18K1LG](http://www.reuters.com/article/us-abu-dhabi-solar-financing-idUSKBN18K1LG)  
<https://iddp.is/>

## Energy transition well under way in Europe

As stated in the Second Report on the State of the Energy Union, Europe is on track to reach its 2020 targets for greenhouse gas emissions, energy efficiency and renewable energy. With another €444 million investment from the Connecting Europe Facility (CEF) in some 18 key European energy infrastructure projects, the European Commission will drive the connection of European energy networks, increase security of energy supply, and contribute to sustainable development by integrating renewable energy sources across the EU. A total of €5.35 billion is to be allocated to the trans-European energy infrastructure during the period from 2014 to 2020.



Sources: [www.paneuropeannetworks.com/energy/eu-invests-e444m-in-energy-infrastructure/](http://www.paneuropeannetworks.com/energy/eu-invests-e444m-in-energy-infrastructure/)  
[www.paneuropeannetworks.com/government/eu-energy-transition-well-under-way/](http://www.paneuropeannetworks.com/government/eu-energy-transition-well-under-way/)



## Swiss Energy Strategy 2050

Swiss voters adopted the Energy Strategy 2050 by 58.2% in a referendum at the end of May 2017. The strategy aims to withdraw Switzerland from nuclear power and increase its use of renewable energy sources, including the shutdown of the existing nuclear power plants at the end of their technically safe operating life. The Energy Strategy 2050 will be implemented in phases: the first set of measures focuses on energy efficiency and the development of renewable energies.

Source: [www.bfe.admin.ch/energiestrategie2050/index.html?lang=en](http://www.bfe.admin.ch/energiestrategie2050/index.html?lang=en)

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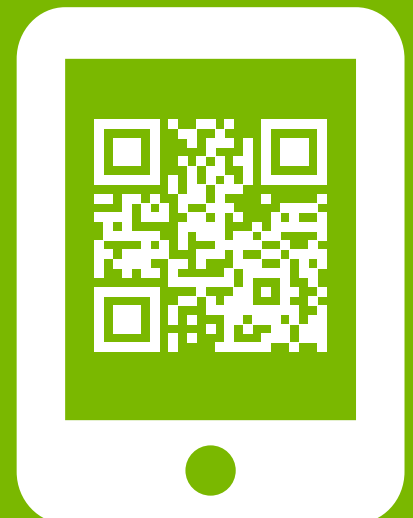
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