



KPMG Global Power & Utilities Conference 2015: Conference report

28–29 October 2015
Madrid, Spain

KPMG Global Energy Institute

kpmg.com/powerconference



Event at a glance

The KPMG Global Power & Utilities Conference is KPMG's premier annual event for Chief Executive Officers, divisional heads and financial executives in the power and utilities sector.

Launched in 2011 in Paris and successfully repeated in 2012 in Vienna, in 2013 in Berlin, in 2014 in London and in 2015 in Madrid, the KPMG Global Power and Utilities Conference is a premier business-to-business industry event for the power and utilities sector.



Goal

The goal of the conference is to provide participants with new insights, tools and strategies to help them manage industry-related issues and challenges. Attendees also have the opportunity to join their peers from leading power and utilities companies to share effective practices and participate in networking activities.

Concept

The conference agenda focuses on strategic, financial, environmental and risk related issues that are top of mind for power and utilities executives. The intensive program consists of keynote presentations by distinguished leaders, issue-focused plenary roundtable discussions and interactive parallel sessions.



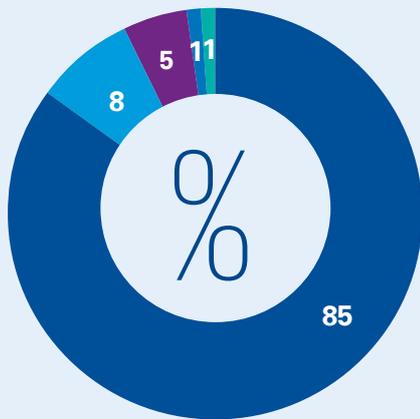
The conference program in numbers

- 2 days conference
- 3 networking events
- 4 industry leading speakers
- 6 plenary sessions
- 5 parallel sessions

Delegate profile

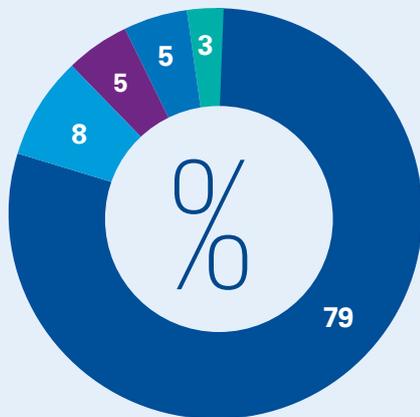
With 210 delegates from 32 countries in attendance, the conference brought together executives from across a broad spectrum of the industry worldwide, including power producers, developers, investors and regulators.

The charts below indicate the cross section of conference delegates by sector and geography.



Sectors:

- Power generation, transmission, distribution
- Governmental, trade and industry associations
- Institutional, industrial, private equity investors
- Water, utility
- Other



Regions:

- Europe
- North America
- Middle East & Africa
- Asia
- South America



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Introduction

We are honored to present this report on the fifth annual **KPMG Global Power & Utilities Conference** held in Madrid, Spain on **28–29 October 2015**.

With 210 delegates from 32 countries in attendance, this leading global forum once again brought together executives from across the industry, including power producers, developers, investors, regulators and other key industry stakeholders.

The conference featured industry-leading speakers from around the world who shared their knowledge and insights about current challenges facing the global power sector, including security of supply, carbon-emission standards and affordability.

The Conference was opened by **John M. Scott**, Deputy Chairman of KPMG International, Chair of KPMG's

EMA region, and Chairman of KPMG in Spain. He discussed volatility in today's energy marketplace, the need for industry transformation, and the opportunities this transformation can provide to energy companies.

Keynote speakers included **José Manuel Barroso, former President of the European Commission and former Prime Minister of Portugal**, as well as **José Manuel Soria, Minister of Industry, Energy and Tourism of Spain**. The two leaders shared their views with the audience about the evolution of the energy sector over the past few years in Europe and Spain respectively.

On the second day of the conference, **Simon Upton, Environment Director at OECD**, delivered a candid and informed address about the challenges related to climate-change

policies. To conclude the Conference, **Miguel Arias Cañete, European Commissioner for Energy and Climate Action**, gave a wide-ranging speech on the energy priorities of the European Union in the years ahead.

During the Conference, six issues-focused plenary sessions included a number of senior executives and industry leaders who shared their thoughts about global environmental challenges; global supply challenges; innovation and technology; rethinking regulation in power & gas; successful business models for renewables; and current trends in energy financing.

We look forward to welcoming you to our upcoming **KPMG Global Power & Utilities Conference 2016 to be held in Brussels, Belgium on 8 November 2016**.



Michael Salcher

Partner, Deal Advisory; Head of Energy & Natural Resources, KPMG in Germany; Head of Power & Utilities EMA



Alberto Martín Rivals

Partner, Head of Energy and Natural Resources, KPMG in Spain

Contents:

8

An industry under transformation

18

Global supply challenges:
The power mix of the future in
the new oil price scenario



10

Global environmental
challenges: Climate change
and emissions reductions



22

Innovation and
technology: The
emergence of the
smart consumer and
the decentralized
energy model



14

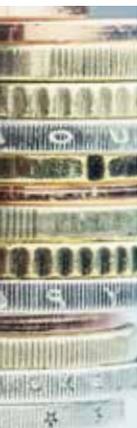
Ensuring economic
sustainability: The case
of Spain



26

Rethinking regulation
in power & gas





30

Successful business models for renewables



34

Trends in energy financing: New energy investors and innovative business models



38

Electricity and climate: Investment and regulatory challenges



46

Looking forward: Brussels 2016'

An Industry under transformation

John M. Scott
Deputy Chairman, KPMG International,
Chair of KPMG's EMA region, Chairman,
KPMG in Spain



In his welcoming speech, Scott observed that we face a time of great volatility in the energy marketplace, a situation that is intimately related to global geopolitics. He explained how energy is fundamental to the future of any economy, and that even if we see significant imbalances, many countries clearly need stronger infrastructure and services from the gas and electricity sectors.

Scott described how China is struggling right now, probably even more than the Western press has indicated. This is having a significant impact in Latin America, as well as the US and Europe. One of the key issues that China faces is the lack of sufficient infrastructure to meet potential demand — an enormous opportunity for Western energy and infrastructure companies. However, China's marketplace has not quite opened up, presenting a challenge for foreign companies wanting to capture that opportunity. In contrast, the US offers both a fairly open market along with a pressing need for infrastructure development.

Another country with the potential for development is India, especially in the area of electric generation. For that development to happen, however, domestic political changes will have to be made.

Scott continued by explaining how geopolitics (probably the most unpredictable factor that all companies struggle with) is having an impact on today's energy prices. He shared the KPMG view that today's market volatility will probably continue for the next two or three years, and will certainly not return to previous levels any time soon.

Scott also pointed to a general consensus these days that global warming is a reality and that actions have to be taken to mitigate the rise of greenhouse gas levels in the atmosphere. He predicted that when 140 countries come together this year in Paris for the Climate Change Conference, they could reach an agreement that would be stronger than Kyoto and, most importantly, would include countries that in the past were not prepared to sign the

Kyoto agreement. He explained how, if structured properly, change can be an enormous opportunity for the energy industry to renew the sources of energy.

As a final point, Scott mentioned the annual survey of CEOs that KPMG conducts globally. This year was not any different, given the environment and new technologies that need and could be applied. The biggest issue concerning CEOs is transformation. Scott emphasized that there is no industry under greater transformation than energy.

"There're lots of countries that need stronger infrastructure and clearly need the services of the gas and electricity sector."

"The question is how does the industry embrace the change and how does the industry take advantage of the change."

"The biggest issue concerning CEOs is transformation. There is no industry that is under greater transformation than the energy industry."

Jose Manuel Barroso
Former President of the European
Commission (2004-2014) and
former Prime Minister of Portugal (2001-2004)



Barroso began his opening address for the Conference by explaining the importance of energy issues when he led the European Commission. These included not only the climate and energy package adopted in 2007 — which was a major breakthrough reinforced further in 2014 — but also the geopolitical crisis triggered by problems in Ukraine when Russia could have cut the supply of energy to large parts of Europe. He also mentioned the disappointments of the 2009 Copenhagen conference that failed to reach many of its goals and other important transformations, many of which occurred after the Fukushima tragedy. These include the surprising reversal of German policy in terms of nuclear, and the growth of shale gas in North America along with its exploitation by the US.

Barroso described how Europe is taking the lead on carbon-emissions reductions. In February 2015, the new European Commission adopted a framework strategy for a resilient energy

union, including a forward-looking climate change policy. The European economy is currently the most carbon-efficient region in the world and the only one that generates more than half of its electricity without producing greenhouse gases. It is particularly successful in decoupling economic growth and greenhouse gas emissions. Barroso argued that if not only Europe but also other key countries like the US and China moved in that direction globally, an effective agreement would be possible. Although the Paris conference would probably not be a revolution, addressing climate change is going to be one of the most important driving forces for energy policy, certainly in Europe and most likely in the rest of world.

Regarding the single European energy market, Barroso stated that significant progress has been achieved although the EU is not yet where it should be. He expressed his frustration to see government resistance in terms of the internal market. There is a lack of strategic thinking in this

matter, given only one third of EU governments have a national strategy planned beyond 2020. According to Barroso, European thinking is very much focused on immediate consumer interests, but energy is a sector where one has to consider long-term security challenges as well.

Regarding energy and geopolitics, Barroso explained how the current low price of oil is partly determined by the desire of Saudi Arabia to maintain a dominant position in the market and by the US commitment to shale gas. According to Barroso, the most likely scenario for oil and gas prices is that volatility will continue and that demand growth will happen at a more sustainable rate than in the past, given that the potential growth of important developing economies has changed, including Russia, Brazil and China. He added that this volatility is not going to be balanced by more positive news from India, because that country is economically smaller than China.

Global environmental challenges

Climate change and emissions reductions

Matti Ruotsala

Chief Operating Officer and
Deputy to CEO, Fortum Corporation

Edward Davey

UK Secretary of State for Energy and
Climate Change from 2012 to 2015

Dariusz Marzec

Vice President of the Management
Board for Development, PGE

Moderated by

Simon Virley CB

Partner and UK Chair, Energy and
Natural Resources, KPMG in the UK



Global environmental challenges: Climate change and emissions reductions

Moderated by Simon Virley and featuring Matti Ruotsala, Edward Davey and Dariusz Marzec, the first discussion panel focused on the key challenges of global emissions reductions.

The Paris Climate Change Conference was just a few weeks away, so the panel explored the role that the power sector has to play in terms of global emissions reductions, the role of different technologies such as nuclear, gas, coal, and renewables; and whether technological breakthroughs could help us with today's global environmental challenges.

Regarding oil and gas, it was pointed out that prices are very low and the markets are functioning very well. The fundamental reason for low oil and gas prices is the oversupply of those commodities. When we take a closer look at the electricity market in Europe behind wholesale price development, we see economic development but also an oversupply of allowances. When we combine that with low coal prices and subsidized renewables, the result is that the wholesale electricity price in most of Europe has crashed. Not surprisingly, equity investors are distancing themselves from shares related to fossil fuels.

“The failure of the ETS CO₂ trading system has led to an instrument that is too powerful not to work well.”

Panelists agreed that policymakers should not make choices on the technologies, so what is needed is a good regulation of the marketplace itself, a clear instrument that will lead to strong decarbonization of the world.

Europe has served as a strong example of that goal by introducing the Emissions Trading System (ETS), which, if working effectively, will give a strong and long-term signal that industries should look to both technology developers and utilities for ways to achieve decarbonization. Europe needs an integrated electricity market. That has not been achieved yet, but it can be achieved.

The panelists explained that electricity used to be an industry sector that was based on an agreement between the generators and the regulators. However, the future is now between consumers and technologies. This leads to questions about the role of utilities in this transformation because the energy system will be based more on decentralized electricity and energy products. At the same time, consumers must be encouraged to participate in the energy market. Utilities companies can do that by playing the role of a centralized power generator. Electric supply must be in balance every second so many services are needed along with various players to keep the system running. Utilities companies can play a very big role in achieving that requirement.

In a review of recent progress for renewable energy, the UK provides a ready example. The government has set clear emission reduction targets until 2050, based on a series of five-year rolling carbon budgets. Renewable electricity use increased from about 5 percent in 2010 to about 25 percent in the last quarter. The UK has taken a technology-neutral approach promoting nuclear, carbon capture storage and of course energy efficiency, but it also promotes interconnection. In the run up to the 2014 package, Britain was a leader. Most of the policies needed for sustainability are the same policies needed for energy security.

The panel also discussed the possibility of setting emissions reductions targets for countries and then letting each country find its own way to reach these targets. The specifics of the economy and those of the energy sector are so different that applying the same regulatory framework, mechanisms, and tools everywhere could be inefficient and impossible to implement. For example, one country might reduce emissions by 30 percent and improve energy efficiency by another 30 percent within five years by installing coal energy units that are environmentally friendly.

“Set the targets of the emissions reductions for the member countries and let the member countries find their own way of reaching those targets.”

Everybody is interested in renewable development, but this is costly. How can the European economy remain competitive in the global market with gas that is three times more expensive and electricity that is twice as expensive? This is a global issue, so it has to be addressed globally. Europe will not succeed in the global marketplace if it is not competitive worldwide in terms of industry and production costs.

The panel underlined the importance that the power sector plays in emissions reductions. Every study shows that reductions are impossible to achieve without the help of this sector. The only thing that utilities and technology companies require is effective mechanisms to set their direction so they remain competitive and clean electricity production forms can survive in the market.

“It’s not about decarbonization but about emission reduction.”

Market mechanisms are the most important way to reduce emissions, the panel agreed. China, South Korea and the US are now adopting some of these mechanisms. As the group of countries that led on this initiative, European countries need to reform the European Union Emissions Trading System (EU ETS). One of the things the European industry agrees on is a need for technology neutrality. In addition, policymakers need to build a political consensus by ensuring that different countries are not necessarily treated in the same way.

Regarding distributed generation, the panel also pointed out that solar panels have decreased in cost by 70 percent over the past three years and are becoming a mass product attractive to the consumer. The role of the utilities is to help the consumer get to this market and receive needed services. This way, the consumer can be part of the system and not off the system.



“Solar panels have seen in three years the cost go down by 70 percent At the same time in 10 years the cost of building nuclear power station has gone up by nearly 400 percent.”

(*) Matti Ruotsala; Edward Davey; Dariusz Marzec. Moderator: Simon Virley CB

Ensuring economic sustainability:

The case of Spain

Jose Manuel Soria

Former Minister of Industry,
Energy and Tourism of Spain from 2011 to 2016





Ensuring economic sustainability: The case of Spain

Jose Manuel Soria
Former Minister of Industry,
Energy and Tourism of Spain from 2011 to 2016

Soria began his speech by sharing some remarks about energy reform in Spain, including observations on the global national reform plan, which the government started just four years ago.

He said that prices had increased by an accumulated average of 80 percent between 2004 and 2012. At the same time, the electric sector had a deficit between revenues and costs of regulated activities of about EUR30 billion. For 2013 alone, the deficit was about EUR10.5 billion.

Spain has also enjoyed some definite strengths. These include a balanced energy mix, a well-developed infrastructure, and a high ratio between generation capacity and energy demand.

“The forecast for the structural deficit was completely unsustainable from the financial and economic point of view.”

Soria also noted that the Spanish gas sector had also faced some problems, such as a deficit of EUR300 million and the lack of an organized gas market. Operations were over the counter and therefore had relatively little transparency. Every part of the economy has been affected by the nation’s global reform process.

He went on to explain that the energy situation in Spain has changed significantly over the past four years. Deficit levels for the electricity sector declined in 2013 and 2014,

and although they still remain high, 2013 marked a change in direction for the industry after 12 years of deficit. In addition, 2015 saw foreign investment in the energy sector increase by over EUR3 billion. As for renewables, recent government auctions amounted to 500 Mw in wind and 200 Mw in biomass over the past year. In 2014, global participation of renewables for primary energy in Spain totaled 17 percent, surpassing announced goals. As a result, renewables in the nation’s energy mix are expected to reach 20 percent by 2020. Recent reform in the gas market has eliminated the deficit, and the government has established by law an organized market. The government has also made a strong bid for increasing energy efficiency with the national efficiency plan.

“The energy reform belongs to the national plan of structural reforms started at the beginning of 2012.”

Soria said that new measures have been implemented over the past four years in the transportation, distribution and retail. These include a new pricing system to better determine prices in the electricity sector. The regulated costs of renewable technologies incentives have been reduced, with profit levels set at 7.5 percent of the cost of the investment. This will also include a gradual change in the remuneration system of all regulated activities, resulting in a 6.5 percent profit, considered a reasonable return.



In hydrocarbons, the government has taken measures to introduce more competitiveness in the wholesale and retail markets, especially in sectors such as construction, infrastructure, industry and transportation. Future plans involve increasing the percentage of renewable technologies while decreasing the global level of emissions.

Out of 12 regasification plants in Europe, seven are located in Spain; so the country has sufficient capacity to import. In fact, With sufficient interconnections, Spain could import about half the amount of Russian gas now coming to Europe through Ukraine. Spain will also continue efforts in prospecting for new reserves in gas and oil.

“In 2014 we had the first surplus in the electricity sector.”



“We have some challenges. The first is to maintain the sustainability of the sector in terms of environmental conditions.”

(*) Jose Manuel Soria, Former Minister of Industry, Energy and Tourism of Spain from x to 2016

Global supply challenges

The power mix of the future in the new oil price scenario

José D. Bogas Gálvez

Chief Executive Officer, Endesa

João Manso Neto

Chief Executive Officer, EDP Renováveis

Peter Smink

Chief Executive and Financial Officer, NUON Energy

Moderated by

Alberto Martín Rivals

Partner, Head of Energy and Natural Resources, KPMG in Spain



Global supply challenges: The power mix of the future in the new oil price scenario

In a panel moderated by Alberto Martin Rivals including José Bogas, Joao Manso Neto and Peter Smink, discussion focused on an analysis of global supply challenges and future power mix scenarios.

What is going to happen next after the Paris conference? That is the big question energy leaders are asking themselves, according to the panelists. It is one thing to say that everyone wants to achieve a certain level of carbon reduction but quite another to explain how this will be done. The electricity sector is going to have a big influence both because a large amount of the emissions in the world are linked to this sector and also because it has the capacity and the flexibility to achieve high levels of reduction.

One panelist pointed out that the competitiveness of any technology, be it renewables, nuclear, coal or gas, cannot be assessed by comparing them with the spot market for energy. The spot market does not pay for debt and will give less and less signs of investment. So, if we move away from this misconception, and we look at real competitiveness (meaning the full costs), mature tech renewables such as onshore wind are clearly competitive, even with the current oil prices of about US\$40 to 60 dollars. In recent years the industry has been able to reduce the full costs by about 5 percent per annum. In the future, this reduction may not be 5 percent but more like 2.5 to 3 percent, but progress is being made. And what is happening today in wind onshore is beginning to happen more and more in solar photovoltaic panels (PV). As for offshore wind, panelists noted significant decreases in costs. The problem is that in many places in Europe, stakeholders have not yet understood that the only way to incentivize investments is through long-term agreements with long-term prices, established through market mechanisms like options. These developments have already occurred in Brazil, South Africa and the US.

“Even at gas prices of about two dollars as we have today, in places where we have 50 percent load factors, renewables are competitive.”

What is clear according to the panelists, is that Europe will have a low CO₂ emission economy and system in the future. This means that from now until 2030, the industry will see a gradual shutdown of coal power plants with no plants functioning after 2040. This transition involves several issues. First of all, coal is largely imported but also mined domestically and remains a cheaper energy source than combined cycles. This means that the change or the shutdown of all the coal power plants will increase the pool prices. The second issue is that the industry lacks a long-term price signal if all the coal power plants are shut down. By 2020 or 2021, Europe could face a capacity deficit instead of excess capacity. If the decision is made to maintain just some of the plants, something like a capacity payment is needed.

“In the European Union we have fixed a target for the year 2030, where we are obliged to reduce CO₂ emissions by 40 percent. Within this framework it would be very difficult to maintain coal in the future.”

The International Energy Agency has found that if we take the 2 centigrade increase in temperature over the next few years seriously, then nuclear power plants should have an important role. In particular, the 6.6 percent participation in the current energy mix (based on 2013 data) should be increased to at least 17 percent by 2050. In EU countries, that means that the nuclear participation in the energy mix will stabilize at around 20 to 25 percent from the current 26.9 percent. If we add the Chinese and the Indian projects that are already either signed or likely to be implemented, then the Chinese and Indian fleet together in 2040 will be bigger than the current US and European fleet together. Regarding the technology itself, it is unfortunately very CAPEX intensive and especially after the Fukushima accident, many issues still need to be resolved. As a result, the investment has become much more expensive than in the past, even though the OPEX is relatively cheap compared to the other technologies. This means we need to keep an eye on the competitiveness issue because the costs are high and such an investment is for 50 to 60 years. Therefore, the decision has to be



“We have the chance to show the clients that what they are doing might not be cost efficient compared to centralized generation.”

(*) José D. Bogas Gálvez; João Manso Neto; Peter Smink. Moderator: Alberto Martín Rivals

carefully considered. Overall, nuclear technology can be competitive, although there is high cost pressures, mainly on the CAPEX side. But in countries that are poor in primary energy resources and definitely want to meet CO₂ emissions targets, then nuclear is an attractive choice for the future.

Technical progress has also been very solid in PV, so decentralized PV systems have seen a substantial decrease in costs. Significant progress has been made in storage — a known issue — and decentralized PV is clearly going to be a very important part of the solution. However the panelists raised some caveats. One is that total disconnection from the grid is possible but extremely expensive. Marginal benefits decrease significantly as the system reduces its reliance on the grid, so total disconnection from the grid is technically possible but very costly. On the other hand, when the competitiveness of decentralized PV is being considered, the comparison is not the cost of this technology with other technologies, but the cost of this technology with the cost that the client pays to the grid, including all the backups and policy instruments. As a result, today’s

major expansion in decentralized PV has a lot to do with the huge subsidization derived from this effect.

“If we are serious about the 80 percent decrease in CO₂ emissions, then obviously we cannot do it without nuclear power plants.”

Another consideration regarding PV is that end consumers love to be self-supplying in power and heat, so distributed generation continues to exist. The big utilities companies still take little note of PV because in the past the utilities were living a happy life where their product was always in demand and they could sell more and more and the prices were going up. Now the issue is completely different. What will be important in this respect is that utilities companies apply more and more IT solutions, namely to manage the matching of demand and production in the future.

“The level of penetration of decentralized PV will more or less depend on what level of subsidization the government and the (regulators) want to provide.”

Innovation and technology

The emergence of the smart consumer and the decentralized energy model

Pablo A. Vegas

President and Chief Operating Officer AEP Ohio

Rosie McGlynn

Head of Smart Energy and Networks Programme,
Energy UK

Roberto Zangrandi

Special Sdvisor at EDSO for Smart Grids

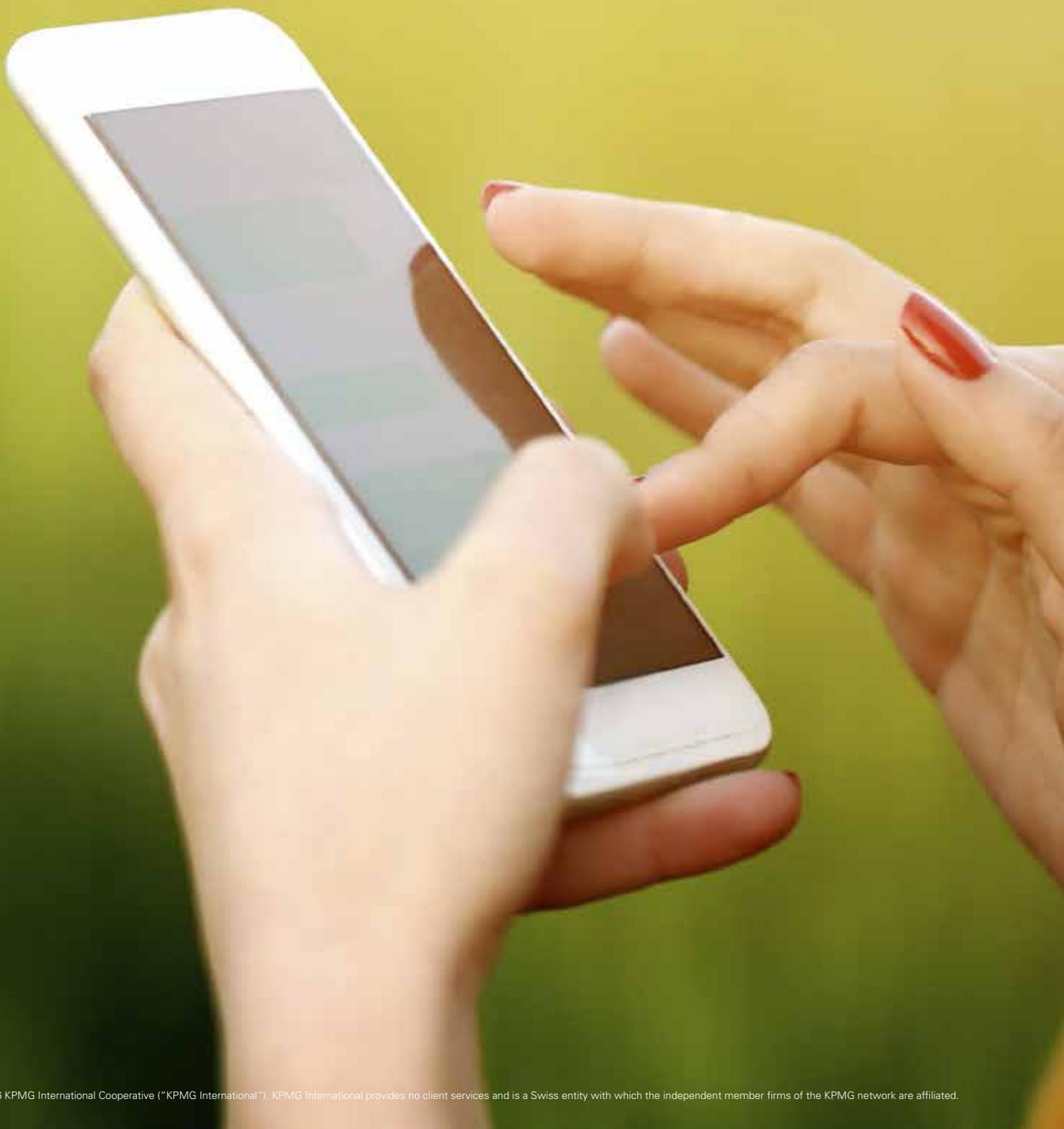
Simon Hill

Vice President for EMEA, Opower

Moderated by

Michael Salcher

Partner, Deal Advisory; Head of Energy &
Natural Resources, KPMG in Germany;
Head of Power & Utilities EMA



Innovation and technology: The emergence of the smart consumer and the decentralized energy model

The third panel included Pablo Vegas, Rosie McGlynn, Roberto Zangrandi and Simon Hill, with the discussion moderated by Michael Salcher.

The panelists began by pointing out that customers are now in the middle of all strategic initiatives. This has basically two impacts. One is the battle about customers. But also, customers are threatening the traditional industry business by being more energy efficient and self-producing.

One example of a customer-centric program is the UK roll-out of smart meters. Led by the government, the program has reached out to 26 million households, replacing approximately 53 million meters. This has resulted in a huge transformation and an amazing opportunity for suppliers to rebuild trust with consumers.

“What smart meters give is the opportunity to effectively provide energy literacy”

For the first time customers will be able to see in pounds and pence exactly how much electricity they’re using in their home. The evidence from the smart meter roll-outs that have been carried out so far is that trust in energy companies increases significantly. So the industry is moving from a passive relationship where customers engage with their energy company to talk about their bills in what might be a negative way, to a positive pro-active dialogue, where customers understand how much they are using and therefore want to get advice and tips about how to use their energy better.

The US has, in effect, 50 different energy policies under no consistent federal energy policy related to areas like the smart grid and basic supply investment decisions. In the early adoption states, there was a rapid roll-out of the smart grid. But there was not necessarily a lot of customer interest in participating in things like time-of-use rates. Because price elasticity was so broad, very significant changes in the price to the consumer were required before behaviors would change.

US companies realized very quickly that they had to reconsider how the smart grid investments were going to be made. Accordingly, they started shifting more into investments that have direct cost benefits for the distribution operators, like distribution automation and circuitry configuration. From a reliability perspective, significant advancements can be made in terms of a self-healing grid using automation in the grid. For example, technologies like voltage optimization incorporates voltage regulators in a distribution circuit that consistently reduces energy use by 2 to 3 percent while still ensuring that the right voltage arrives at the end of the circuit.

Panelists also stressed the importance of a smarter grid. Even though customers may not be excited about being able to decide when they are going to run a high-energy use appliance in their home or make a significant change in their heating and cooling, they will eventually enjoy a number of distributed supply options that are going to be rolling out and become more prevalent in the coming years.

By having normal energy use levels to benchmark for comparisons, consumers now have an understanding of their usage for the first time. That in itself typically drives something in the region of two to three percent of energy efficiency. It is also attractive to the energy companies because it has an impact on their customer engagement.

Typically, the smart meter is able to drive down cost-to-serve, reduce customer churn, improve net promoter scores and supports the cross-sell of services.

We followed what I believe was this hype curve for smart meters and the smart grid, but our consumers were asking, “What’s the big deal?”

Today, the residential customer is king, or queen. Indeed having a solid relationship with that customer is fundamental to retail energy companies.

Every smart meter has an IP identification number. Actually, smart metering is one of the first steps in the Internet of Things. Based on developments by distribution system operators (DSOs) and technology companies, smart meters will be at the convergence of internet capabilities and electric distribution. The next step is to add optical fiber and internet access capacity to the smart meters. This is going to bring a revolution in the distributors' business model that goes beyond the current studies.

“Today we see one of our biggest energy companies in the UK starting to sell telco services, fixed line and broadband.”

However, a gap continues to exist between the evolution of technology and the evolution of regulation around smart meter data. This gap will be the most important

obstacle to a faster development of new business models for DSOs. Smart meters produce valuable data that explains a great deal about customer energy usage. The data also allows the DSO to balance charges and optimize alignment between the grid and electricity production. For DSOs, transmission system operators (TSOs) and national regulation authorities, the ownership of this data and data hubs remains a major topic of conversation.

What is important from a policy and regulatory point of view is allowing flexibility and innovation. The UK has a very interesting approach called RIIO, a framework for setting price controls for network companies. RIIO has been encouraging network companies to look at things like self-healing grids. With an innovative regulatory framework that rewards technology innovation, new market actors will arrive and start to disrupt the market.

“Electricity is not certainly going to enjoy the killer application that the apps did develop on the smart phones but we are not far from that.”



(*) Pablo A. Vegas; Rosie McGlynn; Roberto Zangrandi; Simon Hill. Moderator: Michael Salter

Rethinking regulation in power & gas

Dr. Yoshitsugu Kanemoto

President, Organization for Cross-regional
Coordination of Transmission Operators (OCCTO)

Miguel Sebastián Gascón

Former Minister of Industry and Energy of
Spain between 2008 and 2011

Julio Castro

Chief Regulatory Officer, Iberdrola

Moderated by

Alistair Buchanan

Partner and Chairman,
Power & Utilities Practice, KPMG in the UK





Rethinking regulation in power & gas

This session, moderated by Alistair Buchanan and including Dr. Yoshitsugu Kamemoto, Miguel Sebastian and Julio Castro, began with what is considered to be a good example of how to rethink regulations. It's about a regulatory model in the UK called RIIO that has been copied and very closely watched by other countries around the world.

Policy makers in the UK wanted much more innovation coming out of the network companies, with a specific focus on local solutions that use smart technology. In addition, the regulators wanted both incentives for the energy companies and an increase in customer involvement. The old formulas were simply not working. With RIIO, the revenues of a regulated company are derived from monies available, through incentives and innovation, and through the delivery of outputs. The initial results have been very promising. Underperformance is being exposed and innovation is supporting industry transformation. Equally important, the regulatory relationship between the government and the companies is much better. With the emphasis on output measures, energy companies are now focused on their customers like never before.

“Rethinking regulation through the RIIO model in the UK has forced the network companies to reconnect with their customers.”

The panelists agreed that for effective regulation in the future, energy must be taken seriously and that involves focusing on two pillars that are compatible. One is energy independence, and the other is electrification. Electrification is good for the sustainable goals and good for energy independence, although it requires electricity supplied by renewables. This is especially the case for Spain where there is a small demand for electricity and a huge supply capacity. Continued electrification will increase the demand, helping to reduce the average power and regulatory costs, which are currently a heavy burden on consumers.

Another example of rethinking regulation involves Japan after the Fukushima accident. Energy politics has changed significantly and there is now a strong impetus for a second stage of deregulation. Security of supply through cross-regional connections has become a focus of many discussions. The first step in deregulation was to establish the Organization for Cross-regional Coordination of Transmission Operators (OCCTO), and the second step will come next April, a full liberalization including family households. By 2020 there will be a legal unbundling. Japan made the same mistake as Spain in the introduction of feed-in tariffs. There has been a rapid increase in solar energy and that is a risk for reliability. Most of the renewables are introduced at the end of the Japanese islands, in Kyushu and Shikoku, and there are a lot of solar farms in Hokkaido and Tohoku, but most of the demand is in the central area that includes Tokyo, Chibu and Kansai. Strengthening these interconnecting lines will therefore help Japan to increase its supply of renewable energy.

The traditional paradigm of competitiveness, sustainability and security of supply needs to be changed when considering the key drivers of our sector. First of all, the customer is king and deal maker these days, with the ability to choose supply from the grid or self-generation. In addition, price-responsive demand provides a certain level of quality in supply. Secondly, the networks, grids and power hubs make all supply and generation choices more apparent. In reality, the grids now have much more value than ever. The third key driver involves climate change and steps required to limit the rise of carbon emissions.

“Our very preliminary simulation shows that even with current interconnecting lines, if we make full use of them, we could incorporate much more solar and wind energy than currently.”



In the last three years, these industry drivers have resulted in many changes across the energy value chain, including demand reduction that has led to high prices and in some cases to overcapacity. At the same time, self-generation is becoming more attractive because of lower solar panel prices as well as increased charges by utilities for electricity. Smart metering is making customers more engaged, and climate action targets are encouraging a huge deployment of renewable energy.

An opportunistic approach can be taken with regulation. Many think that nothing needs to be done over the long-term, given today's reserve margins. But this approach

lasts only a very short time. One only has to consider Belgium with their power shortages and load shedding, which is unbelievable under the blue flag of Europe.

Rethinking regulation, means encouraging a fair allocation of costs between integrated and distributed resources. It also means preserving the value of the grids. Grids are the core of the future evolution of the sector. In addition, industry stakeholders should work together in launching a long-term view on decarbonization with contributions from all sectors. Those polluting are those that should be paying. A new market design is a must, given the high penetration of renewable energy.



“The elaborate pricing arising from non-despatchable energies require a price stabilizing mechanism for renewable sources the power system itself needs the back up of a capacity mechanism.”

(*) Dr. Yoshitsugu Kanemoto; Miguel Sebastián Gascón; Julio Castro. Moderator: Alistair Buchanan

Successful business models for renewables

Paul van Son

Chairman RWE MENA & Turkey and CEO Dii

Rafael Mateo

Chief Executive Officer, Acciona Energy

Santiago Seage

Chief Executive Officer, Abengoa

Brent Cheshire

Country Chariman and Managing Director,
DONG Energy UK

Moderated by

Antonio Hernández García

Partner, KPMG in Spain



Successful business models for renewables

This panel discussion was moderated by Antonio Hernandez and included Paul Van Son, Rafael Mateo, Santiago Seage and Brent Cheshire.

Talking about renewables is to think about many challenges. The first challenge is related to technology. Renewables deployment has definitely taken advantage of learning curves. In recent years, costs have been reduced by around 70 percent for PV models and 30 percent for wind turbines. The second relevant challenge is regulation, including the importance of transparency and predictability.

“There are some projections from the Hofer Institute that in 2050 probably the cost of PV will be something between 20 and 30 dollars per MWh.”

Today's media savvy consumer is the third challenge. Consumers are much more active now because they have much more technology to help them be active. The fourth challenge involves huge investment needs. These will total almost US\$ 8 trillion between now and 2040, at an annual rate of close to US\$ 270 billion.

Renewables are no longer an emerging technology. The future in the world in terms of new capacity will be renewables. In 2014, US\$ 250 billion was invested in renewables, half in PV, half in onshore wind. For the first time, the investment in new capacity for renewables is higher than new capacity investment for conventional energy sources. The whole PV industry has increased its capacity, moving factories from the US and Europe to China and Asia, reducing costs and increasing efficiency. In recent years, this move has reduced the levelized cost of the technology by four or five times. The same developments are seen in the wind industry. Wind manufacturers are today increasing their capacity and moving their assembly lines to new countries.

These trends are expected to continue in the future. Driven by a huge amount of investment, R&D is expected

to result in one additional point of levelized cost of energy (LCOE) reduction each year in wind and two points in PV.

Regarding offshore wind, the costs have been dramatically reduced by a government-created pipeline that has caught the imagination of the supply chain. In addition, a viable offshore wind business needs to be supported by leveraging the benefits of bigger turbines.

There has been a very clear and transparent development pipeline in the UK based on renewable obligation certificates. Along with the Final Investment Decision Enabling (FIDE) for Renewables regime, the transition to an auction model has been quite smooth and predictable. Germany has also had some clear regulatory systems that investors could support.

“There was a lot of dialogue with Siemens at the time to build a 3.6 megawatt turbine. They said, ‘We’ll only build one if you buy 500.’”

Learning rates for offshore wind have reached 16 percent. Between 2012 and 2020, the cost might come down by 40 percent. Projects under FIDE in 2020 could be delivered at EUR100 per MWh.

Less successful models have also been tried. Seven years ago, a new directive allowed trade between countries in Europe or at least to bring renewable power from one company or country to another, and then to count it for regulatory targets. There was also an addition to include northern Africa if a physical connection were put in place. The idea was to make use of renewable energy produced in northern Africa for the targets in Europe. That was the basic idea of energy from the deserts. After many years, the promoters did not manage to make this happen. The plan was too complicated and involved many legal aspects. Europe had an excess of capacity for many reasons and in northern Africa there was a shortage in general. Very soon it became obvious that energy from the desert would not be coming to Europe in the next 10 or 20 years.

The issue now is how to finance the huge amounts of renewables that are being built every year worldwide. The industry is also going through a tremendous transformation as it moves toward a model where there is a decoupling between the owner of the assets in the first phases and the owners of the assets in the long term.

“The European market could be enriched with a stronger trade facility for green electricity.”

Developers and construction companies are leading the first part of this transformation. Infrastructure funds have seen enormous growth in the last few years, being the natural holders of assets. Utilities are now making new investments in technologies and becoming long-term holders of assets as well.

Sovereign and pension funds are completely disintermediating the investment chain and today pension funds want to own assets directly. Once that happens,

pension funds, sovereign funds and the cheapest money will be ready to invest directly without needing, in many cases, infrastructure funds or other players in between. Investors would have access to lower, long-term sources of capita. As a result, investors would in many cases need to choose where to play — whether in development and construction in the early years of operation or as a long-term owner.

There’s a big debate regarding which is the cheapest source of capital in the long-term. YieldCos will continue playing a role and pension funds, sovereign funds and cheap money will play a very important role as well.

From a debt point of view, everything has changed as well. Project finance was the only option 10 years ago. Today that option exists but together with that we have access to totally new ways of financing, including project bonds of many forms as well as access to cheap equity that can play the role that debt used to play.

“In the next few years the challenge is whether we can continue finding enough cheap money now that the technologies, have been more commoditised.”



(*) Paul van Son; Rafael Mateo; Santiago Seage; Brent Cheshire. Moderator: Antonio Hernández García

Trends in energy financing



New energy investors and innovative business models

Gordon Parsons

Senior Managing Director, Macquarie Infrastructure and
Real Assets (Europe) Limited

Juan Romero Izquierdo

Director of Mergers and Acquisitions Execution, Iberdrola

David Swindin

Managing Director and Head of EMEA, Cubico
Sustainable Investments Limited

Moderated by

Darryl Murphy

Partner, KPMG in the UK





Trends in energy financing: New energy investors and innovative business models

The final panel discussion brought together Gordon Parsons, Juan Romero and Daniel Swindin, with Darryl Murphy serving as moderator.

According to the International Atomic Energy Agency (IAEA), US\$ 16 trillion will be invested in the global energy sector over the next 20 years, of which US\$ 2 trillion will be invested in Europe to support an ageing power infrastructure and compliance with low-carbon regulations.

In jurisdictions where the regulatory environment creates a stable, long-term environment, capital is available. That is particularly true for regulated utilities and transportation assets. For the renewable space, capital is also available based on a long-term government commitment accompanied by a proper dialogue with the public about subsidy levels. Access to capital is more limited in the merchant space.

With additional financing alternatives, the possibility of getting partners is more and more likely. The interest in the energy sector is growing, perceptions about risk in the sector are more informed, and infrastructure funds are more willing now to invest in energy.

“I think we don’t play very much with the utilities, frankly, because they want passive capital and that’s not our role.”

What is very important is to get a partner that gets involved and works well with others. Accounting helps clarify what a certain partner can do and cannot do. To consolidate an asset, certain criteria must be met. Sometimes this goes against what the partner wants. One partner should not oppose what the other is planning to do.

“We’re trying to make sure that there are people who bring expertise, who can challenge management, work with management, and support management.”

Investors are not management specialists. They have to get the right management team and have to work closely with that management team.

There are many business professionals who just deploy capital and hope the investment is a success. They do not support management, help management or bring any value to the investment. The market is moving away from that model and moving toward a model where a sophisticated intermediary can approach very large players. A fairly sizeable segment of the investment community is very focused on yield as well as returns, so they want immediate cash flow. For early-stage greenfield projects, the business needs to be built before investors start earning money, so the time period for a return on investment is longer. There might be less money made initially, but the investment can be better in the long run.



Construction risk is not necessarily the thing that worries investors. What worries them is the longevity of returns and the stability of government policy. For certain sectors, that involves transportation assets and renewable assets. There is always financing for good projects and healthy sponsors.

Generally debt markets are becoming more sophisticated. Lots of lenders and investors were burned during the financial crisis, and they are thinking about these things in

a different way. It's a much more challenging conversation, apart from those markets that are supported by long-term government policies.

During the last three years, debt was becoming cheaper and cheaper. But recently, both the mid-swap and the spread are widening, affecting bonds issued at 1.9 percent. Everything has rallied in terms of interest rates. The funding has become more expensive, and today's investors do not like going beyond 10 years.



“The only projects we’ve ever had problems with have been those where the government has changed the laws.”

(*) Gordon Parsons; Juan Romero Izquierdo; David Swindin. Moderator: Darryl Murphy

Electricity and climate

Investment and regulatory challenges

Simon Upton

Environment Director, Organisation for Economic
Cooperation & Development (OECD)

Fuse together

Miguel Arias Cañete

European Commissioner for Energy and Climate Action



Electricity and climate: Investment and regulatory challenges

The second and last day of the Conference was opened and closed respectively by Simon Upton, Environmental Director at OECD and Miguel Arias Cañete, European Commissioner for Energy and Climate action. They shared their views on electricity and climate.

When governments started worrying about climate change about twenty five years ago, it seemed to be a long-term problem for which there was plenty of time to find a solution. Now it is clear that the world is rapidly running out of time.

There are a lot of policy makers and industry leaders who talk quite comfortably about the fact that there is a big role yet to play for fossil fuel. Transitionally, that is correct, but little time is left to start making a serious transition unless a significant amount of new investment is left stranded.

There will be good opportunities for those who have prepared for the transition. Dynamic firms that seize new market opportunities and deploy new technologies may in fact gain from more stringent environmental policies, boosting short-term economic growth.

“If governments continue to defer taking decisive steps in the short term, the rising costs of climatic disruption are likely at some future point to cause them to act, at which point there is a risk they will trigger an even larger dislocation in trying to head off even higher climate impacts.”

Climate policies need to be strong, transparent and predictable. They start with a price on carbon and also help eliminate all subsidies for both consumers and producers of fossil fuel.

Governments need to address the reality that many of our regulations and our institutions were designed to support a fossil fuel economy. If they are left unchanged, even very

ambitious climate policies will be less effective and more costly to implement.

More technical means are available that are economically within reach to decarbonize the power sector than any other sector of the economy. A key question is whether electricity regulation and markets are designed in such a way that carbon constraints such as a carbon price or the EU ETS are actually reflected in investment and operational decisions.

The electricity markets were created in the 1990s and were geared to drive competition, minimize costs and optimize near-term power supply. But the impact of competition on these markets is challenging from the perspective of low-carbon technologies. Without a change in market design, the decarbonization of electricity will be at best more costly and at worst, impossible. Targeted technology support is one way around the problem, but a more fundamental approach should be to ask whether market arrangements should be reformed.

A carbon price is the best and most basic policy. Beyond that, the market has to send the right investment signals. There is no general model, but there are options being tested in countries like Brazil and South Africa. The priority should always be the enablement of a fossil fuel phase-out through better system integration and storage capacity.

Technology and overall efficiency also open new demand-side possibilities. A possible game changer is the availability of cheap electricity storage that could facilitate the integration of variable renewables. The grid remains a strategic asset. The challenge for governments will be to ensure that its operation, regulation and revenue model are adapted to the more decentralized and multi-directional world of the future.

“Success in the reform of this regulatory system is essential to achieve the decarbonization transition without imposing excessive costs.”



“When it comes to tackling climate change, the policy of being too cautious is the greatest risk of all.”

(*) Simon Upton, Environment Director, Organisation for Economic Cooperation & Development (OECD)

As a result, some combination of technological change and regulatory reform will determine the future of the power sector. Whether governments adequately manage the transition will determine whether we see an orderly reallocation of capital or a protracted and potentially costly regulatory battle between incumbents and new technologies.

The power sector is undergoing one of its most profound changes in history. With the liberalization of the energy industry, climate and energy targets can be set, and with new technologies, the sector can move toward a more decentralized, sustainable and smarter power system.

“Technology, science, consumer behavior and industry have all moved on and so of course has the fight against climate change.”

Europe now has the most ambitious climate and energy targets ever implemented. By 2030, countries need to cut emissions by 40 percent, improve energy efficiency by at least 27 percent, and ensure a minimum 27 percent share of renewables in the energy system. But the greatest changes could be in the future. Three energy initiatives can help promote open markets, cross-border trade, wholesale trade and greater competition.

Firstly, decarbonizing the economy to meet Europe’s climate objectives must create new market opportunities, including a modernization of the emission trading schemes. Secondly, the internal energy market must be

updated and the infrastructure that goes with it. And lastly, an investment climate must be created to support the first two initiatives.

In July, a revision of the EU ETS was presented to help ensure the level of emissions. The aim was not only about cutting emissions just for the sake of reaching targets. The EU ETS is an industrial policy that Europe needs to decarbonize its economy. Accordingly, changes were proposed in three key areas. First, more targeted rules for the free allocation of emission allowances would be put in place. Second, the pace of emissions cuts after 2020 would accelerate, with an annual cap of 2.2 instead of 1.74. Third, funding for low-carbon innovation and energy-sector modernization would increase.

As the European Environment Agency recently announced, Europe has cut emissions by 23 percent since 1990, while the regional economy grew by 46 percent. That shows that economic growth can go hand in hand with emissions reductions.

Some sectors are at risk of losing international competitiveness and being exposed to the risks of carbon leakage, so a significant share of allowances will be optional throughout this decade. The rest of the allowances will be allocated for free to companies operating in the EU that are at risk of carbon leakage.

“The argument that economic growth and cutting emissions are incompatible is incorrect.”



“Investment in infrastructure is central to Europe’s competitiveness and security of supply.”

(*) Miguel Arias Cañete, European Commissioner for Energy and Climate Action

The energy market and its infrastructure has to keep pace with the transition toward a decarbonized economy. Our energy systems have always relied on flexibility due to variable demand and unforeseen events. But now that need is growing quickly, especially with the increase in wind and solar energy. The first priority is making sure that renewable energy is fully integrated in the market. This also means ensuring that this type of generation plays according to the normal market rules. It is unthinkable to have technologies representing half of the electricity market that are exempt from key principles. This includes further adaptation and the possible phasing out of subsidies for new renewable investment while still ensuring investors’ confidence.

As a result, the merits of renewable-capacity remuneration mechanisms are being outlined, with a new framework being proposed based on three principles. First, ensure that all EU countries should take into account the internal market and their neighbors when assessing their own generation adequacy. Second, ensure that when such mechanisms are introduced, they are open to participation across borders. Third, make sure that the number of mechanisms is not too large or confusing for consumers. If so, these mechanisms should be limited to one or two types. As part of a new consumer-centric market, consumers need easier access to information and supply options in the market, thereby making it easier for them to switch to better deals. Below-cost price regulation

needs to be phased out because it prevents competition and is one of the greatest single factors contributing to retail market fragmentation. Consumers need to be empowered so that they can become active market players by generating their own energy. All these changes will require the deployment of smart technologies and meters that are key to the modernization of today’s energy needs. Proper interconnection is needed for an energy market where energy can flow across borders and competition is encouraged. A big step toward that goal was made with the 10 percent electricity interconnection target. Support continues for interconnection projects through funds totaling EUR 5.35 billion from the Connecting Europe Facility. However, public money alone is not enough. Private investment needs to be leveraged through public support. That is the thinking behind the European Fund for Strategic Investments.

“The revised emission trading system will pave the way for a sustainable and competitive energy transition right across Europe.”

Here is the bottom line. Individuals, industry and institutions need to make sure that they are pulling in the same direction. The energy union is the vehicle to facilitate that. It is there to ensure that the energy that our economy needs is available at a competitive, affordable price without damaging our climate.



If you have further questions relating to the topics discussed at the KPMG Global Power & Utilities Conference 2015, please do not hesitate to contact the chairmen or the moderators of the conference.

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Roundtable 4: Rethinking regulation in power & gas



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Roundtable 5: Successful business for renewables



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Roundtable 6: Trends in energy financing



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KPMG member firm's 13 Power & Utilities Centers



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Our **business model** enables deep **industry experts** to work side by side with **business leaders** to develop forward-thinking strategies using highly **specialized teams** tailored to the **specific business needs** of clients.

Looking forward: Brussels 2016

We are pleased to announce that the 6th Annual **KPMG Global Power & Utilities Conference** is open for registration.

This year, there will be no registration fee for the conference. We continue to have a strong agenda built into 1 day, providing you access to industry luminaries, networking opportunities, knowledge sharing and market insight.

Why should you join? Our conference will be held in a "from industry to industry"-format. Our panelists represent major industry players shaping the industry and provide not only valuable insights into the rapid changing European markets but also transfer these insights to the markets outside of Europe. This conference gives a unique opportunity to get in contact with managers driving strategies to empower their markets.

Amongst others, our guests from abroad will learn about latest developments in regulation and the European investment environment. We will also focus on strategies of energy players towards growth countries – which will lead to a win to win-situation.

KPMG's 6th Annual Global Power & Utilities Conference will take place 8 November at "The Square" in Brussels, Belgium. The city of Brussels is an ideal location, being a daily meeting place of international industry representatives and taking stage as the place where the framework for the future European energy and climate policies is being set. We anticipate over 20 speakers and 200 senior executives from the global power and utilities industry.

Register now to join other senior energy executives and luminaries to take a global view on a moving sector, share ideas and gain insights on the current issues and emerging challenges that are transforming the energy industry.

More information will be shared as the conference approaches. In case of any questions please feel free to contact energyema@kpmg.com. Please continue to visit www.kpmg.com/powerconference. We look forward to welcoming you to the conference and to seeing you in Brussels in November.

Keynote discussions:

- The European Energy Union
Jos Delbeke, Director-General for Climate Action at the European Commission
- Key challenges for Engie
Sergio Val, Deputy Chief Financial Officer, Engie
- Systems of intelligence – an invisible revolution is coming
Ulrich Homann, Partner Architect, C&E Engineering, Microsoft

Roundtable discussions:

- View on regulatory frameworks for low carbon energy
- View on power generation
- View on digitalization and new business models
- View on international growth markets

Some of the companies attending include:

50Hertz	IREN
Chorus Clean Energy	JERA
Cognitive automation	Northstar Solar
Dong Energy	OFGEM
Endesa	PSE Poland
Engie Benelux	Tennet TSO GmbH
European Investment Bank	Tepco
Gamesa	Vattenfal Germany
Iberdrola Group	



**For more information about the KPMG Global Power & Utilities Conference visit the conference website:
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If you have any queries regarding the event, please contact the organizing team at gpc@kpmg.com

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Publication name: KPMG Global Power & Utilities Conference 2015: Conference report

Publication number: 133733-G

Publication date: September 2016