

KPMG GLOBAL ENERGY INSTITUTE

KPMG Global Power & Utilities Conference 2013: Conference Report

27–28 November 2013
Berlin, Germany

kpmg.com/powerconference



Overview

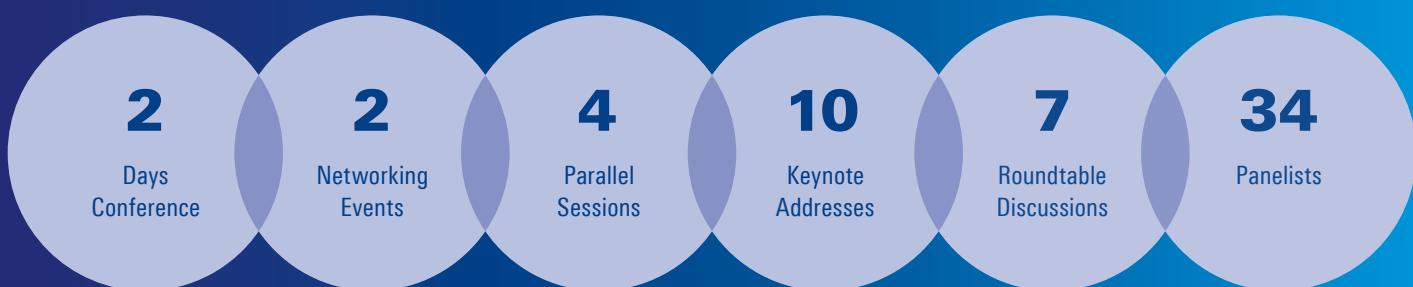
The KPMG Global Power & Utilities Conference is KPMG's premier annual event for CEOs, divisional heads and financial executives in the power and utilities sector.

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 two days program consists of keynote presentations by distinguished leaders, issue-focused plenary roundtable discussions and interactive parallel sessions.

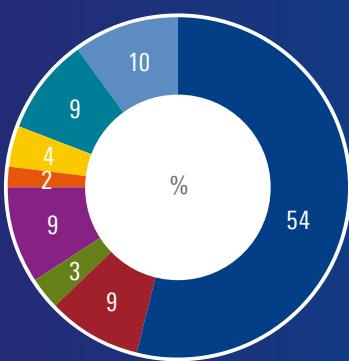


Delegate profile

Our inaugural conference held first in Paris in 2011, second in Vienna in 2012 and third in Berlin in 2013 brought together 250+ executives of power producers, developers, investors, regulators and other industry stakeholders from over 40 countries around the world.

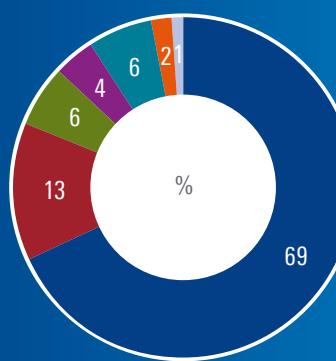
The charts below indicate a typical cross section of conference delegates by sector and geography.

Sectors



- Power generation, transmission, distribution
- Governmental, trade and industry associations
- Technology, engineering suppliers
- Institutional, industrial, private equity investors
- Oil & Gas
- Water, utility
- Media
- Other

Regions



- Europe
- UK & Ireland
- North America
- Middle East & Africa
- Asia
- South America
- Australia & South Pacific

Introduction

It is with great honor that we can present to you this summary of the third annual KPMG Global Power & Utilities Conference, our leading global forum for peer-to-peer discussions on the strategic, financial, operational, environmental and risk related issues shaping the sector.

In 2013 held in Berlin, the capital of Germany, the 2013 conference featured over sixty distinguished speakers from all around the globe, addressing delegates via keynote presentations, seven issue-focused plenary roundtable discussions and four parallel sessions.

On the first day of the conference opened by Michael Andrew, Chairman of KPMG international we were honored to welcome on our global podium Alistair Buchanan, Chairman of KPMG's Power & Utilities Practice in the United Kingdom and Dr. Fatih Birol, Chief Economist, International Energy Agency (IEA) who presented the *World Energy Outlook 2013*. Continuing the lineup of our prominent keynote speakers Anton Yurievich Inyutsyn, Deputy Minister of Energy, Russian Federation commented on the *Energy policy of Russia in the transforming global power industry and trend for energy efficiency* followed by an overview about *The future of gas-fired generation in europe* presented by Denis Vladimirovich Fedorov, CEO of Gazprom Energoholding.

The second day of the conference was opened by Günther Oettinger, European Commissioner for Energy, who shared his view about the *European energy system, its challenges and opportunities in a changing landscape* followed by John Parsons, Executive Director, MIT Center of Energy and Environmental Policy Research who held an impressive keynote address titled *Paper Electrons. Who needs them?* We were privileged to also welcome amongst our honored keynote speakers Thomas Piquemal, Group Senior Executive Vice President of Finance, Electricité de France (EDF), who gave us an exceptional overview of the *Challenges faced by global utilities companies through a case study of EDF*.

Following our traditions, this year we again had roundtable discussions moderated by KPMG's power and utilities experts. The conference's roundtable discussions touched upon a number of current issues, including the future business of utilities, coal power generation outlook, future hotspots for global M&A in the power sector, smart cities and their impact of technology on consumer behavior, the market environment of solar energy, offshore wind's boundaries and cyber security.

We trust that you will find this summary an insightful overview of the key issues defining the power and utilities sector, and we look forward to welcoming you to the **KPMG Global Power & Utilities Conference 2014 on 7-8 October 2014 in London, United Kingdom**. For more information, please visit the conference website: kpmg.com/powerconference or contact the organizing team at gpc@kpmg.com.

Sincerely,



Peter Kiss
Head of Power &
Utilities, EMEA



Michal Salcher
Head of Energy and
Natural Resources,
KPMG in Germany

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The background of the image is a dark, abstract composition of blurred, streaking lights in various colors (red, orange, yellow, blue, green) that create a sense of motion and depth. A solid blue diagonal band runs from the top right towards the bottom left, partially obscuring the text.

Keynote Speakers

Keynote Speaker

Chairman's opening remarks

Michael Andrew

Chairman, KPMG International

Michael Andrew, Chairman, KPMG International, welcomed delegates to the 3rd annual KPMG Global Power & Utilities Conference, held in Berlin, Germany.

In a video montage which preceded him, Mr. Andrew said he recognized the specific dynamics faced by the power & utilities sector. *"I would add that economic conditions, changing consumer tastes, government deficits, the impact of large supplies of subsidized renewable energy, tight margins, aging infrastructure and changing dynamics in the world energy market."*

He recalled that the day previous to the conference he had attended the B20 Meeting, the *"business arm"* of the G20 finance ministers, some of whom set the economic agenda for the oncoming year.

The meeting brought together 40 global CEOs to try and focus the agenda back to economic growth, creating jobs, sustaining global investment – and to do so, they picked four subjects to

coordinate among the top 20 nations of the world; the last of which was facilitating investment in global infrastructure (which he said was most crucial).

"There are substantial equity and debt funds available for good long-term projects and investment, but at the moment, through various regulatory, legal, accounting, financing barriers the connection is not being made between the long-term investors and long-term infrastructure," explained Mr. Andrew.

A number of proposals were discussed, he reported, including creating investment treaties, which actually guaranteed the fundamental investment criteria that investors, at the front of an investment, made, and guaranteeing those through the life of an investment to provide certainty; public private partnerships were also a topic.

He commented, *"They've recognized that governments are going to be fiscally constrained in building essential infrastructure and making sure there's a common language, a common*

process, a common understanding right across those governments as to what it takes to basically build national capacity, and, of course, to create national infrastructure plans which enable people to take a longer term view in spreading their resource, risk and capital.

"All of these things are critical to our success going forward," he added.

Mr. Andrew noted that signs of economic recovery were starting to emerge in Europe. *"Yes, it's fragile, and yes there will be some challenges in the road ahead, but almost, with one or two exceptions, we are back on a path to growth. We are in a situation where the banks are holding double the capital of that in 2008 and we are seeing de leveraging starting to occur."*

There were, however, a number of structural issues in Europe's power & utilities sector, particularly with subsidized renewables, which impacted various areas, not to mention the post Fukushima decision to phase out nuclear power.



"We've seen the significant decline in coal prices, impacting gas prices – all of which are starting to change the dynamics in the market very quickly," observed Mr. Andrews. "In fact, as I found out in preparing these remarks, in 2008 the top 20 utility companies in Europe were valued at USD 1 trillion; today they're valued at half that amount, so there's been a significant loss of value, which has to effectively be regenerated."

He said that when such challenges emerged, there were opportunities.

Mr. Andrews explained that while he lived in Hong Kong, he spent most of his time in China, India, Africa, and Asia,

a fact which made it very apparent to him that there was significant growth potential in those economies over the coming decades and that would place huge stresses upon those places utility systems.

Of renewables in Asia, he said: *"Climate change is not going away, it's going to accelerate. For someone who does live in Hong Kong and Beijing, I can tell you there is an immediate and urgent need in some of these emerging nations to address these issues. They are very interested in the technologies, in the engineering skills, in the services that have actually been developed here."*

"They actually have a significant amount of capital that is interested in investing in these particular markets. They do see a counter cyclical opportunity here to enter these markets," Mr. Andrew said of Europe's energy & utilities industry.

He said that while he thought the industry was very challenged, he concluded: *"I think there's fantastic opportunity if you start to actually recognize the possibilities of thinking about new technologies, new markets, new services and applying some of the investment that's been made over recent years into a new customer base."*

“Climate change is not going away, it's going to accelerate. For someone who does live in Hong Kong and Beijing, I can tell you there is an immediate and urgent need in some of these emerging nations to address these issues. ”

Keynote Speaker

Europe at a cross roads

Alistair Buchanan

Chairman, KPMG's Power & Utilities practice in the UK

In his speech to delegates in Berlin, Alistair Buchanan, Chairman of KPMG's Power & Utilities practice in the UK member firm, recalled that when he lived in New York City there were two different rail lines to get to Wall Street. "You very quickly work out that you don't want to be on the slow one at that time of the morning," he said.

His metaphor sought to illustrate the different speeds being travelled by the European Commission (slow) and European Union member states (fast) in addressing Europe's energy needs.

While slower, he recognized that the EU was working hard to improve the energy environment across Europe. The Projects of Common Interest, for example, were supported by EUR 9 billion; then there were new infrastructure guidelines, new network codes and framework guidelines, as well as new initiatives like "smart cities."

These things took time. As an example, the north-south link for natural gas in Eastern Europe required 43 separate projects, "And only one of the 43 is up

and running in a serious way – a short interconnection between Slovakia and Hungary."

Uncertainty regarding government policy and energy security concerns, he said, were a couple of the factors that explained countries' reactions to events, not to mention tax and fiscal stress, economic malaise and changing attitudes toward climate change.

"If the lights are going out and your gas is not secure, and you're worried about information you're getting from new technologies, then both as a government and as a company in that country, you are starting to get very concerned indeed," he said.

Presenting a map of Europe, Mr. Buchanan offered up the electricity market in the UK to illustrate his thesis and a possible solution. He reported that the UK's National Grid operator had warned the country that there was only 2-5 percent reserve margin for the next few years.

"A pretty frightening place to be," he remarked. "There is not a single new power station that will be available in Britain for at least four years, and in the next two years we're going to close another 5-10 gigawatts of plant, because we've agreed to. Coal and oil will close, gas is uneconomic so that is being closed as well," he reported.

In response to this, according to Mr. Buchanan, the British government had acted, putting in place long-term contracts to promote renewables and nuclear, while also providing a boost for gas and authorizing the national grid to have emergency auctions to get capacity back on the system.

Networks were part of the solution, according to Mr. Buchanan who said that the British approach (the so-called "RIIO method"¹) also involved the enacting of transmission and gas distribution legislation in 2013 to get rid of an old price control method from the end of the 1980s. The new model, he said, offered capital markets greater clarity, facilitated longer-term stability,

¹ RIIO is Ofgem's framework for setting price controls for network companies. RIIO stands for: Revenue=Incentives+ Innovation+Outputs.



ensured market force initiatives within a monopoly, encouraged innovation and rewarded through incentive.

The incentives, he said, were environmental, sustainable and social based incentives. The old British method had squeezed innovation out of the industry, according to him.

"This new price control is particularly effective for the electricity distribution companies. It's going to promote research and development and incentivize good management, attract investors," he said.

While he admitted that bills would go up in Britain, consumers would have a voice in setting price controls and in seeing the outcomes from the companies. He commented: *"It's going to have a significant benefit to our security of supply. You've got a reconfiguration of the network to ensure that if there's any kit anywhere on the system, both local and macro, we can get that onto the wires."*

The policy, he said, was creating a substantial number of jobs, and had a focus on infrastructure. Suppliers also liked it, according to Mr. Buchanan, who said that consumers had also welcomed it, as had governments and companies.

Britain, he said, needed almost GBP 200 billion spent on it immediately with GBP 110 billion into power generation.

As this all meant the effective rewiring and repiping of Britain, with consumers' money going into R&D, according to Mr. Buchanan, who concluded: *"We believe that the better companies will be able to achieve 13-14 percent return on equity and that is a very strong incentive for both the companies' management, but also for the capital markets."*

“There is not a single new power station that will be available in Britain for at least four years, and in the next two years we're going to close another 5-10 gigawatts of plant, because we've agreed to. Coal and oil will close, gas is uneconomic so that is being closed as well. ”

Keynote Speaker

Energy policy of Russia in the transforming global power industry and trend for energy efficiency

Anton Yurievich Inyutsyn

Deputy Minister of Energy, Russian Federation

As the producer of a massive amount of energy resources the Russian Federation plays a vital role on global hydrocarbon and coal markets, according to keynote speaker Anton Inyutsyn, Deputy Minister of Energy, Russian Federation.

To back that assertion up, he remarked that Russia is number one in the export of gas, second in oil export after Saudi Arabia and among the top three coal exporters, following Australia and Indonesia.

He stated, *“According to our long-term forecasts the mineable energy resources in Russia will not be reducing. There are new projects and new technologies in infrastructure development and the overall investment that we forecast until 2020 will be more than USD 1 trillion.”*

Therefore, said the Deputy Minister, the Russian Federation saw the development of the sector as a priority. He pledged to outline how the country would go about doing that, noting breakthroughs in technology like the mining of complicated reserves of hydrocarbon raw material similar to shale gas breakthrough in the US, not to mention the breakthroughs in extraction of hydrocarbons offshore.

“Within the context of our economy we want to increase the mining of complicated resources and for this we have many options, such as tax benefits, including oil extraction tax” said Mr. Inyutsyn, adding that profitability in such cases could be achieved. Via such oil extraction stimulation measures, he contended, over the next 15 years more than 300 million additional tons of oil per annum could be extracted.

He noted that at the beginning of 2000 the share of horizontal drilling was quite low, but now its share had increased drastically to 15 percent of total well stock.

“These measures result in development of highly technological services in a sector which last year almost doubled increasing from 18 to 30 percent. With the application of new technologies the co-efficient of the extraction of oil has increased significantly and this is one of the main indicators.”

In that context, he mentioned that Russia was trying to expand activities in Russian shelf via export tariffs and other tax incentives. As a result, the profitability of shelf projects had increased by 20-25 percent, according

to him, thereby increasing the interest of Russian and foreign investors; Exxon, Shell and Statoil were cooperating with Russian companies, he noted.

Mr. Inyutsyn commented: *“We hope that this cooperation will get even closer. We are also working on enabling the mining of new deposits. A reduction of oil and gas export duties has already been implemented and we would like to promote these processes.”*

“Improvement of the oil and gas transportation system would play a special role in this. The goal is to reduce dependency on transit countries and increase sales, taking into account shifts in global energy demand to Asian-Pacific region, especially LPG. During recent years Russian pipeline system expanded by 7000 thousand km and continues to evolve, for example Sila Sibiri (The Power of Siberia) pipeline, which enables the transport of 600 billion cubic meters a year.”

He remarked that coal was presently a serious resource, needed in the internal Russian market, Asia and also in Europe, where the demand was growing. The state offered tax incentives to facilitate further extraction.



"A critical task is the raising of competitiveness of oil refineries, so these are programs that are designed for improving the quality of our capacity and new high tech facilities."

By 2020, he said, Russia planned to increase its refined oil production by 125 million tones and refinery yield increases from 71 percent to 90 percent. Investments in the sector that would be made in the next 3 years, comprise USD 300 billion.

Power generation is also being developed. Nuclear power generation would rise from 16 to 19 percent. "We will have nuclear power plants with improved efficiency and safety". Share of renewables will increase from 1 to 4 percent with RUB 500 billion in investments.

Mr. Inyutsyn reported that new capacities were being built up in Sakhalin, where one facility was in operation and whose share of the global market comprised 4 percent. "Our task is to increase this share up to 10 percent in the next 7-8 years," he said.

Mr. Inyutsyn further reported: "The government understands that 1 billion tons of equivalent fuel is being used and the energy efficiency of the GDP needs to be reduced by 40 percent, so out of that 1 billion the consumptions needs to be decreased by 20 percent other things being equal which is challenging given current level of energy intensity of Russia."

According to him, Russia wanted to have guidelines for the best accessible technologies, inviting European specialists to participate in development of these guidelines.

Decrease in energy intensity should not be targeted for energy sector only. "There are all the other industries, like transport and agriculture industries where energy resources are consumed, so we have to deal with that via new measures. New methods need to be applied, mathematical formulas and models," he explained.

He remarked that Russia's President Vladimir Putin had held a speech at a summit in Indonesia where he had invited investors to participate in the country's comprehensive projects like LPG plants construction, Trans-Siberian Railway, development of new coal deposits, pipelines etc.

Mr. Inyutsyn added: "I can only invite you again to participate in those projects and we would be really delighted if there is an interest from our partners' side."

“According to our long-term forecasts the mineable energy resources in Russia will not be reducing. There are new projects and new technologies in infrastructure development and the overall investment that we forecast until 2020 will be more than USD 1 trillion. ”

Keynote Speaker

The future of gas-fired generation in Europe

Denis Fedorov

Head, Directorate for the Development of the Power Sector and Marketing in Power Generation, Gazprom and CEO, Gazprom Energoholding

Keynote speaker Denis Fedorov, Head, Directorate for the Development of the Power Sector and Marketing in Power Generation, Gazprom and Chief Executive Officer, Gazprom Energoholding, pledged to reveal the future of European gas generation, according to Gazprom Energy Holding, one of the world's top 10 energy companies, with over 35 gigawatts of installed capacity, in hydro, coal and gas.

He said that while Russia had taken note of the major developments in renewables, preparing projects on photovoltaic energy and wind energy, numerous objections had been sent to regulators, both from consumers and generating organizations.

"Renewable energy will grow 3-4 times, at least these are the plans," he remarked. *"We also see the risks and see the negative impacts of these processes which you see in Europe and we do not want that to happen in Russia."*

The EU had adopted the "20/20/20" strategy, he recalled, realizing its objectives.

"Today we see that the share of renewables in EU countries is over 22 percent and the installed capacity is being raised thanks to renewable energies including hydro," he said, offering to go through the 20/20/20 outcomes from a Russian perspective.

For one, renewables were elbowing out conventional power generation like gas-fired.

"We see that price is formed through more expensive renewable energy resources while conventional power plants are being used only in peak periods," he observed.

Another task was to cut CO₂ emissions, but because more coal-fired stations were generating energy and emitted much more CO₂, the task was not accomplished, explained Mr. Fedorov, who added that consumers, meanwhile, were paying high prices – approximately 3 percent above inflation.

Traditional pipeline operators, he said, were also suffering because they found themselves in a difficult financial situation, with their assets underused

and resultant profit loss, *"so they are lacking incentives to invest into new conventional projects."*

Meanwhile, governments were losing funds, according to him, while all the major subsidiaries went into renewables. All the while, CO₂ emissions stayed at the same level and certificates remained cheap. The price of energy, he said, was being shaped by regulation, which resulted in a high prices in a difficult economic milieu.

Mr. Fedorov cited a Boston Consulting Group scenario which showed price fluctuations up to 2020, taking into account different sources of energy (traditional and renewable). By 2020, he explained, the cost of renewable energy would be cut. *"But today it is the least competitive source of energy."*

His simple conclusion was that promoting renewables increased energy prices.

By 2020, he said, more nuclear and conventional power plants were scheduled to be decommissioned, as well as coal-fired plants, while more



renewable sources were coming online. According to him, the mismatched price of coal meant that CO₂ emissions would remain.

In Germany he noted that by 2030 coal-fired installed capacity would remain more less the same but the share of traditional power plants would be cut two-and-a-half times. *"Within these conditions traditional power plants are going to be less competitive."*

Regarding the reduction of energy dependency from Russian gas, he said that the share of gas in European energy production was more or less the same, fluctuating 16-18 percent.

The promotion of renewables had cut taxes and state income, he added, but the growth of green power lead to more subsidies.

"We also see renewable generation increased the supply of the CO₂ market and substantial growth in electricity prices: up to two times in 10 years, which has led to increased costs and loss in competitiveness."

Further increasing the share of renewables through subsidies or other priorities, he contended, would further impair the European economy.

Prices of CO₂ emissions certificates, he noted, had fallen five times since 2008, so the market was actually contributing to CO₂ emissions by making coal-fired power plants more competitive than gas-fired power ones.

Because renewable power plants were very much dependent on external factors like the velocity of wind, amount of solar energy and the seasonal

fluctuations of rivers, Mr. Fedorov cited renewables' lack of reliability. He conceded, however, that renewables were green and mitigated climate change, but conventional plants were still needed.

To effectively promote renewables, he suggested introducing a capacity tariff covering the fixed costs of power units. Some success with this had been seen in Russia, he said.

Carbon emissions trading also required reformed. He added that renewable power plants needed to be subject to a more honest competitive situation.

"All of this is going to result in maintaining the renewables and in commissioning more conventional power plants," concluded Denis Fedorov.

“Renewable energy will grow 3-4 times, at least these are the plans. We also see the risks and see the negative impacts of these processes which you see in Europe and we do not want that to happen in Russia”

Keynote Speaker

World Energy Outlook 2013

Dr. Fatih Birol

Chief Economist, International Energy Agency (IEA)

The “*job descriptions*” of global energy players have been rewritten, according to keynote speaker Dr. Fatih Birol, Chief Economist, International Energy Agency (IEA), who explained that some countries which had been energy importers for many years were turning out to be significant energy exporters, like the United States in terms of natural gas, or Brazil, which would become a significant oil exporter by 2015, while some energy exporters were becoming major energy consumers, like countries in the Middle East.

Prices for coal, gas and oil had been kept artificially low in some countries, making energy consumption inefficient and giving way to the wasteful use of energy, in sum creating numerous challenges for governments. The IEA's oil price projections going forward was above \$100/barrel for years to come, not set to decrease any time soon.

While the world had been trying to decrease the share of fossil fuels since the late 1980s, that share had remained at 82 percent, and the future, he said,

was more or less still dominated by fossil fuels, despite the significant growth of renewables. Gas was growing more strongly, however, than oil and coal combined.

The IEA estimated that the US would be the largest global oil producer by 2015 (2 years earlier than a previous estimate), and US shale oil would plateau around 2020.

In terms of electricity, the bulk of demand growth, new capacity would come from China and India. In the OECD countries the bulk of new additions would be to replace aging infrastructure, he said, like in Europe which needed to build 800 gigawatts of new capacity.

He described the major challenge for companies, especially utilities in Europe with a lot of gas in their portfolios: *“They are squeezed between the low electricity demand and the obligations of renewables taking a significant part of the market; therefore they have difficulties generating revenues and being able to make investments.”*

Renewables were growing strongly with the bulk of investments in China, but renewing green subsidies was a hot topic for governments. *“One of the reasons why governments are looking at renewable subsidies, is the electricity prices are placing a burden upon consumers,”* he added.

The new, wide variability in energy prices, he said, could mainly be attributed to shale gas. *“Today, there are huge differences,”* he noted. *“In Europe, gas prices are about three times that of the US, and in Asia, they are about five times higher.”*

That price differential, according to Dr. Birol, was likely to stick around for the next two decades – a *“real problem”* for industries where the cost of energy had a higher share of the total costs – up to 70 percent in petrochemicals, for example.

“This means that companies who are located in the high price areas are in a disadvantageous position vis à vis companies who are in a low-cost region or countries,” he explained.



This would lead to the redefining of the geography of competitiveness, he said, noting that the export market share of energy intensive manufacturing for the US, China and the Middle East would increase, while that of Europe and Japan would see a significant decline, bearing effects beyond the industries themselves.

One could witness the relocation of industries seeking lower energy costs, he observed. *"This may well have long-lasting implications for the prosperity of the European economy,"* said Dr. Birol.

Gas prices would not converge into an international, single price even if US natural gas were shipped to Europe, as taking on liquefaction and transport costs to the Henry Hub price resulted

in roughly the same price Europe was paying for gas: around \$9-10/MMBtu, although such imports offered assistance in the renegotiation of contracts.

He urged Europe and Asia to make their policies, positions based on a *"rather bitter fact"* that energy price differentials would remain, making it important for industry and governments to take measures to narrow the pricing gap, like improving energy efficiency.

"Nobody has the right to sit back and watch the markets. It is very important to read what is going on and position yourself accordingly," concluded Dr. Birol, who said that there were only losers if the world continued to ignore climate change.

“Nobody has the right to sit back and watch the markets. It is very important to read what is going on and position yourself accordingly.”

Keynote Speaker

Urban mobility redefined: car2go and moovel

Marcus Spickermann

Managing Director, car2go GmbH and CFO,
Daimler Mobility Services GmbH

Does Daimler-Benz still want to sell cars? The answer is still yes, according to Marcus Spickermann, Managing Director, car2go GmbH and CFO, Daimler Mobility Services GmbH, who explained that the company also wanted to be involved in "*mobility innovation*" so that people around the world would continue to travel in their vehicles, even if they didn't buy cars.

Mr. Spickermann pledged to describe the megatrends that had pushed the business into this new direction, like urbanization. He explained that while most people had been living in cities since 2008, by 2050 their numbers could reach 70 percent of total population, which translated into people buying fewer cars because they either found them inconvenient or expensive to maintain, as well as difficult to park. Cities were reacting, he said, by limiting individual motor traffic, e.g. the "*congestion charge*" set in London.

Today, in big cities like Tokyo or Berlin, more than 50 percent of residents don't own an automobile, he said.

For Mercedes Benz, this made it crucial to cater to the needs of customers and bring them back into the company's vehicles, without them having to buy, lease or finance them. This, explained Mr. Spickermann, was how "*car2go*" came to be.

"Access trumping ownership" was the second trend he outlined, offering an anecdote.

"When I was 18 it was absolutely clear for me that the first thing I needed was my own car. In my case, it was a light green W123 Mercedes," he recalled.

"At that time, you knew for sure you were among the top 3 investment goods for young people that are turning legal driving age."

But nowadays, he said, car manufacturers were beat out by things like the computer notebook, tablet PCs or smartphones. Still, if young people preferred to spend on their smartphones, again, did not mean that they did not want to drive cars (but he admitted the average age of those purchasing autos was near 50).

Daimler's objective, he explained, was to develop intelligent mobility concepts that were tailored to consumers needs, getting them back into a vehicle on a very simple basis.

The third trend he introduced was that of computerized "*autonomous driving*" – a flat-rate, on-demand transport subscription – which would eliminate the need for taxi drivers, delivery services, buses, petrol stations, car dealers and even lorries. The bottom line, according to him, was that private car ownership was declining.

Car manufacturers could decide to sit back and watch, or get into autonomous driving, mobility platforms and even tap into the markets rendered by ubiquitous smartphones.

Of the latter, he said they enabled industry to come up with business models allowing for direct interaction with customers on a real-time basis, "*whenever there is a need for the customer: When he comes from unexpected shopping – three bags in each hand – thinking 'now I need a car.'*



Now you have a chance to talk to this customer and come up with business models that are actually tailored to his needs."

Mr. Spickermann proceeded to describe car2go, a "free floating fleet" of vehicles distributed within a city, say 1,200 cars within 270 square meters. Those vehicles, he said, were not located at any specific station, but via smartphone, internet or call center could be ordered. One could swipe their membership card at access terminals and enter their pin number in the vehicle to verify membership.

Car2go had started in 2008 in the German city of Ulm and been a great success, today having 40,000 customers and 10,000 vehicles in 25 countries.

He also spoke of pilot projects in Germany like "moovel," which linked various mobility service providers, showing subscribers the best way to get from A to B based on their preferences. He gave an example: *"I want to go the shortest route, the quickest route or the cheapest. Maybe you're not the kind of guy who uses public transport – you're more into limousines and helicopters. Even that should be available in the future."*

Spurred by the increasing costs of parking spaces, he said that Daimler had also initiated a "park together" application that helped to defer those costs by offering designated parking spaces to others when the users weren't using them. Numerous other applications were also in progress like one for long distance bus services or even car pooling.

Despite all this, Mr. Spickermann admitted, *"We still want to produce vehicles."*

"The revenue share of mobility innovation will increase," he continued, "turning us from a purely car manufacturer into a mobility provider. If you ask me what the revenue share will be, I can't tell you, but I am convinced it will be significant."

“The revenue share of mobility innovation will increase, turning us from a purely car manufacturer into a mobility provider.”

Keynote Speaker

The European energy system: challenges and opportunities in a changing landscape

Günther Oettinger

European Commissioner for Energy

Keynote speaker Gunther Oettinger, European Commissioner for Energy in the European Commission, spoke about the challenges of helping Europe meet its energy needs as it simultaneously sought to meet its climate change commitments and maintain competitive economies.

In 1996, he recalled, electricity was made subject to the internal market rules in the EU and he emphasized that it is the Commission's duty to do what's necessary in order to complete the internal market. He observed: *"Globally, politicians are taking care of power issues more than ever before and in Europe I see the threat of a re-nationalization of energy policies. Why? Because more than 80 percent of the oil and fossil fuel resources are in the hands of state-controlled companies or owned by the state itself."*

Commissioner Oettinger cited, for example, BP's minority shareholding deal with Rosneft in the Russian Federation, or the fact that in Germany municipalities were buying back their power grids. *"This is all about extending the influence of public authorities and about re-nationalization. I don't know any sector where public private partnership plays such an essential role."*

Commissioner Oettinger stressed that globally, and in Europe in particular, we have a great need for investments, especially in the power sector. Such investment, he said, was necessary for conversions and the renewal of facilities, for transport, smart grids and smart metering. *"Effective use of electricity, for example in buildings, and the issue of final waste deposit are broad areas where billions and billions in investment are needed."*

"But, suddenly, almost no one is investing in the energy sector anymore." This applies to coal fired stations as well as gas-fired power stations which generate mostly losses and is also true for nuclear power plants for which costs are constantly increasing.

Likewise, investments in grids will only take place if the regulator commits to strict and definite conditions for operation. *"There is no market, no sector in the economy where there is such a critical lack of investment and, therefore, clarity and planning from the side of politicians – European, national, regional, local – is necessary."*

Commissioner Oettinger proposed working from an established oil relationship between the EU and North Africa which could be made more intelligent, for instance by exporting

energy efficiency measures from the EU to North Africa and installing solar parks in Algeria (instead of Berlin), thereby replacing old oil-fired plants and simultaneously reducing CO₂ emissions in North Africa. At the same time, power from those new stations could be delivered to Europe.

Still, he recognized the varying ideologies regarding the different technologies of power generation in Europe: While Austria strongly opposes nuclear power, Prague, Budapest and Ljubljana were advocating it.

The Commissioner reviewed Europe's "20/20/20" goals: reducing CO₂ emissions by 20 percent compared to 1990 levels, increasing to 20 percent the share of renewable energy sources in power generation, and 20 percent higher energy efficiency.

He stated that the EU was on a good way towards achieving its GHG target, which is, however, to a large extent due to the shut-down of the old soviet industries in the newer member states. Therefore, to continue reducing the GHG emissions in the future would be more difficult and more costly. And, due to the fact that the EU's share in global GHG emissions will decrease, such reductions would not save the world – binding commitments from China, Brazil, and the US were crucial.



Commissioner Oettinger pointed out that the US' commitment to a 15 percent reduction of GHG emissions had one simple reason: shale gas. With America's vast production of unconventional gas, the US needed less emission-intensive coal to generate power and the coal surplus was being exported and burnt in Germany among others, he explained. *"Europe alone is too small for all the complex issues that have to be taken into account,"* he said.

In contrast to oil markets which exhibited more or less the same price around the world, and a well-functioning global coal market which keeps coal prices down, there was not yet a global gas market, meaning that gas prices varied widely all over the world, in particular between the EU and the US, despite new potential sources from Central Asia or LNG.

In that context, he said that while Europe was experiencing a deindustrialization, re-industrialization was going on in the US. Europe lost investments in particular

in energy intensive industries: steel, ceramics, cement industry, textiles. According to the Commissioner, this divestment could lead to deindustrialization if Europe didn't react.

The huge gap in natural gas prices between the US and Europe he called *"decisively too high."* Possible remedies he cited included diversification, fewer long term contracts and oil-indexed pricing, more spot markets. He mentioned the Southern Corridor and potential new sources of gas like from Turkmenistan, even the possibility of LNG gas deliveries from Houston to Rotterdam, to help alleviate that price gap.

Higher taxes in Europe were one reason for higher electricity prices in Europe, he explained. If finance ministers were to renounce to such revenues this would have a direct impact on the electricity prices for end consumers. In addition, the Commissioner stated that support schemes for electricity from renewable sources had not been cost

efficient in the past and that there was room for improvement.

Mentioning strategic reserves of oil and gas in Europe, Mr. Oettinger said such energy was necessary to keep manufacturing and transport running because electricity from those sources along with hydropower, geothermal, biomass, coal, and nuclear could reliably provide for the baseload industry needed. Wind and solar power were too volatile and not storable.

Mr. Oettinger emphasized that the energy mix required a sensible European strategy which took into account which location was best suited for which kind of power generation. According to him, fossil fuels would be necessary for some time to come. But, he said, Europe would still have to expand its grid connection, investing billions into research.

The question of how 28 national energy strategies can be made coherent with one European strategy was crucial.

"Globally, politicians are taking care of power issues more than ever before and in Europe I see the threat of a re-nationalization of energy policies. Why? Because more than 80 percent of the oil and fossil fuel resources are in the hands of state-controlled companies or owned by the state itself."

Keynote Speaker

Meeting challenges of global utilities: the case of EDF Group

Thomas Piquemal

Group Senior Executive Vice President of Finance, EDF

Thomas Piquemal, Group Senior Executive Vice President, Finance, EDF Group, pledged to speak of how global utilities were meeting the challenges they faced, and said he would also explain how EDF was doing it.

The global energy landscape is changing, argued the EDF Group CFO. In the US, cheaper energy costs are offering competitive advantage to the manufacturing base. Asian players, he said, were now tough competitors to European utilities. Europe's energy transition, he contended, presented attractive, long-term prospects but required massive investments in both generation and networks.

Apart from EDF, he contended, most European utilities had decreased or cut their investment programs; meanwhile, tough market conditions, difficult financing conditions, and uncertainty in the regulatory environment did not add up to a favorable investment environment.

The EDF Group CFO said that, despite the crisis, the investment needs in Europe remained massive in, for example, new generation capacity, whether peak or flexible capacity, distribution networks or grid connections at borders.

"It is true that this crisis prompted the creation of a sharp overcapacity in power markets," he said, explaining that approximately 300 TWh of power demand gap had emerged since 2007, which accounts for 10 percent of European power demand.

Thomas Piquemal explained that, despite such demand gap, within the same period 75 GW of conventional capacity and 200 GW of renewable capacity were added to the market to meet rising demand as expected at that time, but also to replace old coal-fired plants by new generation means with less CO₂ emissions. On the other hand, investments were still needed in peak generation, as peak demand continued to grow despite the crisis. Investments were also necessary in flexible production means as the share of renewable energies in the generation mix is still increasing.

EDF, he said, was building a new combined cycle gas turbine (CCGT) along with GE in France, well suited to meet the current power markets, characterized by a rising share of intermittent generation means. But EDF was rather an exception since the overall deployment of such type of technology was slow under present

market conditions. The investment and strengthening of grid connections at borders was also critical, as well as significant new investment into smarter networks.

In connection with the current overcapacity situation in the market, Thomas Piquemal said that not only were power prices depressed but also volatile, sometimes with negative spark spreads, primarily due to the crisis and a collapse in CO₂ prices, which now stood at EUR 5/ton down from EUR 25/ton 5 years ago.

He reported that at current market prices no gas-fired power plants were profitable on the continent, and it is currently more profitable to produce power with old coal-fired plants, with higher CO₂ emissions. According to him, no investments into new generation could be justified on an economic basis, as the development cost of a CCGT was EUR 70-80/megawatt hour – about twice current market prices.

Debt ratings of utilities had been impacted by the current situation and equity markets, he maintained, were still doubtful as evidenced by market capitalization of some utilities being lower than the book value of their

¹ Since the KPMG Conference took place, EDF has announced that it was raising its cost savings target for 2013 to €1.2 billion.



shareholder funds. According to EDF Group CFO, all this did not bode well for the financing of the massive investment needed.

All utilities, he argued, had done their jobs, taking bold actions to strengthen their financial situation: selling non-core assets, implementing cost cutting programs, shutting down or mothballing generation capacity, and curtailing investment.

EDF, he offered, had done the same, with the company's target last year of EUR 1 billion in cost reduction¹, but also strengthened its business profile by either taking full control of all its operations or selling its minority positions.

"Doing that, we strengthen our balance sheet and our control over cash flows, but we also strengthen operations – we are now able to deploy our industrial strategy everywhere

in all our operations in our five key geographies: France, UK, Italy, Belgium and Poland and, globally, in our three key businesses: renewables, trading and optimization, and energy services business."

EDF, Thomas Piquemal said, was not cutting its investment program, but increasing it to EUR 12 billion, of which EUR 4 billion was dedicated to developing new generation capacity, mainly in renewable and nuclear. The company, he added, had also announced that it would be recruiting 6,000 people in 2014 for all of its businesses.

EDF Group CFO stressed that a supportive regulatory framework was a must. He illustrated this point by explaining that EDF considers building two nuclear plants in the UK, an investment GBP 14 billion. He explained that this was made possible thanks to a strong commitment

from that country's government and long-term views in terms of energy policy, with ambitious carbon reduction targets.

This, Thomas Piquemal said, showed that pro market policymakers had come to three conclusions: long-term, visible and stable rules were necessary for investment in low carbon, efficient new generation means; power markets were not providing the appropriate investment signals; and policy should be designed with energy policy goals and an investment friendly environment to achieve those goals.

As evidenced in the case of the UK, the fine tuning of regulation was needed to build an investment case. *"It is not about less markets; it is about better markets,"* opined Mr. Piquemal.

EDF's recent successful issue of an EUR 1.4 billion *"green bond,"* he said,

"We are now able to deploy our industrial strategy everywhere in all our operations in our five key geographies: France, UK, Italy, Belgium and Poland and, globally, in our three key businesses: renewables, trading and optimization, and energy services business."

Keynote Speaker

Paper Electrons. Who needs them?

Dr. John Parsons

Executive Director, MIT Center of Energy
and Environmental Policy Research

The role of trading operations in energy groups was the focus of a talk by keynote speaker Dr. John E. Parsons, Executive Director, the MIT Center for Energy and Environmental Policy Research, who began by describing “rooms full of electronic screens following price statistics” that could procure supplies for generation units, manage sales of retail power, or even focus on a company’s trading portfolio.

Of measuring the profit of a trading operation, Dr. Parsons said it was a tricky problem, “especially when trading operations share a balance sheet with generation assets and with customer wholesale assets.”

Who made the profit? he asked. “Was it the trading operation that made it or was it the generation asset?”

But the trickier problem was, how much capital was at risk in the trading operation?

He offered: “The problem is that the upfront capital required to open up a trading operation can be very small and can seduce people in to thinking there’s

very little capital at risk. The difficult part of capital for a trading operation is that it entails a large amount of contingent capital obligation – contingent future capital obligations are very easy to overlook, very difficult to estimate and quite often lead people to exaggerating the profitability of trading operations.”

Sometimes, he said, the problem could be solved with external capital markets to finance trading opportunities and indirect financing for counterparties. If the balance sheet was shared, according to Prof. Parsons, the focus was on hard assets, with the trading opportunity “piggybacking” onto their capital, at the heart of the difficulties seen in the US.

Prof. Parsons offered Constellation Energy Group as an example, a company formed as the US was restructuring its electricity markets, when there was a consensus that such energy trading companies were profitable. He recalled, “Quickly, with the collapse of those markets in 2000-2001, Constellation changed its beginning strategy and made trading a

subordinate function of the operations of the unit. Trading was organized to support generation, to support wholesale supply; trading was not a profit center.”

But the trading operation of Constellation energy, he said, was an extremely advanced leader in the marketplace for what a risk management operation could be.

He then showed Constellation’s stock market performance from 1999-2008 – 17 percent – comparing it against the S&P 500 utility index, which had earned a rate of return of 5.4 percent.

In 2007, Constellation had decided to reorganize itself, moving its trading unit from a support function out of customer wholesale supply, making it into a profit center in the corporation – the engine of their growth strategy for the future. Proprietary trading and other trading operations were also expanded, he said.

“Right after they did that, they had a liquidity crisis in 2008,” said Prof. Parsons, who explained that 10 years of stock market return had disappeared



in the space of 2 months. Suddenly, the company was short USD 1 billion of capital, and desperately needed cash in September 2008, an inauspicious time.

He explained that company had lost about 75 percent of its stock market value, and went through a number of transactions. Why had it happened? *"My claim is, what happened is unexpected contingent capital requirements: the company imagined that it was running this trading unit for free, that very low amounts of capital were required and there were a wide variety of events that made clear how much more capital was required."*

In 2008, he said, commodity prices had gone through the roof, so collateral for transactions was going up. Among other problems, errors in the company's risk management systems meant Constellation was not aware of the scale of contingent collateral requirements embedded in contracts for coal operations. Upon uncovering these, he recalled, the company's precarious financial situation made the headlines, forcing Constellation to try and raise cash quickly, but the company's portfolio of assets could not, in fact, be sold quickly, so losses grew beyond those forecast.

Enron and a host of other company, said Prof. Parsons, had all put trading at the center of their operations, with their stocks going up and up, but their capital at risk was not taken into consideration. Trading arms were profiting from the credit of generating assets, but never paid them a penny. Those companies were all eventually restricted from doing this.

In light of the US anecdotes, Prof. Parsons said: *"I would suggest that the Europeans also need to think through the dangers of underestimating the amount of capital required. Have you really figured out the capital required at your particular unit?"*

“The difficult part of capital for a trading operation is that it entails a large amount of contingent capital obligation – contingent future capital obligations are very easy to overlook, very difficult to estimate and quite often lead people to exaggerating the profitability of trading operations.”

Keynote Speaker

Renewable Energies without financial government support

Paul van Son
CEO, Dii (Desertec Industrial Initiative)

Renewables from the deserts could save Europe billions of euros, according to keynote speaker Paul van Son, CEO, Desert Energy Industrial Initiative (Dii), who described his consortium's target as creating an industrial-scale market for solar and wind energy from the desert regions of North Africa and the Middle East and connecting them to the European power markets.

Dii, he explained, is an international industrial initiative with shareholders and associated partners from over 16 countries, offering a platform for all relevant stakeholders, including political representatives, scientists, members of civil society and major industrial actors. Dii experts work on site assessments, technology analyses and evaluate the financial viability of projects to create business opportunities that could be picked up by the market. Dii intends to enable an integrated market place in EUMENA in which desert renewable energy will be competitive.

"This should become a normal business," he stated of renewables, *"without government support, subsidies.*

"There's a massive market distortion worldwide that there is a lot of support on the non sustainable side," he said of hydrocarbons.

Renewable energy should not distort the market, contended Mr. van Son, but be a normal part of energy markets and exhibit positive economic effects.

According to studies conducted by Dii, which considered other energy resources like nuclear, with coal, gas and oil – there is a cost benefit to developing wind and solar in North Africa and Middle East. He recalled that, initially, countries there scoffed at the prospect of renewables.

He offered: *"Today they say 'what nonsense to burn oil and gas in our country; we have solar and wind energy for free and we can export it, earning USD 90/barrel of oil instead of the four dollars that they earn today in the local market."*

Such countries, he said, know that the game had changed. Solar and wind have become competitive in countries like Saudi Arabia, with a de

facto hydrocarbon subsidy of EUR 45 billion/year, if such subsidies there were nullified. It is also true, he said, of countries like Egypt that do not have much oil and gas, which they have to import, would not be able to sustain huge energy subsidies for consumers. The message was getting better as renewables have a lot of cost reduction potential in, for example, photovoltaics.

"It's a direct energy conversion: wind energy and solar radiations in, electric power out; no nonsense. That's really an example of the future," he offered, adding it made no sense to import coal from far away.

In the last several years, he recounted that Dii has identified highly attractive sites in the Middle East and North Africa with a renewable energy potential of 800 gigawatts close to demand centers and existing infrastructure. By 2020 there are 50 gigawatts of *"low hanging fruit"* – projects that could be built immediately, according to Dii's assessments. *"It's only a matter of organizing this,"* he commented, *"getting local structures,*



regulatory framework, local culture of entrepreneurs and capacity."

Germany, he recalled, has spent EUR 200 billion on renewables in the last 10 years, a huge number, but it amounted to only 0.77 percent of GDP in Germany (2012) and nearly half of that in Italy and Spain, fairly small numbers. *"But if you compare this with the numbers of subsidies on the fossil side in North Africa/Middle East, it's something like 10 percent."*

There is consensus, he said, that markets in that region are challenging, because there is little cohesion between the countries there. Dii's mission, he said, is to connect these markets in terms of technology, education, and exchange of power, among others, highlighting the

synergies. For Europe, he said, such a connection could provide for a EUR 30 billion/annual cost reduction, but this could only happen with the help of policymakers.

Meanwhile, Mr. van Son reported a doubling in the capacity of solar thermal, photovoltaic and wind in North Africa/Middle East, from today's 1,007 megawatts to over 4,000 megawatts in 2 years, the beginning of a steep increase.

In light of the fact that energy intensive industries would likely be drawn to the Middle East, Mr. van Son said that Dii will continue pursuing its long-term strategies, offering recommendations to governments on how to integrate renewables into markets, among others.

"It's not magic. Renewable energy is not exotic any more – it's the standard," he concluded. "Years ago, they were called alternative energies; non renewable energies will be called alternative, an alternative that we don't really want any more and that we are phasing out. It will cost a bit of money but bring tremendous gain."

“It's a direct energy conversion: wind energy and solar radiations in, electric power out; no nonsense.”



The background of the image is a dynamic, abstract pattern of blurred light streaks. These streaks are primarily horizontal and diagonal, creating a sense of speed and motion. The colors are a mix of warm tones like orange, red, and yellow, and cooler tones like blue and green, all set against a dark, almost black, background.

Roundtable Discussions

Roundtable Discussion

Theme 1: Future business of utilities – On top of the CEO agenda

Economic, technological, consumer, market and natural resource factors are currently reshaping the power market as we know it. At the same time, these factors are providing new opportunities for businesses in the sector to realize new revenue channels.

Top management from a broad spectrum of energy players took part in a panel discussion dedicated to the Future Business of Utilities.

Despite the wide range of business models used across the globe, noted Michael Salcher, Head of Energy and Natural Resources, KPMG in Germany, the traditional power utility business model was of companies delivering profit from a mix of generation, distribution and retailing activities across centralized grids – yet economic, technological, consumer market and natural resource factors were currently reshaping the market.

The old business model were questionable these days, proposed Gotz Wehberg, Partner, Head of Power & Utilities Consulting in EMEA, KPMG in Germany. He asked members of the panel what major utilities would look like in the coming decades.

Thomas Birr, Vice President, Group Corporate Development & Strategy, RWE AG, said that companies like his were clearly moving from upstream to downstream, despite the money they had earned in generation. *“One of our biggest challenges at the moment is to catch the ‘free fall’ of the generation*

business model,” he explained. “We are pretty sure that conventional power generation will be needed even in light of the ramp up of renewables, at least for the next generation to come, but more as an efficient back-up provider than as a sustainable business model.”

The huge challenge, he added, lays in the development of a new downstream business model, which took a more holistic look at how people consumed and produced energy in the future: how to find the link between decentralized generation and the wholesale markets in the future. Utilities would discover their new business models once the renewables’ subsidies expired and it was time to combine the generation of private households.

The European utilities were going in different directions, according to Stefan Jost, Vice President of M&A, E.ON SE, who said that some were focusing more on E&P or renewables, some were looking for growth opportunities outside Europe, or to the contrary going back to home markets. He mentioned E.ON’s *“Cleaner and Better”* energy strategy, which comprised investment into renewables, *“but we want to do that by way of using less capital, by using an ‘asset light’ strategy by*



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applying capital recycling after the commissioning of renewable assets, or going into partnerships."

The second element of the strategy, he explained, was to become "*one energy partner*" by going into services like distributed solutions and a third element was entering emerging markets with traditional generation.

The "*micro-grid approach*" sounded nice, but in actuality the economies of scale created by larger generation assets meant that costs would go down, according to Pedro Azagra, Chief Development Officer and Member of the Executive Committee, Iberdrola. He explained: "*If you start going towards an individual, fully distributed generation approach, when those assets fail you still need a backup,*" he commented. "*Who's going to pay for that?*"

Iberdrola, he added, was focused on cost cutting and its customers.

Alan Svoboda, Director of Sales and Trading, CEZ Group (the largest utility in Central & Eastern Europe), noted the great deal of uncertainty about the future, meaning that any strategy for utilities had proved ineffective. "*So we don't want to rush into one field like 'let's do renewables' or 'let's do*

distributed co-generation' because it might turn out that these are also not the areas where a sufficiently solid profit will be made in the future, because it depends on regulation and subsidies."

He concluded that the industry needed clarity on the rules going forward; someone – perhaps the customer – would have to pay for any new capital expenditures in the future and it was a question how much more cost they could bear; meanwhile, he thought subsidies dangerous. In this regard, Pedro Azagra, Iberdrola, added: "*in order to guarantee the investments that the energy sector needs to face the existing challenges, it is essential that political issues do not alter the conditions of the investments already carried out*".

Representing a company with renewable assets in four countries, Mr. Fady Khalilouf, CEO, THEOLIA, observed that there was a lot of "*churn*" every few years into capital markets, as investors (as well as the utilities represented in the panel) were selling off their oftentimes fairly new assets. When utilities had uncovered a problem, it was often too late to fix it. He stated: "*You need 15 years to have*

a nuclear plant, 10 years for a coal plant, so when the demand is aggressive and you are lacking energy, it's too late. Instead of having a very financial focus approach of the market, we should see it on the longer term."

ACWA Power's CEO, Paddy Padmanathan, offered some perspective from the Middle East, which he said was concentrated on reducing its energy intensity by changing the fuel mix away from the predominant use of hydrocarbons, able to '*leapfrog*' over parts of the transformation.

One bright spot, he said, were pension funds, which had trillions in assets were desperately looking for investments: "*Horribly invested in our sector, with only a minuscule amount in electricity – luckily for them perhaps, because if they had come in the early days, they would have gone into coal, which could get stranded in the next decade, but the market is open for them now and they have recognized this: they realize that the long-term stability of these capital intensive assets.*"

In this context, he added that it was important for regulators to maintain stability at the macro level.



Roundtable Discussion

Theme 2: Coal power generation outlook

Coal is still the dominant source of power generation worldwide. Coal fuels more than 40 percent of the world's electricity. Longer-term outlooks envisage a decrease in its share in the fuel-mix, however the growing energy needs of the developing world ensure that coal remains a key component of the power generation mix in the foreseeable future, regardless of climate change policy scenarios.

A panel discussion dedicated to the global outlook for coal power generation offered perspectives, from North America, Europe, Africa and Asia. It was kicked off by Alison Kitchen, Head of Energy & Natural Resources, KPMG in Australia, gave mention to a previous panel's opinion that coal was "yesterday's theme."

Addressing the presumption that coal was "yesterday's fuel," Laszlo Varro, Head of Gas, Coal and Power Markets Division, International Energy Agency, provided an initial high level assessment. He noted that coal is still a cheap and readily available source of fuel for significant parts of the global economy. As such, he highlighted that coal accounted for half of the increase of total global energy production in the last decade. He also provided a view that coal fired power generation will continue to increase in a large number of economies unless either there is strong regulatory intervention for climate change related reasons, (ie putting a price on carbon) or there is a local economic trigger for change.

As examples of this, he noted that last year coal had had a bad year in the US because the emergence of cheap gas in North America and ready access to supporting infrastructure meant fuel switching from coal to gas occurred

on a large scale. He also noted that high rainfall in China meant that the huge hydro capacities had generated a lot of cleaner power lessening the need for reliance on growth in coal-fired generation. *"But even after taking this double hit, last year coal was still growing more rapidly globally than oil or gas and was the largest single component of the increase in global energy production,"* he said.

Coal, he added, should not be seen as outdated and low-tech. In the Asia Pacific region, for one, around one-third of the fleet of coal-fired plants was built after 2005 meaning they are far more fuel efficient and less polluting than the older coal fired plants still running through much of Europe. Meanwhile, coal reserves are huge.

Turkey will remain highly reliant on coal, according to the speakers present, and in particular will target use of locally produced lignite coal for cost efficiency reasons even though it is less environmentally friendly than other metallurgical coal sources available for example from US.

Darryl Murphy, Partner, Global Infrastructure, KPMG in the UK, led into the Turkish market, by offering Poland, which also had very large coal resources, push for new coal





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generation, but grappling with the expense of the extraction process.

Dr. Sirri Uyanik, General Manager, ISKEN-TURKEY, explained that power demand had doubled there in the last 11 years and the country needed an additional 5,000 megawatts of additional capacity comprising USD 5-10 billion/year in investments needed into hydro, renewables and coal. *“Turkey is over-reliant on gas: 44 percent is generated from gas, which is not sustainable. Gas is ridiculously expensive and gas is not a reliable source because of supply security issues,”* he explained.

And there was huge demand growth for coal, according to Huseyin Kavustu, Planning and Analysis Manager, Akenerji Elektrik Urretim, a Turkish integrated utility company. Turkey's own coal resources comprised lignite coal which is less efficient than other imported coal options. *“When you are making decisions about investments in Turkey, you need coal, but then you need to decide whether to go with the lignite or imported coal, based on the technology. We have room for both in Turkey due to the demand growth: 5.5 percent per annum, which is huge. To feed this demand, lignite or imported coal is the best way to invest,”* he said.

The biggest question mark, he added, was the possibility of a carbon tax, but that would only likely appear in the future under the current political situation.

More broadly across Europe it was noted that withdrawal from nuclear power, a lack of regulatory policy certainty which is hampering long term investment decisions and similar concerns about over reliance on gas from one source to those expressed for Turkey are being experienced. As a result, many ageing coal fired plants are continuing to function long beyond the end of their expected useful lives as a lack of policy direction hampers either

upgrading these coal plants to introduce carbon scrubbers to make them cleaner, or investment in other fuel sources.

Meanwhile, it was virtually impossible to build new coal plants these days in Europe in the uncertain electricity market, said Dr. Bernhard Fischer, CEO, E.ON Generation GmbH, who was still convinced that coal would play an important role going forward. Emissions trading, he noted, also presented a regulatory risk for coal as a revised Emissions Trading Scheme in the future might raise the price.

“Our coal plants are running like hell,” he reported, *“due to the low coal prices we see coming from the US and the entire global market, but it’s also due to the fact that we see these very low CO₂ prices. Therefore, at the moment all our modern gas-fired power plants are standing still and we are running the coal plants.”*

Turning to Africa, Panel participants from Zimbabwe highlighted their basic need to improve availability of a reliable source of power to a greater cross section of their community, many of whom do not yet experience ready access to electricity. They highlighted that in this context, they must exploit their country's massive coal reserves, but acknowledge their desire to do so in a sustainable way. This, in a country with occasional power rationing, which created political pressure, according to Cde Munacho T.A Mutezo, Deputy Minister of Energy. *“The availability of electricity is a measure of people’s standard of living,”* he explained. *“And unfortunately the investment decision and benefit from the investment have long lead-times, so politicians don’t have the luxury of keeping that decision in abeyance for too long.”*

This meant that Zimbabwe was aggressively searching for investments into coal mining, the reserves of which were estimated to meet the country's energy needs for 1,000 years.

Noah Gwariro, Managing Director, Zimbabwe Power Company (ZPC), described the two development projects that we're being signed off on: an increase in capacity of a coal-fired generation and a hydro generation facility, which would take a lesser role in generating baseload power going forward. *“Our generation is going to be more skewed towards the coal side of things, even though there will also be some development on the hydro side of things.”*

Much of the broader African market are experiencing the challenges outlined by our panelist from Zimbabwe, as many of the estimated 1.3bn people worldwide who do not have regular access to reliable electricity supply are based in Africa. Lack of power is hampering both meeting the most basic human needs of day to day living and the development of broader sources of economic growth to help raise basic living standards.

Within that context, roundtable participants pondered how Carbon Capture Storage (CCS) technology might be developed more quickly to offset the carbon emissions of coal-fired power as the world's present course was headed towards 3.54 degree Celsius warming. The panel also debated an interesting question from the audience about the acceptability of carbon storage compared to the storage of nuclear waste.

There was a consensus among the speakers that, indeed, the power industry would likely still be speaking about coal as a major source of fuel supply for power generation in 10-15 years time. – They noted an increasing expectation that continuing decreases in its usage in US depends on ongoing access to gas from unconventional sources, and that over time, coal would increasingly become an African and Asian phenomenon and become less socially acceptable in Western economies.

Roundtable Discussion

Theme 3: Future hotspots for global M&A in the power sector

**Where are the next
hotspots going
to be in 20 years.
What have we learned?**

In his introduction to a roundtable discussion entitled *Beyond BRICs – future hotspots for global M&A in the power sector*, Andy Cox, European Head of Energy and Natural Resources for Transactions and Restructuring, KPMG in the UK, observed that M&A activity had varied widely globally, with, for example, US M&A increasing by 100 percent in 2011, but Europe's decreasing 40 percent in the same time period. The types of transactions have also varied regionally, with distressed assets coming onto the market in India, Japan undergoing asset unbundling programs and a number of regions seeing a move from government to private ownership.

According to Q3 '13 data, activity levels were up 25 percent on the previous quarter, with about nine deals done totaling over USD 1 billion. *"It feels positive to me,"* he said, offering that the ensuing discussion would address why that was so.

Fady Khalouf, CEO, THEOLIA, a renewables player, said his company was utilising M&A for growth via new acquisitions and co – investment

approaches, but also in terms of divestments. He explained that in Europe his company's activities were shaped by comprehensive and stable regulations and employing a co funding approach through partnerships with public utilities embracing 20-year perspectives.

"Of course the market is very volatile and if you consider that renewables was very speculative in the 2000s, now it's harder to find financing. The fundamentals are to always get good projects and markets where the incentives are not too high, so the assets are able to work regardless of the change in regulations, so that the assets work within the commercial market," he said.

Partnerships, according to Mr. Khalouf, must adapt to the local situation in every instance.

M&A was one way of executing corporate strategies, according to Alan Bevan, Senior Vice President and Global Head of M&A, E.ON SE, who shared that his company had been involved in a EUR 20 billion divestment program, instigating a *"less capital, more value"* strategy and was looking to grow





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outside of Europe (with investments in Turkey and Brazil), as well as pursuing distributed energy solutions.

Utilities, he said, would need to decide in which parts of the value chain they would remain, in which geographies and in what technologies, like distributed generation and associated solutions, as utilities were trying to grow their exposure in such areas. *"In addition to that, I think you will see them continually seeking to grow outside of Europe. As we have heard about the lack of growth, we are looking for more opportunities to deploy the capabilities that we have,"* said Mr. Bevan.

E.ON, he added had taken a capability-led approach rather than just a balance sheet-led one by carefully choosing partners in Turkey and Brazil.

Lex Hartman, Director of Corporate Development, TenneT Holding B.V., said his company had recently purchased a grid from E.ON. While he admitted that M&A value creation had been difficult in the past, he said there was value creation in the grid business.

One hot spot for investments he named was Berlin, as the German government was setting new goals for renewables: for example 4,600km of new high voltage lines. While billions more would need to be invested, he cited market reform as necessary for guaranteeing Europe's security of supply.

"That means investments in conventional production capacity. And that's the other area that won't be developed in a couple of months – it will take another year or 2 years in Germany to have that development; Germany is simply too rich and can wait another year or two, but at the end of the day we will need that and that will set a new movement of investments into capacity markets," he explained.

Heading an Australian infrastructure fund that had invested EUR 11 billion in Infrastructure, Werner Kerschl, Investment Director (Europe), IFM Investors, said he had been witnessing a lot of consolidation activity in Europe's transmissions system operator (TSO) market, across electricity and gas.

Asked for his perspective on the scarcity of capital by Hans Bongartz, Partner of Corporate Finance Transactions & Restructuring, KPMG in the Netherlands, he replied that there was always enough capital for the right asset, but said he had worries that infrastructure was seen as the *"next big thing"* considering the low rates of return seen for government bonds.

He commented: *"That leads to people confusing yield with total return, so a lot of assets are being built on a 'yield play' rather than seeing the fundamental business and increasing operational efficiency and actually the value of the underlying asset. A lot of investors see equity returns as debt returns, and that's where it becomes very dangerous in terms of overheating the regulated utility market."*

"A regulated utility is not risk free – that is something some investors will learn."

Mr. Kerschl added that diversification was important to manage that regulatory risk.



Roundtable Discussion

Theme 4: Smart cities – The impact of technology on consumer behavior

Smart cities hold the potential to fundamentally change the way energy is integrated via distributive generation, used efficiently through smart grids, and used ecologically via electric transport systems.

To kick off a panel discussion on smart cities, KPMG's Global Head of Cities, David O'Brien, began by offering a definition of a smart city as a "finite entity" within its own local governing authority that uses information, communications and technology and instrumentation technology to achieve the explicit goals of improving the quality of life of its citizens and sustainable economic development.

Still, the definitions of smart cities depended on where they were used and they must take into consideration productivity, social development, and environmental concerns among others. James Stewart, Global Chairman of KPMG's Global Infrastructure practice, noted that panel participants came from a diversity of backgrounds: utilities, mobility and cities.

According to Paul Schindler, Global Urban Matters Lead at SAP, urban governments across the globe are facing the greatest economic, social, and technological changes in history. In the face of decreasing budgets and increasing citizen expectations, there is very often a need to "do more with less".

"Regardless of a city's age and maturity, it can always run better," he explained. "And while each city or region faces a unique set of challenges, all of them can benefit from technology-enabled innovation. And this is not necessarily about sensor technology. Very often it is about doing the fundamentals like tax collection or citizen services really well."

"Is it really necessary", he asked, "to physically travel to the authorities to be able to file an application? You might say that's a minor problem. And I would agree if you live e.g. in Central Berlin or London, because it takes you 20 minutes to go there and there might be a 10-minute wait and then you're done. But if you are somebody living in a remote area of a less developed country it is a vital problem if your commute takes 4 hours one-way, time you would need to procure food for your family."

To address such problems, Mr. Schindler reported that many of SAP's customers in developing countries were "leap-frogging" to mobile devices, providing citizens the possibility to access governmental services via their mobile phone or online.





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Cities also had to be livable, taking into consideration issues like economy, mobility, environment and people, according to Dr. Anne Kerr, Director, Practice Leader Sustainability in Design, Group Champion for Future Cities, Mott MacDonald Hong Kong, who said the term "smart city" often excluded issues like social and environmental capital.

One example of "smart" she provided, however, came from Korea: telemetry systems that told cities when to de-ice a bridge or send out a snowplow, or how much energy was being used in a specific flat in an apartment block. She explained: "The city is trying to make citizens understand how they're using their energy and make them more efficient, and also how to make their own choices, like how they spend their money."

In that context, Zsolt Bertalan, Board Member, European Network of Transmission System Operators for Electricity (ENTSO-E) was asked about how transmission system operators' role in the supply chain could help the consumer. He said that such smart approaches like those previously mentioned could provide an incentive

for TSOs to change their procedures. "In order to be able to change them, of course, have to 'invent' that they need more information, meaning metering. That's why they're installing smart metering infrastructure," he said.

The emergence of the "prosumer," he said, had made for a game-changing procedure; meanwhile, as large customer pools, smart cities were useful to educate consumers on such technologies.

In terms of when such transformations would take place, David Elzinga, Senior Energy Technology Analyst, International Energy Agency (IEA), noted that while utilities and cities were revamping their systems, the biggest impediment was the lack of information to consumers on energy use.

"If we can give them that information, the power to use energy at different times, use it for the services that they need and want to pay for, the price of energy can go up but that doesn't mean the cost of energy to them has to go up as well," he stated.

Addressing consumer needs/concerns is also affecting the car business,

according to Kerstin Meerwaldt, Head of Electric Mobility Framework Strategy, BMW, who presented the company's recently unveiled electric car, the i3, as proof of how the German car manufacturer was taking a mobility focus with both inter modality solutions and private cars in their sights.

She explained: "The reason we are so involved in electric mobility is the change of customer behavior, desires; we do take climate change, resource shortages and urbanization very seriously. As a consequence, we believe that we are at a point of iconic change: we see that technology changes – combustion-engine cars will be here for the time to come – but we are at a point in time where we really need to be ready for the next era of technology as the curve for combustion engine cars will become flatter."

Ms. Meerwaldt questioned when utilities would reach their cusp of change and added that BMW was anticipating the era when individual homes would incorporate their own power storage centers, providing a synergy with the carmaker's electric vehicles.



Roundtable Discussion

Theme 5: Quo vadis photovoltaics? The market environment

Once key players come to the table, how will contracts be structured? This panel will target developers by giving a broad look at the current landscape and how they can apply these new opportunities to pull together projects in 2013 and beyond.

Citing the fact that worldwide capacity of photovoltaics (PV) had surpassed 100 gigawatts, Bertolt Mueller, Director of Corporate Finance, KPMG in Germany, began by noting the industry's reputation due to the subsidies it had received. He said that while 31 gigawatts had been installed in Europe the previous year, representing the largest PV market in the world, that amount had dipped significantly in 2013. Mr. Mueller asked panel participants to offer their assessment of the sector and the challenges.

Dr. Enno Wolf, Sales Executive, TSCM Solar, offered that, the demand for large PV parks in Europe has dropped significantly, especially in Germany and in the Italian market, which was considered for a long time a "*rising star*". He explained: *"Basically if you take all the European markets you see a significant decrease in terms of contribution to the total solar market, so that's something we have to face. But, on the other hand, for global players it's*

good because you have other markets we will touch soon."

According to Dr. Wolf, TSCM saw good opportunities in Poland, where legislation is still pending; and Portugal, where grid parity has been already achieved and new business models are being devised. Competition, he added, was tough in the overall market with a large number of manufacturers, distributors and EPC (Equipment, Procurement, Construction) providers had gone insolvent as cost pressure driven by Asian competitors was intense.

Less activity in Europe meant some were sniffing out activity in other geographies.

For one, Christopher Burghardt, Vice President of Business Development Europe, Middle East & Africa, First Solar, recounted how his company, faced with slower European demand, observed different models around the world. The US PV industry, he said, had started as a market with a government



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mandate. He commented, "Now there is commercial procurement of solar something must have gone right, over time. You can say, 'the solar resource is good, financing is low, so clearly the conditions were just right.'"

Additionally, he said utilities had come a long way in learning how to integrate renewable assets that were non fuel dependent into their overall portfolios. For operators, the winning solution was knowing how to manage the performance of such assets, according to Mr. Burghardt, who mentioned India, China and Japan as other intriguing solar markets.

Meanwhile, Cornelius Matthes, Senior Advisor, Dii (Desert Energy Industrial Initiative), described the massive attitude change in Middle East/North Africa ("MENA"), where, just 3-4 years ago there were almost no national action plans or even intentions to work on solar and wind. "So now there's almost no single MENA country that does not have very ambitious

renewable action plans for renewables, so we're talking about 50 gigawatt of officially declared objectives until 2020 – 7 years from now."

Those projects, he said, were complemented by hydro and wind in the region in places like Morocco and Egypt, where this "massive shift" had taken place. Countries like Algeria were no longer hostile to renewable energy.

Some of this had to do with where PV development was economically driven, like in Saudi Arabia. Mr. Matthes recalled one of Dii's shareholders was involved in a 100 megawatt project there, with generation at USD 0.12/kilowatt hour. The price of oil would have to go below USD 45/barrel, he said, to render that uneconomic.

In response to a query from Santosh Kamath, Partner, KPMG in India, regarding the delegates' vision of PV solar in the next 5 years, Nikolaus Krane, Member of the Board, Wirsol Solar AG, described what he sees as

an energy revolution in renewables, creating a multi-billion dollar market.

"It's clear where we're heading; it's not clear how fast nor who will benefit from it, or who are the best players to make use of it. But what we will see is an energy intranet, which will fluctuate, be more decentralized. Production will follow usage and not vice versa as we've had it in the past."

It is all about smart grids and energy storage solutions, efficiency, and load shifting, all of which would create a huge market, he said, which required financial backing.



Roundtable Discussion

Theme 6: Pushing the boundaries of offshore wind

Of all renewable projects, wind projects (both off shore and on-shore) have shown the greatest investor interest.

In a panel dedicated to *“Pushing the Boundaries”* of offshore wind, much of the discussion revolved around overcoming some of the obstacles of an entirely new industry. Yet, given that the conference was being held in Germany, there was clearly some good news for players.

Highlighting the fact that recently the new coalition agreement had announced higher feed-in tariffs to be extended 2 years in Germany, Annette Schmitt, Partner, KPMG in Germany, noted that no investment decisions have been taken since 2009-10 because of grid uncertainty.

The announced extension of the feed-in tariff was a positive signal, bolstering investor confidence, said Dr. Thomas Meerpohl, Head of Corporate Strategy, Stadtwerke München, whose company's objective is to produce as much power via renewables equivalent to Munich's energy consumption by 2025, where an EUR 9 billion investment project had been spearheaded in 2008.

“We are prepared to go into a further

round of projects that the industry wants,” he commented, in light of the latest government signals in Germany.

This was a strong contrast to the UK, argued Adrian Scholtz, Head of Renewables for Europe and Director, Corporate Finance, KPMG in the UK, where projects were being abandoned as *“too difficult.”*

The UK was seeing more in the pipeline than the government could stomach, replied Fintan Whelan, Co-Founder & Corporate Finance Director, Mainstream Renewable Power, who added developers were deciding which projects to focus on and which to postpone. *“As long as Britain sees wind as viable for its energy future, projects will eventually see the light; it's not the decay or abandonment of the sector, just prioritization in the face of a narrowing target.”*

If the equation were all about costs, he said, the UK would only be going for onshore wind; meanwhile, in the wake of Fukushima, Japan was *“at the cutting edge”* of offshore wind




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with its expertise in floating platforms, according to him.

Ms. Schmitt queried panel participants on the availability of capital for offshore wind and asked if the industry could help bring costs down, given that despite the large amount of projects in the pipeline, utilities would no longer be able to implement them by themselves.

This was the *"chicken and egg situation,"* according to Georg Friedrichs, Vice President of Offshore Wind Projects, Sustainable Energy Projects, Vattenfall. He said, *"We need volume to drive down costs; without it there will be no supply chain engagement, investments, and the company will be stuck with costs."* This, he stated, required two drivers: technological development and competition, both of which would bring costs down, but required creative strategizing.

In agreement with that sentiment, Mr. Meerpolh offered what he said was a short-term driver, explaining: *"I think the learning curve of this round of offshore wind developments is*

impressive and the next round should be much smoother." By his account, so many of the industry's actions had been performed for the first time, when hiccups and problems could occur.

Robert Pottmann, Head of Renewable Energies and New Technologies (RENT), MUNICH ERGO AssetManagement (MEAG), agreed, but argued that it didn't ensure funding, at least not from his industry. He explained, *"Insurance companies tend to invest around 80 percent of their capital into investment grade bonds. It's all about investments at the lower end of the risk spectrum."* In the last 4 years, he recalled, MEAG has only invested in assets that are up and running or in turnkey assets as they were averse to construction or development risks.

"It's to a certain extent a kind of adventure, and there are numerous technical and maintenance questions, and lots of risks," he said, adding that he thought the main part of the equity should come from utility companies and strategic investors.

Case in point: out of the EUR 2.5 billion his group was authorized to invest, it has invested EUR 1 billion into onshore wind and photovoltaics so far.

There was consensus on the panel that one of the biggest misconceptions was that offshore wind was comparable to onshore wind or photovoltaics. As utilities couldn't presently invest in natural gas or coal-fired generation, the industry eagerly awaited investment opportunities like offshore wind.

"Times when there was more capital than projects for utilities is over," offered Mr. Friedrichs, who said it would be harder for offshore wind to obtain finance, but that investors must be convinced that the risks of such projects weren't that big and that it was all a question of the volume of projects and the experience behind them.



Roundtable Discussion

Theme 7: Cyber security – The power and utilities industry challenge of an interconnected world

Cloud technology, the roll-out of smart meters and prevalence of IT solutions throughout the entire value chain of utilities is not only empowering utilities to do more with less, but also weighing them with new obligations (PII information) and risks (cyber attacks, data integrity)

Effectively depicting what was at stake for energy firms in their approach regarding cyber security, Ramon Poch, Partner, KPMG in Spain, posed a flurry of questions: *"How is the business interpreting these cyber attacks? Are they considering attacks on smart meters? And how does this impact the regulatory side?"*

For the power and utilities business the seriousness of cyber security could not be overstated, according to panel participant José Luis Bolaños, Director of Security, Gas Natural Fenosa, who described what was at stake in the context of recent high profile, cyber security happenings across the globe.

"For the first time in human history governments do not have control of their own countries, management does not have control of their own companies," he explained, offering that the estimated cost of the Edward Snowden espionage scandal, for example, was around USD 26 billion to American IT companies.

European legislation, said Mr. Bolaños, was critical for the protection of vital

infrastructure: the smooth operation of utilities had great impact on society, so it was crucial to confront threats on the cyber side of the business.

The industry, he said, needed to change the grid to cope with requirements as it had previously operated in isolated systems; now, with smart metering, the network was open to millions of points that could be attacked by spies, terrorists, criminal organizations and hackers.

That was much different than the old days, recalled Zsolt Bertalan, Board Member, European Network of Transmission System Operators for Electricity (ENTSO-E), when the industry had to protect, for example substations from physical attack; smart meters at customers were an open threat. ENTSO-E, he reported, had realized how crucial cyber security had become for the industry and had a group working on a strategy paper on the subject.

"One of the recommendations is to prepare a minimum level of security to the TSOs, but it depends on them





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whether they actually implement something," he explained. "At the end of the day the TSO has to implement various measures."

Having previously worked for a TSO, Mr. Bertalan said that they were coming around to how relevant the subject was.

Francesco Ceccarelli, Head of Security Governance and Business Intelligence, Enel Group, outlined the kinds of attacks that the utility company had to defend against, like the personal data stored within smart meters, or protecting them from real cyber attacks as well as curbing energy fraud. Maintaining a high level of protection, he explained, was crucial for Enel.

He offered, "So we have developed a lot of experience regarding these aspects – about which I cannot divulge the details, but they are a mix of physical and technical countermeasures. We have to protect the physical equipment against physical attacks and protect internal CPO and the memory area where the data are stored."

The real problem for smart metering, he added, was that the lifecycle of such technology was 15 years or so, making it difficult to guarantee security for such a long span of time. A network's remote control features could be used to constantly upgrade software, said Mr. Ceccarelli.

Shawn Lafferty, Partner, KPMG in the US, said that Shell, as an oil and gas supermajor, had long been the target of attacks, so he asked Tyler Williams, Manager, PCD IT Security Solutions, Shell, how it was possible to engage the business in the topic.

Describing the *"painful and expensive"* journey Shell had endured, Mr. Williams divulged it was a tough job convincing an engineering community, that it was necessary to translate what the real asset risk was to the business.

"In the engineering world we're not used to hearing 'the world is ending' – we want quantifiable facts; we don't want to be sold with anecdotal newspaper articles about threats and risks," he explained. By convincing the engineers, he said, that importance of

cyber security could be felt in the board room, by describing the risk in the context of business impact.

Shawn Lafferty noted that the type of cyber security threat had changed: once a virus, it was now a persistent, quiet threat that continued to change, which meant that enterprises must constantly monitor what was going outbound from their networks. He raised the prospect of utilities being able to monitor their vendor risk – how was it possible?

Mr. Williams replied it was easy at Shell because of the company's deep pockets, but that part of the problem for a security supplier was cost without being able to differentiate the quality of the service provided. In that context, Francesco Ceccarelli added that Enel had a strategy to classify information and establish different layers of protection for it.



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