

Brussels 25th May 2016
The Customer and the Changing Energy Landscape
Iain Conn, CEO, Centrica



Welcome to you all and thank you for coming.

I am delighted to be back in Brussels - a city which I have been visiting regularly for 15 years.

In my 30 year career in energy, I have had the privilege of engaging with the EU institutions over many years on the formulation of EU energy policy. That policy now has significant impact regionally and globally.

In February 2005 I was asked to become a member of the cross-industry High Level Group for “energy, the environment and competitiveness” set up by Commissioners Piebalgs, Dimas, Verheugen and Kroes. That group contributed to what became the “20-20-20 by 2020 targets”.

I remember at that time having discussions with Commissioner Piebalgs and President Barroso about what the task in energy should be for the first Barroso Commission. I said it was to set the initial direction in energy policy for the next 9 Commissions over a 45 year journey and to ensure consistency was delivered from one Commission to the next. Looking back, I think this initial step was achieved, and in the 10 years to COP 21 in Paris a huge amount has been delivered.

I spent most of my career in energy at BP, and for the last 10 years as a member of BP’s Board I had responsibility for Europe. In my last 7 years I was also Chief Executive of the downstream business. I became CEO of Centrica in January 2015.

Centrica may not be familiar to you, so let me begin by telling you a little about us. We are the largest energy supplier in the UK, under the British Gas brand, one of the largest in Ireland, significant in parts of Canada and one of the largest independent suppliers in the United States. We also supply services to homes and businesses.

In total we have 28 million customer accounts, supplying them with energy and services to light and heat their homes, providing peace of mind and reliability for their home energy and other domestic systems.

We are in Exploration & Production in the UK, Canada, Norway, the Netherlands and Trinidad, in energy storage, energy trading, and central power generation. Most recently we have acquired companies with operations in Israel, Denmark, Sweden, Germany and Hungary as we build capabilities in distributed energy - a major trend which I will come back to.

Finally, we are active in the “Internet of Things” for the home, and our Connected Home business is regarded as one of the leaders in smart thermostat controls for the home.

In summary, we are an energy and services company with a strategy built around the customer. Our purpose is to satisfy their changing needs. We have been delivering energy and services to customers for over 200 years since 1812. I believe we are extremely well positioned for the changes taking place in energy globally.

Centrica is incorporated in the UK, and given the timing of this speech I thought I would say a few words on the issue of the forthcoming UK vote on membership of the EU.

This is a hugely important issue and I hope that everyone eligible in the UK will exercise their right to vote.

Clearly I cannot and would not tell Centrica’s 30,000 UK employees or 11.4 million UK customers how to vote. I can tell you that personally I am strongly in favour of the UK remaining in the EU. Let me give you three reasons which are founded in my experience of global energy affairs and the energy markets:

Firstly, power in the World is shifting, and growing and populous countries such as China and India are becoming much more powerful both economically and politically. Against this backdrop, being part of the EU, the largest economic bloc in the World on some measures, the UK will have greater influence in trade and geo-strategically.

Secondly, from its perspective, the UK has privileged membership terms to that economic bloc. Why would you give up privileged terms to a globally leading club?

Thirdly, the UK is importing more and more of its energy - both electricity and natural gas. We are importing more than 50 per cent of our natural gas needs today. European prices are the price setting mechanism for UK imports of energy. The UK can have significantly more influence on the efficiency of EU energy markets, and therefore the ultimate cost to UK energy consumers, by being a member of the EU.

In short, from an energy perspective there is no question in my mind - the UK should remain part of the EU - and the first two of these arguments apply well beyond energy.

Having introduced Centrica to you, and covered the rather topical subject of the UK’s membership of the EU, I would now like to focus on the main subject tonight - the changing energy landscape, and the role of the customer.

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Agenda

- The energy mix and three phases of energy policy
- The customer and three drivers transforming the energy system
- Five major impacts and consequences
- The role of Governments

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I am going to cover four things. I would first like to set the current situation in context, touching on energy policy developments over the last 20 years and the pathways towards the energy mix of the future. I will then describe some of the major changes I see in the way customers are re-shaping the demand function for energy. I will describe what the global consequences of these trends are likely to be, and what Centrica is doing about them. Finally, before summing up I will return to the role of Governments in setting the framework within which all market participants operate.

So let me start briefly with the **energy mix** and what we have all learned over the last 20 years. I am going to return to themes I first outlined here in Brussels at the end of 2013.

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The energy mix and three phases of energy policy

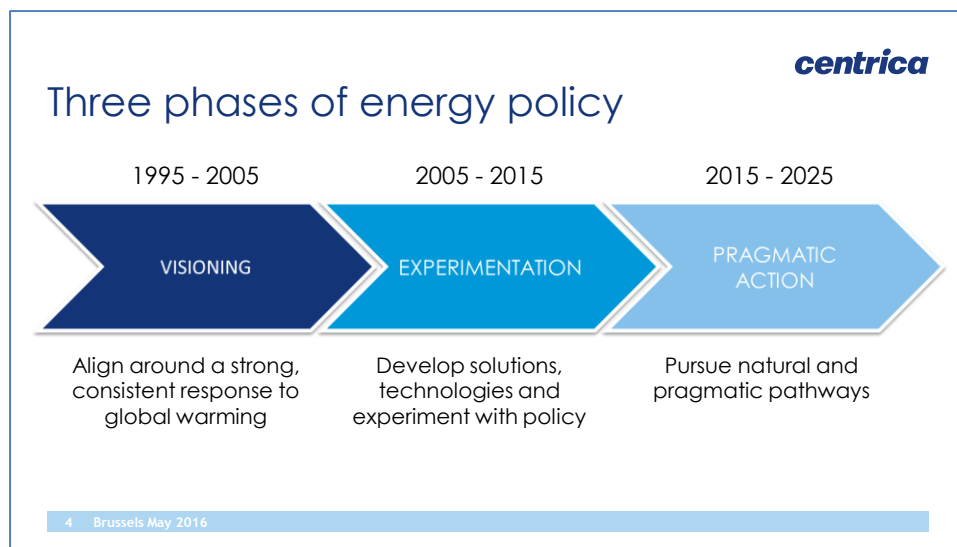
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Most forecasters agree that, for the foreseeable future, globally we will remain heavily reliant on hydrocarbons, which in 2035 are still expected to account for about 80 per cent of primary energy supply.

Within that 80 per cent figure, all the fossil fuels – coal, oil and gas – will have a roughly equal share of around 26 to 30 per cent each.

The primary energy mix will continue to diversify. And this process of diversification will be strongly influenced by energy policy.

I believe that – starting in 1995 and looking ahead to 2025 - we are experiencing **three distinct phases of energy policy** from Governments around the world.



Twenty years ago, we were in the **visioning** phase of post-climate change awareness. Following the 1992 Earth Summit in Rio, the priority was to align around a strong, consistent response to global warming, but with limited concrete ways of achieving this.

Over the last ten years or so, we have been in a phase of **experimentation**. Many solutions have been tested and some, such as Europe's Emissions Trading System, were only partially successful.

There have been subsidies for all types of renewable energy. Global renewable capacity has grown by 76% over the past decade, and energy consumption and GDP growth have begun to diverge, as have energy use and CO2 production.

But there have also been unintended consequences in terms of intermittency and cost to the consumer. In the European Union, for example, where carbon reduction has been mandated by policy, average retail energy prices are more than double those in the United States, where equivalent progress on decarbonisation has been driven more by market forces and - in particular - the revolution caused by cheap, abundant natural gas.

However, despite some setbacks, we have learned a huge amount which will benefit us in the coming years. In particular, we are learning that there are **natural and pragmatic pathways** that should be followed to achieve our energy and climate change objectives most effectively, without triggering unintended consequences.

So, over the next ten years, we should be pursuing material and pragmatic action. We have learned enough to know what to do and which pathways to follow.

For **power and heat**, the natural pathway is to focus on energy efficiency; natural gas; nuclear power where it is supported by Governments; and - over time - the steady growth in competitive renewable generation. It is also essential to move away from unabated coal.

Cost-competitive renewables are an essential part of the power and heat solution, and they are becoming more and more competitive. The levelised cost of utility-scale solar PV in countries such as the US has decreased by 16% a year between 2000 and 2015. The cost of onshore wind is now, in some cases, within the same range as new gas generation.

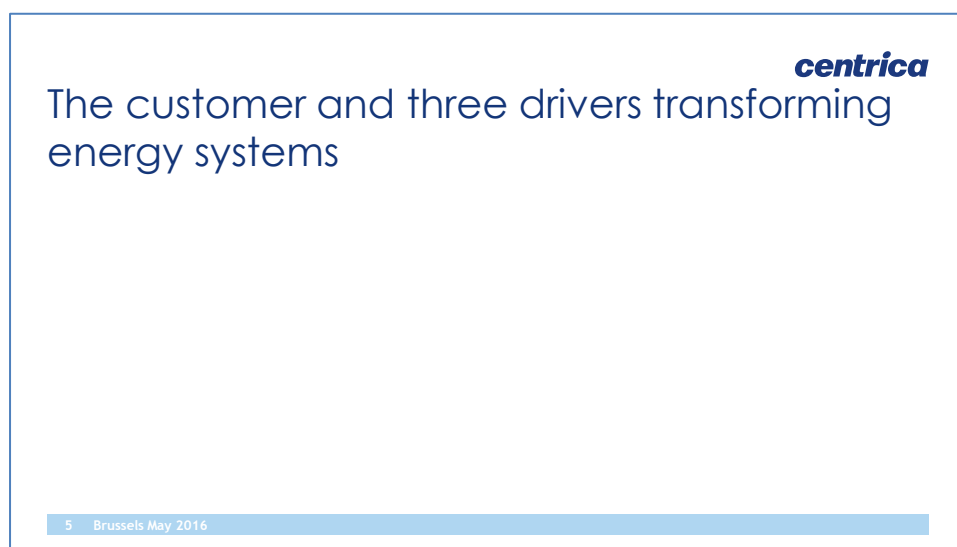
There will be a continued central role for natural gas. Gas, renewables and nuclear are expected to show the fastest growth over the next 20 years as sources of power. Of these, natural gas is likely to play the key material role in the transition to a lower carbon economy for both heat and power. Gas is cleaner than coal, cheaper than nuclear and more reliable than intermittent renewables.

Turning to **transport**, the logical pathway involves: energy efficiency - particularly from smaller, boosted internal combustion engines; hybridisation; some biofuels; and the development of electric vehicles at an average pace which allows for the decarbonisation of electricity production, although some customer segments and markets will adopt at an accelerated pace for reasons of fashion and performance.


Governments clearly have a key role to play in creating the right policy framework to open up these practical pathways and make them easier to pursue.

But it is customers, within the framework established by Governments and regulators, who are the real enablers of change, and their behaviour is fundamental to the future energy mix and where and how energy will be used.

So, turning to my second theme and looking through the lens of the customer, there are **three key drivers** transforming the energy system and changing how, where and when energy is produced and consumed.



The first is **what customers want and are now able to do**. Customers want affordable energy; they want choice; they want control and the ability to use less energy; and, increasingly, they want lower carbon.



Three drivers transforming energy systems

What
customers
want & can
do

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In terms of **affordability**, survey evidence shows that the vast majority of customers in the UK and the United States regard price and affordability as the primary factor influencing their choice of energy supplier.

In terms of **choice** - it has never been greater. In the UK, there are now over 39 energy suppliers and price comparison websites are an everyday tool of choice for millions of energy customers.

Next, there's **control and the desire to use less energy**. More customers are acquiring the means to control their energy use proactively and remotely. In the UK, Centrica has the largest installed base of connected thermostats and we are now selling on average about 4,000 connected products every week under the HIVE brand. To date, we have sold over 500,000 smart thermostats in the UK and North America. 98 per cent of customers with active heating under the HIVE brand feel more in control of their heating and 60 per cent use HIVE to reduce their energy use and save money.

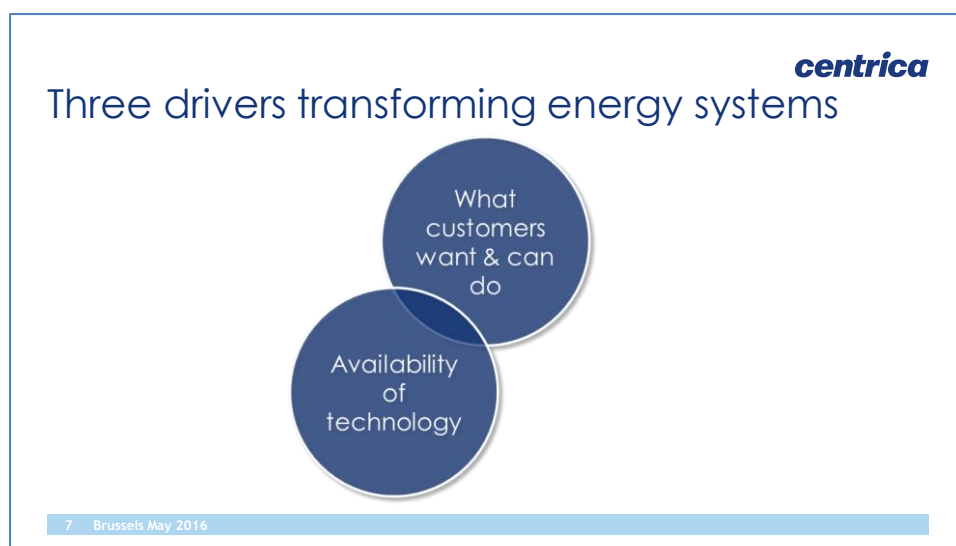
Customers also want to control their own power generation. In 2015, it was estimated 4m households globally were equipped with domestic solar systems, this is forecast to grow to 25m homes by 2020.

In the US residential solar capacity is forecast to nearly double in two years, from 5.4 Gigawatts in 2015 to 10 Gigawatts by 2017 and in Europe solar PV is forecast to account for 12% of Europe's total electricity production by 2030, compared to just 3% today.

Finally, **lower carbon**. Environmental awareness has increased across society and is an important factor in purchasing decisions. In the industrial and commercial sector too, we are seeing more customers who want to make a difference to their carbon footprint.

So, the first key driver transforming the energy system is **what customers want and are now able to do**, which is significantly different to only ten years ago.

The second key driver of change is the **availability of technology**. The viability and use of distributed generation and storage technologies by households and businesses is set to grow rapidly. According to some forecasts, distributed generation, such as solar and small scale flexible gas turbines, could grow from a 2% global market share in 2014, to 12% in 2030.



Distributed energy generation is economic today and will become more so. This is particularly true because of “power-by-the-hour” energy pricing.

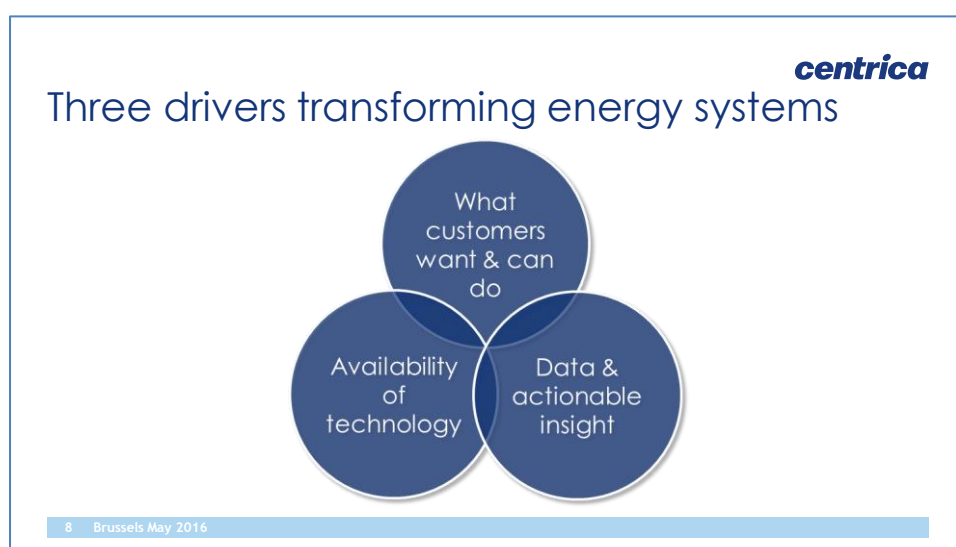
Electricity storage is also poised to become an established and affordable technology. Lithium-ion battery prices fell by over 50% between 2012 and 2015.

Consumer technologies dominate our global culture. It is estimated that the world will have 50 billion connected devices by 2020. By the same year, there will be 200 million smart electricity meters and 45 million smart gas meters in the European Union alone.

Smart meters and smarter grids will enable the demand-side response technologies which allow consumers to become more actively engaged in reducing and flexing their demand.

So, that’s the first two drivers of change: what consumers want and are now able to do; and available technology at the point of use.

The third driver of change is **data and actionable insight**. Smart meters are just one example of the way in which the energy system is becoming more measurable, interconnected and intelligent.



Big data and analytics provide suppliers and customers with the ability to extract meaningful insights from this intelligent system, and change their behaviour, so reducing the amount of energy they consume.

In power generation, for example, the impact on cost effectiveness and optimising performance could be enormous. In a 2015 study, GE estimated that digitising existing power plants could potentially deliver \$50 million in additional value for an existing gas-fired plant over the life of the asset, and save up to \$230 million over the life of a new-build gas-fired plant.

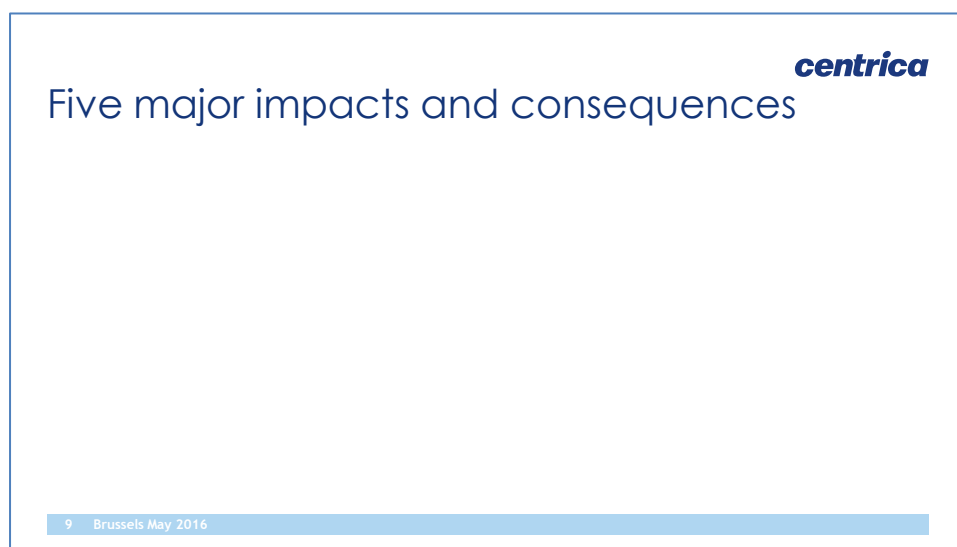
Customers will also benefit from usable data and insight, through energy usage reports, when combined with demand response programmes and time-of-use pricing. In the US, the concept of “behavioural demand response” has already taken off.

Our own North American business, Direct Energy, has already launched a programme which allows customers to earn bill credits for adjusting their consumption during peak weather and demand periods. This uses data to identify critical periods and relay signals back to customers.

So, we have looked at the three drivers transforming the energy landscape at the point of use – what the customer wants and can do; the availability of technology; and data and usable insight.

But the changes in the energy market have consequences for everyone and it’s those global impacts which I’d like to turn to now.

I see **five major impacts** of change.



The first is that there will be a fundamental shift in **where energy is generated and managed**. This arises from more viable technologies, increased choice and many types of solutions. It will give communities, businesses and individuals more control over their energy use. And it will remove the locational separation between generation and consumption.

We can already see the evidence of this in the projected increase of distributed generation and in the growing number of community energy projects.

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Five major impacts and consequences

- Shifts in where energy is generated and managed

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The second impact is that distributed energy has the potential to **accelerate access to energy for millions of people** in developing countries without incurring the large infrastructure costs of building a central grid. There's a parallel here with the telecoms industry. Mobiles have enabled developing countries to become substantially connected without fixed lines.

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Five major impacts and consequences

- Shifts in where energy is generated and managed
- Accelerated access to energy

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The third major consequence of the changes in the energy market is a **new competitive landscape** with new value chains, business models and competitors.

We face new challengers in terms of technology, energy supply and generation, energy management and - of course - access to customers. Google has launched a WiFi router which could double as a smart home hub. Amazon has stepped up its efforts in the Connected Home market, partnering with appliance makers such as GE, and Samsung have announced plans to equip their TV's with smart home hubs - connecting all the smart devices within the home.

So at Centrica, we are going head-to-head with the likes of Google, Amazon and Samsung. We continue to deploy new connected home devices, provide innovative data analytics on energy use and develop new technologies.

Earlier this year we launched the “connected boiler” under the “Boiler IQ” brand using pioneering remote diagnostics and predictive fault detection to alert customers ahead of a critical fault or failure.

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Five major impacts and consequences

- Shifts in where energy is generated and managed
- Accelerated access to energy
- New competitive landscape

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The fourth major impact is that getting from today’s energy market to the energy market of the future will involve **huge complexity in the transition**. The system will be turned on its head and we will see the customer become the price setter rather than the price taker.

One important question is whether distributed energy will increase to the point where it will challenge the economics of the central grid and generating system.

We could see distributed systems, historically seen as back-up, becoming more mainstream, while centralised generation and grid systems are forced to fill more of a back-up role. This would be a huge change.

The capacity auctions which are a feature of many developed markets, and the large scale decommissioning of existing capacity, are both indicators which point in this direction. According to some forecasts, more decentralised new capacity will be added globally over the next decade than centralised capacity.

In the UK, the development of a Capacity Market mechanism is key for securing the right level of supply at the lowest cost to consumers. The mechanism has been proven to work, in procuring capacity at a competitive price. The challenge, however, is ensuring the procurement of sufficient capacity for the medium to long term. The Government has made important improvements in the mechanism which will hopefully incentivise the development of new capacity whilst securing the longevity and reliability of existing assets. I know the Commission is currently considering the role of capacity markets as part of the power market proposals. My own view is that they are an important feature of market reform and necessary to provide long term signals for investment.

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Five major impacts and consequences

- Shifts in where energy is generated and managed
- Accelerated access to energy
- New competitive landscape
- Increased complexity during transition

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The fifth and final impact is that - with all this choice and drivers to use less and lower carbon energy and to diversify the energy mix - energy use and GDP growth will continue to diverge, as will CO₂ emissions and energy use.

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Five major impacts and consequences

- Shifts in where energy is generated and managed
- Accelerated access to energy
- New competitive landscape
- Increased complexity during transition
- Continued divergence of GDP, energy use and CO₂ emissions

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So how is Centrica responding to these changes?

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Centrica's Response

We are an energy and services company. Everything we do is focused on satisfying the changing needs of our customers.

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Logos: Bord Gáis Energy, British Gas, centrica, centrica storage, Direct Energy, DYNO, hive

In addition to serving the 28 million customer accounts I spoke of earlier, we are developing capabilities which we believe will be crucial in response to the trends I have outlined.

We have a distinctive and leading services capability through our team of 12,000 engineers and technicians on the ground in all our geographies. This is a vital capability for the future because, at the point where physical meets digital, customers must be able to trust people to enter their homes and businesses to install and maintain physical and digital infrastructure.

We are pioneers of the Connected Home and we are continuing to build a strong product and technology capability, with good early success. We have over 800,000 smart meter customers in the UK who now receive our unique smart energy report, 'my energy'.

In distributed energy and power, Centrica has the expertise to deliver what business customers need, including energy efficiency, flexible generation, and energy management systems.

We plan to invest £1.5 billion of additional resources in distributed energy and power, the connected home and the customer facing activities within energy marketing and trading by 2020. Since we announced our strategy we have purchased three companies for approaching £400m in areas of energy management and optimisation.

Panoramic Power is a leading provider of wireless, device-level management solutions and cloud-based analytics with over 25,000 sensors deployed at 750 sites in over 30 countries.

We have also expanded our route-to-market capability by agreeing to acquire the Danish company Neas energy, a leading provider of energy management and optimisation services for decentralised and renewable assets. This has increased our activities across major European energy markets and our capacity under management by over 8.5 Gigawatts.

We have also acquired ENER-G cogen, a leader in the supply of combined heat and power solutions to commercial and industrial customers in the UK and internationally.

We will continue to build our capability in all these areas both organically and inorganically, to strengthen our position as a leading 21st century energy company.

So that's a little about what we're doing at Centrica as we respond to these drivers.

So, finally, what should Governments and regulators be focusing on?

The role of Governments

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Aside from customers, Governments are the other crucial participant. They shape the space within which all of this customer-led change can occur, and as a result fundamentally influence the degree and pace of change.

I will focus on the EU, and would suggest there are six key dimensions.

Firstly, the EU must establish a true economy-wide price of carbon. The ETS is not sending a sufficiently strong signal - there are excess allowances at present and too many opt-outs. The reform proposed by the European Commission goes in the right direction but we know its effects will not be immediate. In addition, there are multiple inferred carbon prices in each country and these will need to be rationalised and simplified. As we establish a meaningful price of carbon some carbon leakage to other regions will be inevitable. Waiting for an aligned global price will take too long.

The role of Governments

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- Establishing a true economy-wide price of carbon

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Secondly, the EU must continue to make the internal market for energy as efficient as possible. Today Europe has energy costs which are twice those of the US. This cannot serve us well in the face of the global trends and competition I touched on earlier. We are a net energy importing region and must encourage as

much energy competition as we can and efficient distribution mechanisms. Increasing the number and diversity of energy sources and import routes will also contribute to energy security.

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The role of Governments

- Establishing a true economy-wide price of carbon
- Building a more efficient and competitive internal energy market

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Thirdly, Governments must encourage energy research into, and development and deployment of new energy technologies. Energy RD&D is fundamental to accelerating the pathways I spoke of earlier. Through its Horizon 2020 programme, the EU has the capacity to encourage large-scale pilot projects across Europe in areas such as battery storage. In line with COP 21, the EU RD&D budget should be scaled up and correctly focused as quickly as possible.

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The role of Governments

- Establishing a true economy-wide price of carbon
- Building a more efficient and competitive internal energy market
- Strengthening RD&D programmes for energy innovation

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Next, all of this change will require material investment and access to efficient capital markets. Financing mechanisms for energy investments need to be constructed, perhaps on the model of the European Fund for Strategic Investment. The capital markets must be efficient and effective in providing the injection of investment which is needed.

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The role of Governments

- Establishing a true economy-wide price of carbon
- Building a more efficient and competitive internal energy market
- Strengthening RD&D programmes for energy innovation
- Providing material investment and access to efficient capital markets

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Fifth, there is the area of data privacy. As customers become more involved in how they relate to their energy including generation, storage and efficiency, and as they interact with an expanding innovative set of suppliers and companies, their data and information must be protected. Governments must establish frameworks to ensure data privacy without constraining innovation unduly. Regulation must enable innovation and the expansion of more sophisticated offers while dealing with concerns over privacy. We are interested in what the Commission will propose to ensure free flows of data and provide certainty to businesses on emerging issues such as data ownership, interoperability and usability.

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The role of Governments

- Establishing a true economy-wide price of carbon
- Building a more efficient and competitive internal energy market
- Strengthening RD&D programmes for energy innovation
- Providing material investment and access to efficient capital markets
- Protecting customer data and information

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Finally, I would encourage the EU and Member State Governments to focus on consistency of policy. The market participants can cope with complexity as long as it is predictable. Consistent policy enables companies and other participants to make medium term choices and investments. Too much change, and too many new mechanisms create complexity and a sense of apprehension and wariness to invest. This area is not a strength of the EU, and needs to be rectified. While I recognise there is a lot of effort being put into the Energy Union by Vice President Sefcovic and Commissioner Canete, I fear this goal of policy consistency will continue to be difficult to achieve.

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The role of Governments

- Establishing a true economy-wide price of carbon
- Building a more efficient and competitive internal energy market
- Strengthening RD&D programmes for energy innovation
- Providing material investment and access to efficient capital markets
- Protecting customer data and information
- Focus on consistency of policy

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So I have now covered: the energy context and what we have learned; the revolutionary changes taking place with the customer as we move towards a more distributed energy system; the consequences I see of these global trends; and what Governments and the EU can and should do about them.

All these impacts lead to **two over-arching conclusions**.

The first is that the energy system is changing rapidly and the customer is going to be at the heart of this change. There will, inevitably, be winners and losers as we make the transition to the energy market of the future.

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Summary

- The energy system is changing rapidly
- The customer is going to be at the heart of this change
- There will be winners and losers
- Governments and regulators have a crucial role to play

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Some infrastructure across both central generation and grid capacity will never be fully utilised. In 2014, European utilities mothballed or decommissioned a total of 50 Gigawatts of capacity, 4.5% of total power capacity and 8.3% of thermal plus nuclear capacity. It is difficult to see that trend reversing itself. Much undifferentiated central generation capacity will continue to earn marginal or, at best, cost-of-capital returns.

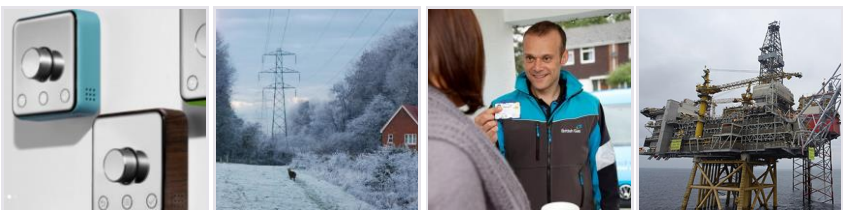
Some hydrocarbons will be left in the ground. In all these supply sectors, including in exploration and production, the winners will be those with advantaged assets.

The second conclusion is that Governments and regulators have the other crucial role to play, in setting the boundaries and the envelope within which all of this change can take place. How this is done, and how simply and consistently, is crucial to the pace of change and to the destination.

This is a transformational moment for the energy industry, which bears comparison to the revolution we have seen in the communications sector over the past 20 years. It is difficult for Governments to grasp the implications of these changes and challenging for businesses like ours to manage them.

But if we get it right, the real winner will be the consumer, and those of us who can respond to this transformation with new capabilities and imagination.

Thank you.



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