Policy priorities for a clean energy future

Helping our customers to deliver decarbonisation in Europe



Our Climate Ambition

Helping energy customers reduce emissions in line with the long-term decarbonisation goals of the Paris Agreement

On 28 November 2018, the European Commission published the EU Long Term Decarbonisation Strategy that sets out a variety of scenarios for the decarbonisation of the European economy by 2050.

As a forward-looking and innovative company, Centrica welcomes the EU long-term decarbonisation strategy.

In addition to reducing its own carbon footprint, Centrica's ambition is to help energy customers reduce their emissions - through energy efficiency, low-carbon energy technologies and digitally-enabled services, so that working together we can deliver the changes that are necessary to fight climate change. Decentralised platforms are now emerging alongside traditional, centralised suppliercustomer relationships. These platforms will offer multiple opportunities for optimisation of energy systems, decarbonisation and competitiveness. After a first stage of energy transition that was policy-led, the second stage of the transition will be technology-led.

Reaching net-zero emissions in a cost-efficient manner.

Achieving net-zero emissions ambitions for the EU has been a central element of the public discussion so far. Centrica believes the Paris Agreement has been a turning point in the response to climate change, therefore we are in principle supportive of this long-term objective. Policymakers should however consider the possible available pathways that are realistic and cost-effective for different economic sectors, bearing in mind the need to maintain European competitiveness internationally.

A single set of binding objectives for CO₂ reductions, underpinned by robust carbon pricing.

Centrica believes that carbon pricing is the most cost-efficient way to drive carbon reductions in a technology-neutral manner. Global carbon pricing mechanisms covering all sectors of the economy remain the ideal framework, and it is vital for governments to jointly pursue that objective.

Enabling our customers to use energy more sustainably

2022

Help our customers reduce emissions in line with Paris goals

Help our customers reduce their emissions by 15%, by direct (target 2%) and indirect action). system access and optimisation.

2030

2022

Help our customers reduce their emissions by 25%, by direct (3%) and indirect action.

2030 Deliver 7GW of flexible. distributed and low-carbon technolgoies as well as provide system access and optimisation services.

Climate change will always be best tackled on a multilateral basis.

The EU should play a leading role in driving implementation of Article 6 of the Paris Agreement, as it sets the foundations for the development of a robust global carbon emissions market. Building on the recent Swiss link, further links between the EU ETS and other regional emissions trading schemes should be created (e.g. the future UK ETS), as emissions can be reduced more cost-efficiently as the size of the carbon market increases.

Enable a decarbonised energy system

Reduce our own emissions in line with Paris

Deliver 4GW of flexible. distributed and low-carbon technologies as well as provide

2022

Reduce our 'internal carbon footprint' by 35% (from 2015).

2030

Demonstrate we are on track with Paris and develop a path to net zero by 2050.

"Our strategy is built around climate change. We help our customers reduce their carbon footprint, we reduce the emissions of the energy system and finally we reduce our own emissions. Over the last decade we have reduced our own emissions by 80%."

Iain Conn, Chief Executive of Centrica, 22 February 2019

Maximising the deployment of renewables to fully decarbonise Europe's energy supply as efficiently as possible

Electricity is likely to be the most effective route to decarbonise large parts of the economy. It is therefore essential to reduce emissions in the power sector before switching more activities to electricity.

Centrica views the deployment of renewable energy as a key part of the future energy system. But a suitable market framework is necessary for this deployment, along with a stable climate for investments.

The following issues should be considered by policymakers:

Optimising renewable assets

The growing share of variable renewable generation requires a higher flexibility and responsiveness in energy systems, not only in the production and consumption of energy, but also in trading. Short-term asset optimisation allows for cost-efficient balancing of volatile production. Machine Learning opens new possibilities thanks to algorithmic trading that better predicts variable renewable energy production and generates more value out of renewable assets. In addition, Centrica Energy Trading ensures that energy can flow from high supply areas to high demand areas across interconnected energy markets.

Providing stable revenues for renewables

In recent years several initiatives to phase out subsidies and make renewables operate on market terms across Europe have evolved. Onshore wind projects are being developed without any subsidies and the latest tenders for offshore developments have been won with zero cost bids. In this context, Centrica provides the necessary financial structuring and physical trading instruments to ensure stable profitable operations and balanced risks from renewable infrastructure investments. Today Centrica has 8.88 GW of renewable generation under management across Europe.





Power Purchase Agreements have emerged as important commercial ways to ensure financing of renewable infrastructure investments, and Centrica has been one of the pioneers within PPA-based projects. Renewable developers need to get their power to market, while many corporates are committing to buying up to 100% renewable power. Centrica helps to meet both needs by structuring mid- to long-term contracts. The generator gets revenue certainty and the end-user is guaranteed green electricity at a given price.

Our activities for climate

Power Purchase Agreements (PPAs):

The power generation needs to be forecasted, scheduled, dispatched and balanced. Centrica needs to shape the unstable production profile from renewable generation into a standard baseload contract to meet the consumption profile from the corporate offtake and needs to offtake the surplus generation since a PPA will usually range between 60 to 85 % corporate offtake.

Overall, Centrica sees the growing need for advanced financial structures to manage market risks in the renewable energy infrastructure investment community.

Platforms and aggregation as facilitators

Battery storage and optimisation services, all managed by smart platform technology and new peer-to-peer trading arrangements play an important role in integrating variable renewable power cost-effectively. By 2050, wind and solar technology are expected to provide almost 50% of total electricity globally (Bloomberg New Energy Outlook, 2018). Digitisation will help reduce the need for investments in back-up generation, by optimising energy demand and supply at all times. For example, in the EU, in 2040 the combination of demand response and additional storage is expected to allow the system to accommodate 67 TWh of additional generation from variable renewables and to avoid 30 Mt CO₂ emissions (IEA, 2017). Centrica does not believe decarbonisation can take place in line with EU ambitions without fully exploiting the potential of digitisation.

A continued role for gas

It is widely accepted that natural gas will play a transition role and could potentially play a permanent role in the energy system if it can be decarbonised. While supplying natural gas to heat homes and businesses and provide flexible backup power to variable generation, we will continue to explore the opportunities to deploy low-carbon heating solutions, including high-efficiency gas technology (for example new forms of hybrid boilers or CHP hybrids), heat pumps and in the longer-term renewable and decarbonised gas. Clear definitions of what can be considered 'renewable' gas and what can be considered as 'decarbonised' should be included in any future legislative frameworks.

Policy Recommendations



Reward flexibility solutions

Flexibility solutions (storage, demand response) should be allowed to access all markets in all timeframes. This should include Capacity Markets. This is necessary to allow revenue-stacking from different markets. A business case can then emerge for non-subsidised technologies. Network charges should be reformed to support the use of flexibility assets. Fixed network charges discourage energy efficiency and neutralise demand response. They should be avoided.

Support PPAs

Removing barriers to Power Purchase Agreements across Member States should be a priority, including a) mitigating uncertainty about future electricity prices, through longterm guidance on regulated components of the electricity price, b) the introduction of market-based support schemes for renewable electricity, c) EU-wide compensation for indirect EU ETS costs (to support electro-intensive industries rather than carbon-intensive industries).

Our activities for climate

Biomethane

In 2018, Centrica acquired a 50% stake in Barrow Green Gas (BGG). BGG is the UK's biggest shipper and supplier of biomethane. Their sales of Green Gas Certificates have reached 1 TWh of green gas. The deal gave Centrica access to leading expertise in the biomethane market and strengthened its ability to offer customers a wider choice of renewable energy products.



A target for renewable and decarbonised gases

Renewable and decarbonised gases can help reduce emissions, especially in the heating sector, but a regulatory framework that encourages the use of this new technology is essential. Alongside other technical adjustments to regulation in this area, the EU should consider introducing a 10% target for renewable and decarbonised gases in total gas consumption by 2030.

Embracing clean, safe and connected mobility

As emissions from transport continue to grow, the development of clean mobility is a key next step in the challenge of dealing with climate change. A combination of solutions will be needed across transport modes and segments.

Centrica is both engaged in the support of the deployment of charging infrastructure for electric vehicles and in the provision of software which facilitates the navigation of consumers in the electric mobility environment. Centrica is also offering tailored electricity tariffs for electric vehicles to further enable the uptake.

Two matters should be prioritised:

Support cost-effective clean mobility solutions

The new IPCC report issued in 2018 as well as the most recent EEA annual assessment display a worrying increase of EU transport carbon emissions for the fourth year in a row. A set of solutions will be required to address this challenge. For cars and urban transport (vans, buses), electric vehicles hold great potential as they are set to reach cost parity with Internal Combustion Engine vehicles within the next 2 to 7 years (depending on vehicle segment). In future, renewable and decarbonised gases could also find a role in some transport segments, for example heavyduty vehicles.

Make charging infrastructure a priority

As an energy supplier Centrica sees the need to integrate electric vehicles into the energy system as efficiently as possible. Rolling out electric vehicles should be supported by a functioning charging and billing system that is brought to consumers in a simple and understandable way.



Rolling out EV charging points

Centrica supports charging services for fleets and business, operating across UK, Ireland and North America, where it provided 17,000 installations. The intelligent software system combines charger, billing, and energy management in a user-friendly platform providing users with excellent functionality, reliability and visibility over charging operations. The charging solutions can also be combined with onsite energy generation and optimisation.

Optimise Prime trial

Centrica is a partner of Optimise Prime, the first and largest Commercial EV trial ever undertaken in the world with 2,000 -3,000 vehicles participating. The project brings together companies from across sectors: electricity networks (UK Power Network, SSE), technology companies (Hitachi Vantara), fleet managers (Centrica, Royal Mail, Uber) and transport companies

Policy Recommendations



Post-2030 trajectories for vehicle CO₂ standards

Following the adoption of CO_2 standards for 2030 for cars, vans and trucks, and whenever EU 2050 climate ambitions are agreed, the EU should consider introducing clear post-2030 trajectories to align CO_2 standards with Paris objectives.

Track progress on EV charging, propose new targets when relevant

Building EV charging points constitutes the main barrier to electrification of transport. As EVs reach cost parity with ICE vehicles, the EU should consider reviewing the targets for EV charging points as part of the review of the Alternative Fuels Infrastructure Directive foreseen before December 2020. It should also monitor Member States' transposition of Article 8 of the 2018 Energy Performance of Buildings Directive (which provides targets for EV charging points on parking spaces of new and renovated buildings). A review should be proposed if no sufficient progress has been achieved.



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Our activities for climate

(Hitachi Capital Vehicle Solutions) to test and implement the best approaches to the EV rollout. It is a three-year project that aims to create a blueprint for a smarter and more sustainable UK-wide connected EV system. It will examine the impact of electrification of transport on the distribution grid and will explore opportunities to minimise this impact, by optimising network and charging infrastructure, providing network services and testing technical and commercial solutions.

Investment in Driivz

In another project to promote electric mobility, Centrica has invested in Driivz, an Israeli start-up that offers end-toend software solutions for EV charging. Established in 2012, Driivz has developed a cloud-based EV charging operating system that is already used by over 200,000 drivers across the globe. The platform offers a new intelligent EV charging service offer for businesses.

Investing in flexibility and energy efficiency for European industry and buildings

Buildings are responsible for approximately 40% of energy consumption and industry represents about 25%. As part of the Energy Union agenda, the EU rightly underlined the importance of 'Energy Efficiency First'. Centrica views energy efficiency and energy savings as a fundamental part of both society's ability to reach the Paris Agreement targets and a core part of its business model. Centrica is focused on allowing both its industrial and household customers to save energy through a set of developed projects and applications.

Europe needs to maintain its competitiveness as it decarbonises. Whilst the investments that lead to carbon-free electricity are essential, policymakers and businesses must also focus on increasing efficiency and reducing costs as far as possible in the buildings, transport and industrial sectors as electricity demand rises. Centrica is focused on making European industry and households more efficient and competitive by using innovation to drive efficiency.

To deliver on this priority, the following elements will be key:

In the commercial and industrial sector, distributed energy solutions can increase efficiency and save costs

Distributed and low-carbon technologies can provide much needed flexibility to the grid. Distributed energy solutions include high-efficiency cogeneration, solar PV, battery storage, Demand-Side Response (DSR). They can be complemented by the generation of insights through realtime data analytics and the deployment of energy management solutions.

Our goal is to deliver 4GW of flexible, distributed and low-carbon technologies by 2022 and 7GW by 2030

In our report ("Distributed Energy -Powering Sustainability", October 2018), we argue that, if just 50% of organisations in the industrial sector adopted distributed energy solutions, annual emissions savings of 7.2 MtCO₂e could be achieved in the UK. That would be equivalent to 11% of the sector's current carbon footprint. By 2030, total cumulative emissions savings would amount to 106 MtCO₂e.

Driving efficiency in the building sector is another key route for energy savings

Through our connected home activities, we provide market-leading products and services that give customers greater choice, control and understanding over their energy. Our IoT smart home solutions allow customers to control their heating and lighting devices at home. Our research concluded that 55% of Hive customers tell us Hive has helped them save money and that savings of over 150 Euros per year are achievable. They reduce their gas consumption by on average 12.6% in the first 12 months following installation of Hive Active Heating (our Hive smart thermostat controlled remotely).



Reducing energy bills for all consumers

Decarbonising heat will be a longterm opportunity for consumers and companies. Our engineers currently provide tailored surveys and energy efficiency advice to our customers on the basis of smart meter readings, if customers have provided their consent. Through the analysis of granular smart meter data, we can encourage greater energy efficiency and provide additional services, such as fault detection services.

Our activities for climate

Demand response for ArcelorMittal in Belgium

In March 2014, two steel plants - one owned by ArcelorMittal and one owned by stainless steel producer, Aperam - started to assess the opportunity to participate in the capacity market in Belgium. A critical question was whether it was possible to limit power to machinery fast enough, and long enough, to qualify for Demand Side Response (DSR).

ArcelorMittal could not allow power to its electric arc furnaces or hot and cold roll mills to be curtailed during certain hours in the day. In addition, the local operations teams were concerned that steel quality and customer delivery would be impacted if machinery was without power for certain periods. On its own, it was likely that ArcelorMittal would not be able to meet the transmission system operator's (TSO) stringent requirements for DSR participation.

The results: Both the ArcelorMittal and Aperam plants were aggregated into Centrica Business Solutions' DSR portfolio. The landmark agreement allowed Arcelor Mittal to return 150 MW to the transmission grid at peak periods. When circumstances meant that ArcelorMittal's plants couldn't curtail power, another company in the portfolio could step in as a substitute, ensuring that the TSO had the required power available at all times. This pooling approach ensured that ArcelorMittal's local operations team could carry on with business as usual, whilst still enabling the company to generate revenues through participating in the capacity market.

£1m energy savings for NHS hospital

St George's Hospital in London is one of the largest teaching hospital in the UK. It had been served by a 40-year-old energy centre, which had grown increasingly inefficient, and was incapable of meeting new environmental targets. In response, the hospital partnered with Centrica Business Solutions to create a new energy strategy for the hospital as part of a 15-year Energy Performance Contract (EPC).

The contract included the installation of two Combined Heat and Power (CHP) units and four boilers, which form the energy centre. Centrica Business Solutions also introduced a number of schemes across the site, including lighting, a building management system, chiller replacement and split unit air conditioning optimisation.

The hospital's trust is guaranteed to save more than £1m a year during the 15-year contract with Centrica Business Solutions. It will also save 6,000 tonnes of carbon a year, the equivalent of the emissions from 3,000 cars. The savings allow the Trust to invest more in-patient care and teaching medical staff.

Policy Recommendations

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An integrated approach to climate, energy and industrial policy

To achieve emissions reductions in the industrial sector, the EU should aim for a competitive industry underpinned by low-carbon energy and technology. Following the EU Battery initiative, the EU should consider encouraging other enabling technologies for the energy transition, such as electrolysers and Carbon Capture and Storage.



compulsory across Member States.



A robust smartness indicator for buildings

The Smart Readiness Indicator for buildings being developed by the European Commission should ensure it adequately rewards buildings equipped with smart IoT appliances, Demand Response capability and EV charging points and takes into account the energy efficiency that is being achieved. If the initial phase brings results, it should be made

Building the smart energy infrastructure for the future

The energy market of the future – for both industry and households - will have to be smart. The way in which customers and energy suppliers interact will be of an entirely new nature, hand in hand with the new integration of services in other sectors, such as transport or home care. Centrica has embraced this challenge in recent years, changing our business model to put the customer at the centre of the energy system.

Centrica is developing new business models and solutions for its customers. New platform models like Home Energy Management Systems offer viable options for customers.

We will have to consider:

The rise of the platforms

Decentralised platforms are now emerging alongside traditional, centralised suppliercustomer relationships. Households and businesses are increasingly generating their own energy and have more than one supply arrangement. Battery storage, electric vehicles and demand-side response, combined with new market structures and the coalescing of platforms, will change the face of the energy sector as we know it. This will require a grid that can deal with a huge amount of complexity.

Data as the facilitator

Through data management and artificial intelligence techniques, insights can be generated out of the vast amounts of raw monitoring data within the grid, from production sites to customers' home appliances. Such data will offer multiple possibilities. For that reason, all nonconfidential data (real-time and historic) that TSOs and DSOs have access to should be made available to system users can identify 1) where reinforcement works are likely to be needed and 2) where DSOs are seeking flexibility services from DSR, storage and other flexible Distributed Energy Resources (DER).

Local flexibility

The role of local energy networks (DSOs) is changing. DSOs are increasingly under pressure to guarantee balancing energy at a local level, a point where Centrica can offer 'local flexibility markets'. Businesses and homes will have the opportunity to become integral parts of these markets, opening up more possibilities for customers to interact and save money. Centrica wants to ensure that smart home and business solutions are installed, upgraded and can function properly and remain well-maintained.

Smart energy solutions are here

Building on our experience as the leading installer of smart meters in the UK, Centrica can develop additional services to improve customer experience. We already provide tailored energy efficiency advice to these customers if they consent to sharing their data with us and the rest of the market. Our data science teams explore use cases for machine learning and blockchain. They are working to develop AI-enabled added-value services for customers, for example by leveraging 10-second smart meter data to provide tailored real-time energy use insights. With the expected arrival of 5G we can expect IoT applications in the smart home to become even more performant, carrying larger amounts of data.



Figure 1 Home Energy Management Systems (source: Centrica)

Home Energy Management Systems for tomorrow

Centrica wants to help customers reduce emissions through the integration of different low-carbon, smart solutions in homes. For example, the connection between battery storage with EV charging points, solar PV or home automation, where a flat rate for energy supply would be charged. It represents a move from energy commodity supply to managing generation, storage and appliances in the home with value created through the installation, maintenance, financing and energy management services of these assets.

Policy Recommendations



Strike the right balance between data protection and data-driven innovation

Consent requirements for the processing of data need to be flexible to not constrain data-driven innovation. Policymakers should consider opt-out programmes which are more likely to favour mass participation in smart energy activities (eg. demand response) and result in largescale societal benefits, particularly in terms of emissions reductions.

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Explore possibilities offered by Peer-to-Peer energy trading

Policymakers should facilitate the development of local flexibility markets and micro-grids for better local balancing. Peer-to-peer trading between renewable asset owners and consumers can be constrained by supplier license conditions (eg. only one supplier relationship per household) and prevent the development of new balancing solutions at local level.

Trialling a local flexibility market in Cornwall

The Cornwall Local Energy Market (LEM) is a €22m pioneer project led by Centrica's Distributed Energy & Power business and financed by the EU through the European Regional Development Fund (ERDF). The project is an eBay-style platform that facilitates the selling and buying of energy and flexibility on the distribution network. Along with its partners Western Power Distribution, National Grid, Imperial College London, and the University of Exeter, Centrica is testing the use of flexible demand, generation, and storage across both the domestic and business sectors.

The Cornwall LEM is developing a virtual marketplace that will provide participants with a platform to buy and sell energy and flexibility both at the local and national level. Centrica will be installing new generation and storage technology into Cornish businesses and homes as well as providing energy audits and grants for energy monitoring equipment.



Our activities for climate

- The LEM has been established to work with the following key groups:
- Businesses providing grants for energy monitoring, energy audits and smart technology upgrades, with the aim of unlocking money-making potential and reducing energy costs for approximately 60 businesses.
- Renewable generators funding to be made available to enable projects that might not otherwise happen, or release currently curtailed renewable energy generation.
- Householders free generation and storage units to be installed in up to 100 homes, combined with the very latest in smart technologies to potentially help them to drive down household bills.

Who we are

Centrica is an international energy and services company focused on satisfying the changing needs of our customers. We employ 30,000 people and supply energy and services to over 25 million customer accounts mainly in the UK, Ireland and North America through strong brands such as British Gas in the UK and Bord Gáis Energy in Ireland, supported by around 15,000 engineers and technicians.

Centrica is responding to key trends in the energy sector (decentralisation, customer empowerment, digitalisation) by focusing investment on our customer-facing businesses. We see long-term growth potential in five key areas: energy supply; services; connected home; distributed energy & power; energy marketing & trading.



Our global reach



To find out more about Centrica's responsible business ambitions, visit **www.centrica.com**

April 2019



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