Scotland's Draft Energy Strategy
Response on behalf of Centrica plc

Centrica welcomes publication of the Scottish Government's draft Energy Strategy at a time of change and challenge for the energy sector. We recognise the strategic value of aligning the strategy to the Scottish Government's ambitious Climate Change Plan and acknowledge the value of pursuing a sector by sector approach.

This whole system approach is to be welcomed but it is not without challenges. We recognise from the draft strategy that energy efficiency remains, rightly, a priority. But there are entrenched issues around hard to treat homes, rural off grid properties and how to stimulate the able to pay market. We also recognise that the decarbonisation of heat remains an issue and consider this in detail within this submission. We hope that our expertise in these areas and others can make a valuable contribution to the development of the strategy going forward. Underpinning our response is the question of cost effectiveness and consumer fairness which must lie at the heart of future energy use and provision.

The Scottish Government's consultation represents an opportunity to develop a new partnership between businesses and Government. This should be a partnership where the Government focuses on creating the conditions for businesses of all sizes to grow and flourish; and where businesses invest in the infrastructure, jobs, skills and technology that can upgrade our economy for a post-Brexit world.

We also believe smart energy will play a transformative role in helping customers to reduce their energy bills and businesses to lower their production costs and increase their productivity. We are leading the UK's smart meter rollout and investing in new technology through our Connected Home and Distributed Energy & Power businesses.

To ensure businesses, large and small, are able to play their part and deliver the growth and prosperity that Scotland needs, we believe the Scottish Government must ensure this strategy is a true partnership with industry by recognising the importance of long term policy certainty and competitive markets.

About Centrica

Centrica is a FTSE 50 energy and services company, headquartered in the UK, employing around 36,500 full-time employees worldwide including 4,200 employees across five sites in Scotland. Our business is focused on satisfying the changing needs of our customers across a number of international markets. We are concentrating our growth efforts in five key areas - Energy Supply, Services, the Connected Home, Distributed Energy & Power and Energy Marketing & Trading. We supply energy and services to around 28 million customer accounts mainly in the UK, Ireland and North America through strong brands such as

Scottish Gas, British Gas, Direct Energy and Bord Gáis, supported by around 12,000 engineers and technicians.

Scottish Gas, Centrica's energy and home services brand in Scotland, serves over 1.5 customers accounts - more than half the homes in Scotland. We are focused on delivering high levels of customer service, and improving customer engagement and rewarding loyalty. We are developing innovative products, offers and solutions, underpinned by investment in technology. We are using new technology and innovation to meet the changing needs of customers. We are leading the smart meter roll-out in the UK, with around 4 million smart meters installed in homes and businesses so far, and we plan to invest £1.2bn in our Connected Home and Distributed Energy & Power businesses between 2015 and 2020.

These investments will allow us to continue to roll out new products, offers and services to customers. We have over 500,000 Hive hub customers and more than 360,000 Hive Active Heating customers in the UK.

We continue to develop solutions for business customers, including our Panoramic Power devices, which provide detailed insight into energy consumption, helping businesses manage their energy usage and save money. We have also recently announced a new £100m venture 'Centrica Innovations' that will identify, incubate and accelerate new technologies and innovations.

In addition to our customer facing business we remain one of the largest producers in the North Sea and as well as operating a number of central power generation assets in the UK we have a 20% stake in the existing nuclear fleet. Our interest in the draft energy strategy is therefore clear. We are happy to provide our insight in key areas, though we have confined ourselves to those questions were we consider we have a particular locus or perspective.

Section One: Meeting Scotland's Energy Supply Needs

Question 1 – Overview: What are your views on the actions for Scottish Government set out in chapter 3 regarding energy supply over the coming decades?

Centrica welcomes the Scottish Government's consultation at a time of fundamental change in the energy sector and supports its ambition to develop a whole system approach in delivering a low carbon future.

We note that there has been a continuing rise in the proportion of installed renewable generating capacity over the last decade. By the end of 2016 there was some 35GW of installed renewable capacity connected to the grid, 14% higher than in 2015.[1] In addition, of the 16GW of new generation built over the past 5 years, 80% has been renewable generation.[2]

Looking ahead, we note that the proportion of renewable generation connected to the grid is set to continue to increase with Scotland well placed to continue to benefit from further wind and solar development.

Rising volumes of intermittent generation place a growing need on reserve capacity, reliable baseload generation and flexibility services, such as demand side response.

[1] BEIS, DUKES, May 2017
[2] Carbon Brief, 2016

We therefore believe it is right that the Scottish Government seeks to focus on all of these areas as it considers the future of the energy supply in Scotland.

We have set out below some further detail around each of the core areas.

1. <u>The Increasing Role of Distributed Energy and Flexibility</u>

Providing large energy users with control over their energy consumption not only allows them to reduce costs, but also allows for the delivery of flexibility services to provide for the better management of grid demand. We believe this new "distributed energy" model is an important growth area and has an important role to play in delivering demand side response services for the grid, so helping manage challenges associated with peak demand and intermittency.

We are currently investing £700m in our new distributed energy and power business to 2020. Our distributed energy proposition is based around three key pillars:

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- Energy insight: brings customers visibility of real-time electricity use so they can understand how they're using energy and help them to identify opportunities to harness the flexibility of their assets through demand side response and/or install new technologies.
- Asset optimisation: aims to help customers to unlock new revenue streams through demand side response, using the data and aggregation services provided by our NEAS business.
- Energy solutions: offers a range of solutions such as energy storage and onsite generation such as combined heat and power (CHP) and renewable technologies, alongside energy efficiency measures.

To widen our portfolio of flexible generation assets we have committed to a £180m investment programme in four new flexible power generation and storage facilities. We are also investing in a 49MW battery storage facility in Cumbria, which will be one of the world's largest and most sophisticated sites of its kind, capable of responding to fluctuations in demand in less than a second and holding enough power to meet the needs of around 50,000 homes. Construction started in March of this year and we expect the facility to be operational next year.

As the Scottish Government considers the longer term future of energy supply we believe it is important that the growing role of distributed energy and demand side response is understood and steps are taken to help raise awareness of the opportunities, especially within the larger business community.

2. <u>Oil, Gas & Nuclear Plant Power Generation</u>

We also believe cost effective investment to maximise the productive lifetime of existing generation assets is important.

The two existing nuclear generation plants in Scotland, Hunterston B and Torness collectively provide electricity supplies to up to 3.7m homes. Centrica has a 20% equity holding in both power plants and we consider each has an important and continuing role to play in delivering secure, low carbon baseload generation. We consider the opportunities for plant life extension of both plants, where appropriate, will also provide an important opportunity for continuing, cost effective power generation into the future.

We also the actions setting out the Scottish Government's commitment to working with the OGA, UK Government and industry to support the oil and gas sector.

Centrica remains one of the largest gas producers in the UK North Sea and in December 2016 we announced that the Cygnus gas field had come on-stream and is on course to be the largest producing gas field in the UK in 2017 – producing enough gas to heat around 1.5m homes.

We are also looking at some further potential new developments, such as the Pegasus field, in the Southern North Sea .Earlier this month we announced plans to invest £35 million in our Chestnut field – extending the life of the field and trebling production.

Similar to all operators working on the UK Continental Shelf in the current climate, we are more focused than ever on making sure we have a competitive cost base to ensure our activities in the North Sea remain cost effective into the future.

We therefore continue to look at new ways of approaching projects and developments in the North Sea. For example, we've hosted our own Hackathons and supported the Oil & Gas Authority on similar events to discuss how new technology and a collaborative approach can make previously challenging projects viable. We would be happy to discuss this approach further with the Scottish Government.

3. Unconventional Oil and Gas

While we remain committed to the continuing cost effective development of North Sea reserves, we also believe efforts should be made to explore the potential of indigenous shale gas reserves. Gas will continue to play an important long-term role in both the heat sector and power sector, and we consider it is right that further strategic thinking is given to developing the indigenous shale gas reserves across the UK.

Centrica is a joint venture partner with Cuadrilla in a shale exploration project in the Bowland Basin, where there is an estimated 1,300 Trillion Cubic Feet (TCF) of gas in-place in (UK annual consumption is 3TCF). We believe more can be done to support the efficient and effective processes necessary for determining planning applications for shale projects, as well as assessing whether all parts of the UK have the right infrastructure and supply chain in place to capture the employment, skills and investment opportunities shale gas could generate.

We believe that there is an opportunity to explore the potential of natural gas from shale to provide safe, secure energy to millions of homes and businesses, while driving forward much needed investment and jobs.

4. Carbon Capture and Storage (CCS)

We note the reference to the development of CCS technology in the consultation paper. We consider that the best opportunity for CCS technology is connected to the potential growth in hydrogen use for domestic heating.[3] . However, we note there are likely to be more cost effective routes to decarbonise heat (at least in the intermediate term) and the case for the cost effective, mass deployment of hydrogen has yet to be made.

Question 2 - What are your views on the proposed target to supply the equivalent of 50% of all Scotland's energy consumption from renewable sources by 2030. In answering, please consider the ambition and feasibility of such a target.

We recognise that the Scottish Government has made progress towards its renewable targets and believe it should continue to build on its successful record on renewables. However, we consider that the target itself remains challenging.

[3] The decarbonisation of heat is likely to require carbon capture and storage (CCS) if hydrogen emerges as a viable option (so as to capture the CO2 by-product at the production stages)

As set out in our response to question 1, increasing volumes of intermittent generation also require significant, diverse investments in flexibility, and back-up generation to ensure energy supplies remain secure and affordable.

We also note that the Scottish Government should consider basing any target on carbon and not on a specific subset of technologies, i.e. moving from a "renewable" ambition to a "low carbon" ambition.

This will make explicit that very low carbon generating technologies, such as nuclear, have a clear, continuing role and that high efficiency, micro technologies, used domestically (such as Gas Absorption Heat Pumps, micro-CHP and hybrid heat pump-boilers) also have a role to play. This is increasingly significant in light of the 5th carbon budget set by the Committee for Climate Change which covers the period 2028-2032, and requires a radical step change (a 50% reduction) in carbon emissions from heat.

Question 3 - What are your views on the development of an appropriate target to encourage the full range of low and zero carbon energy technologies?

We believe that the carbon budget process overseen by the Committee for Climate Change and legislated carbon reduction targets (the Climate Change Act) provide the right overall framework for carbon reduction.

Alongside this, we consider that market based frameworks and incentives are the best route through which investment in low and zero carbon technologies can be delivered, i.e.:

- **The capacity market and contract for difference allocation process.**

  Regular capacity market auctions have helped support investment in low carbon and flexible generation (Centrica's own flexible generation assets and DSR capacity received contracts under the 2016 T-4 and 2017 T-1 auctions). Importantly, the transition to a market based auction process has also helped place significant downward pressure on costs, ensuring best value is delivered for customers. We also note that the CfD allocation process is set to transition to a technology neutral auction based approach, which we consider will drive similar cost reductions in the support provided to new low carbon and renewable technologies.

- **The Carbon Price Floor and continued participation in the EU ETS.**

  A robust carbon price signal provides a strong incentive for investment in low carbon, higher efficiency technologies. In recent years the CPF has been the main driver in the switch from coal to gas generation, and since its introduction in 2013, emissions across the UK have fallen by nearly 14%.[4] Going forward we consider it important that clarity is provided about the future of the carbon price floor trajectory (which has not been confirmed beyond 2020/21) in order to ensure a robust price signal remains.

  In the context of Brexit, we also consider it important that there is continued participation in the EU Emissions Trading Scheme. While the EU ETS price has remained low in recent years, we believe reforms to Phase IV of the scheme (which is set to run from 2020 – 2030) will deliver a more robust carbon price.

- **Cost effective grants/subsidies**

  Feed in Tariffs have been successful in significantly reducing the cost of renewable technology (in particular onshore wind) and we believe there is a wider role for other incentives to bring forward other low carbon investment, i.e.:

[4] Carbon Brief, https://www.carbonbrief.org/analysis-uk-emissions-fall-again-after-record-drop-in-coal-use-in-2015

Re-scoping the Renewable Heat Incentive (RHI) and Electrification of Transport

The RHI in its current form has failed to deliver meaningful uptake. It was anticipated that the RHI would help fund investment in 500,000 homes by 2020 (2% of the total), but as of February 2017 there were only 50,000 accredited domestic installations (less than 0.2% of homes).

As the Committee for Climate Change (CCC) has made clear, heat is the next major challenge for decarbonisation. We therefore believe that attention should be given to how the RHI should be recast to incentivise investment in low carbon heat technologies. We note that:

- Customers demand far short payback periods (typically 3 years) than the 7 years on which the RHI is based.
- The application process and qualification process for RHI funding is particularly complex.
- The scheme itself excludes other cost effective, low carbon technologies such as gas absorption heat pumps and hybrid boiler-heat pumps.

We consider that moving to an upfront capital grant model, as well as widening the eligibility of technologies available for funding would improve uptake and deliver improved value for money.

Finally, we also note that transport is another key sector which over the fifth carbon budget and beyond will need to deliver significant carbon savings. We consider that electrification has an important role to play here and observe that a number of market analysts have indicated that the cost of electric vehicles could reach parity with conventional petrol/diesel cars by 2020. From a "whole system" perspective however, we note that is will not be viable to electrify both heating and transport. It is important, therefore that low carbon heating technologies (such as efficient gas technologies), biogas etc are all actively considered and incentivised.

Enhanced Capital Allowances (ECAs)

Major effort is still required to improve business energy efficiency nationally, and we believe ECAs have an important role to play in improving the commercial attractiveness of certain energy efficiency investments for business while also supporting the development of the market for distributed energy systems.

Currently, the Energy Technology List (ETL) is administered by the Carbon Trust and provides a list of qualifying technologies eligible for Enhanced Capital Allowances (ECAs). The ETL framework provides an important tax incentive for investors in energy efficient technology. It helps mitigate the high, up-front capital costs associated with some technologies which can act as a barrier to investment, especially in the business sector.

One of the main disadvantages with the current regime is the relatively narrow scope of the ETL. We believe there is a strong case to broaden the current list to include technologies which support low carbon behaviours such as solar PV and storage technologies

Section Two: Transforming Scotland's Energy Use

Question 6 - What ideas do you have about the role of hydrogen in Scotland's energy mix and the development of hydrogen production in Scotland?

We believe it is right that all options are carefully evaluated for the longer term. Previous thinking about longer term energy use had assumed wide scale electrification. While the electrification of transport looks likely, at least in part, we note that wide scale electrification of heat is not viable given that:

- peak gas demand is currently between 5 and 6 times the current peak in the electricity system;
- power is currently ~3 times more expensive than gas on a £/MWh basis; and
- electrification of heat would require additional peak generation capacity – estimated at between 24-46 GW.

As stated elsewhere in this consultation, we therefore note that there is a clear role for efficient gas use and gas technologies (i.e. Gas Absorption Heat pumps and boiler hybrids) in helping deliver domestic carbon reductions.

In respect of the wide scale conversion of the gas network to hydrogen, we believe the case for this has yet to be proven, and more detailed work is needed to better understand:

- The significant costs associated with producing hydrogen, either through electrolysis and/or steam methane reformation (SMR) and associated carbon capture and storage (CCS) technology.
- The costs associated with upgrading the entire transmission networks (which is currently of iron construction and incompatible with hydrogen).
- The disruption and costs for customers in changing appliances and spending periods of time "off gas" while the conversion is undertaken.

,In the intermediate term, we believe efficient gas technologies and some biogas use represent a sensible first step in decarbonising heating.

Question 7 - **What are your views on the priorities presented in this chapter for transforming energy use over the coming decades? In answering, please consider whether the priorities are the right ones for delivering our vision.**

AND

Question 8 - **What are your views on the actions for Scottish Government set out in this chapter regarding transforming energy use? In answering, please consider whether the actions are both necessary and sufficient for delivering our vision.**

Centrica is currently conducting research into cost effective heat decarbonisation pathways and related technologies, which will account for customer acceptance considerations. We aim to publish this research over the coming months and will be happy to share with the Scottish Government as part of our ongoing engagement on the draft energy strategy. Our emerging conclusions indicate there is no "silver bullet".

We believe that natural gas can have a role to play but will not deliver carbon target alone and that capital subsidies represent best value for money. Our early conclusions support five core policy recommendations which are:

- There should be a reintroduce zero carbon home standard for all new homes from 2021.
- There will be 7m new homes by 2050 and over 3m new homes by 2030 UK wide, and making new homes zero carbon is far cheaper than retrofitting existing housing stock.
- The renewable heat incentive (RHI) should be re-scoped. Some further thoughts are set out in our answer to question 9
- Off-grid households should be prioritised, focussing the initial funding of a LCHI on off-gas grid households (c.15% all households) supported by a joint Government/industry communications campaign and setting a target that all oil-fired homes should be offered a low carbon heat source by the end of the 4th Carbon Budget period
- Heat and energy efficiency policies should be better aligned
- There should be an increased focus on research and development projects and DNOs should be required to explore and robustly cost the potential of hydrogen (through existing innovation funding allowances).

We have set out some of the key policy areas where government can act in the interests of transforming energy use. Whilst we recognise that many of the associated policies and actions will fall into reserved areas, actions around for example the future of ECO will be devolved and we would urge the Scottish Government to consider the points raised above both in terms of where they can act via their own powers but also where opportunities exist for a co-ordinated approach with the UK Government or other devolved administrations.

Overall, and in the long term, we consider a range of technologies are likely to be needed to deliver heat decarbonisation. This may include, but will not be limited to, the potential re-purposing of the gas network for hydrogen use, increased deployment of heat networks, and gas absorption heat pumps.

We also consider it likely that a transitional period will be required which will involve hybrid technologies, such as high efficiency condensing gas boilers and heat pumps. This will allow peak heating needs to be covered by the gas boiler, reducing customer costs, and will leverage existing gas boiler infrastructure which is already in around 80% of UK homes.

One further suggestion is on the minimum energy efficiency standards for boilers. It is Centrica's view that the minimum standard for domestic boilers should be changed to 92% ErP. However, in our experience, the majority of gas boilers being installed today already meet or exceed this efficiency level.

We believe that it will become increasingly challenging to improve the efficiency significantly beyond the 92-94% levels achieved by modern gas boilers. Condensing gas boilers are now a mature technology, and there are few technical improvements that could be made to materially improve their efficiency. The Scottish Government's fuel poverty schemes – from the Central Heating Programme to the HEAPS/ABS – have focussed on replacing inefficient boilers for vulnerable customers. This had doubtless made a difference to numbers in circulation. However a focus on replacing those which remain may be a more sensible than pursuing the very limited remaining technical improvements in gas boiler efficiency.

With regards to other carbon fuels, and in particular coal and oil we note that around 23% of properties are currently not connected to the gas grid, and the majority rely on electricity for heating. The principal lever

available to convert off-gas grid homes to low carbon energy is the Renewable Heat Incentive (RHI), which will support/incentivise the switch to lower carbon technologies such as biomass boilers. Homes which would be suitable for such technologies are likely to be in sparsely populated rural areas. They are also likely to be older properties, which are poorly insulated.

Renewable Heat Incentive (RHI)

The UK Government announced in its response to the RHI consultation last year a continuation of expenditure on the scheme and an increase in the RHI tariffs for biomass and heat pumps which is welcome. However, as suggested above it is our view that RHI needs to be re-purposed and we have provided our thoughts as to how the policy framework needs to change to support this.

Whilst recognising that these asks lie beyond the remit of the Scottish Government we would urge it to put its own weight behind the future of RHI as a policy vehicle for encouraging decarbonised heat technologies

Question 9 - What ideas do you have about what energy efficiency target we should set for Scotland, and how it should be measured? In answering, please consider the EU ambition to implement an energy efficiency plan

We recognise that the EU Energy Efficiency Directive requires Member States to prepare national energy efficiency plans to set out estimated energy consumption, planned energy efficiency measures, and the improvements individual EU countries expect to achieve, though this is yet to be submitted by the UK for 2017.

Within this context Centrica believes that an energy efficiency target should not be binding but instead allow for the most cost-effective measures to be delivered to the widest possible market. The UK has had energy efficiency obligations since 1994, and many of the most cost-effective energy efficiency measures have already been installed. Those measures which remain are increasingly costly. Given the diminishing remaining technical potential, we do not believe that binding annual targets for energy efficiency are appropriate.

On the broad question of the role of energy efficiency we would refer the Scottish Government to our detailed response to the consultation on Scotland's Energy Efficiency Programme in which we state 'Centrica welcomes the Scottish Government's vision in raising energy efficiency to a national infrastructure priority and acknowledges the contribution that such a programme will make to meeting the twin aims of addressing fuel poverty and climate change in a Scottish context. The implementation of the programme is not without its challenges – harnessing the right level of funding, meeting the needs of specific geographies, dealing with the legacy of Scotland's housing stock and putting in bespoke solutions according to sector and tenure, encompassing both vulnerable households and those which are able to pay. Overarching all of these is the need to put in place long term and stable policy frameworks to ensure the vibrancy and sustainability of the supply chain to do the work'

We understand that, as part of their holistic vision as presented in the draft strategy there will be a strong emphasis in the first instance on energy efficiency and insulation of homes and business. We have already identified some of the challenges in meeting this target, not least of all the tenure and sectoral challenges, and we look forward to responding in detail in early course to further expected consultations on energy efficiency in the private rented sector and the owner occupied sector.

At Centrica we are fully aware of the pressures that many families are under in terms of the rising costs of living, and we know that the cost of powering and heating homes adds to that challenge. Scottish Gas is the country's largest energy supplier. One third of the measures we installed last year through the Energy Company Obligation (ECO) were to low income, elderly or disabled customers, and the Affordable Warmth element of the scheme has already help to cut the future heating costs of these households by an estimated £1.5 billion.

However significant numbers of homes remain without adequate loft or cavity wall insulation, many of which are in the private rented sector and we would urge the Scottish Government to look at these as a matter of priority, alongside the focus on off grid properties being provided with low carbon solutions.

Private Rented Sector

There are now approaching 400,000 private rented homes in Scotland, the sector having doubled within 12 years, with growth set to continue. The private rented sector is the fastest growing tenure type, with the 17 percent of households renting their home privately today forecast to increase to 22 percent of all households by 2025.

Centrica is committed to helping our customers use less energy. The condition of properties in the private rented sector is often below the standard found in other tenure types and there is a particularly sharp contrast between the private and social rented sectors, where the Decent Homes Standard was made mandatory in 2000. While most private sector landlords are very responsible, there is a minority who are not. One third of the properties in the private rented sector fail to meet the UK Government's Decent Home Standard, and 40% of renters have experienced poor insulation or excess cold in the past 12 months.

Centrica believes that this is an area in which the Scottish Government should act. We believe that a clear trajectory should be set for increases in the minimum energy efficiency standard for the domestic private rented sector to provide certainty to the supply chain and an incentive for landlords to improve their rental properties beyond the contemporary minimum standard. We believe that energy efficiency improvements beyond the baseline could be incentivised through further incentives, such as tax allowances for landlords. We look forward to the future publication of the Scottish Government's consultation on regulating energy efficiency in the private rented sector, where we will be happy to provide further thoughts and insight.

Section Three: Delivering Smart, Local Energy Systems

Question 10 - What are your views on the priorities presented in this chapter for developing smart, local energy systems over the coming decades? In answering, please consider whether the priorities are the right ones for delivering our vision.

AND

Question 11 - What are your views on the actions for Scottish Government set out in this chapter regarding smart, local energy systems? In answering, please consider whether the actions are both necessary and sufficient for delivering our vision.

We welcome the Scottish Government's focus on development of a smarter, more flexible energy system and consider that the priorities set out in this chapter are broadly right.

Centrica is leading the industry in adapting to this new landscape. We will be investing over £1.2bn in our Connected Home and Distributed Energy and Power businesses in the coming years, which are focused on using new technology (such as Hive and Panoramic Power) to put consumers in control of their own energy and deliver a more flexible power grid. The National Infrastructure Commission estimated that a smarter power system could save consumers up to £8bn per year.

We believe that competitive markets are the best mechanism to bring forward new smart energy and flexibility solutions as they provide the most cost effective solutions – the Capacity Market and National Grid's EFR Tender are good examples of this. Because the energy system of the future is difficult to predict we believe the market needs to be allowed to evolve. **The Scottish Government, where it can, should focus on promoting independent, transparent, technology neutral and market-based solutions and promote "least regret" polices where necessary**.

At this stage, we believe there are three areas of focus that can help develop a smarter, more flexible energy system:

1. Support the growth of new technology that puts consumers in control of their energy
2. Realise the potential of larger energy consumers to benefit from a smarter energy system
3. Ensure sufficient power capacity and support the growth of new markets for flexibility especially at local (distribution) level.

Support the growth of new technology that puts consumers in control of their energy

- We believe the market is already bringing forward new innovations and technologies to support this transition – such as our FreeTime tariff and our suite of Connected Home products.
- We are leading the smart meter roll out in GB – with over 3.5m meters installed in homes and businesses to date – as well as leading the growth of new connected technology.
- We now have over 500,000 Hive customers in the UK and are launching new products regularly, such as active lights, plugs, motion sensors and connected boiler technology.
- We believe Ofgem and BEIS should focus on ensuring regulation is proportionate and does not stifle innovation. For instance the CMA stated that Ofgem constrained innovation via its "simpler choices" Retail Market Review (RMR) rules and we also hold concerns around the introduction of some elements of the General Data Protection Regulation – applicable from May 2018. Some provisions within this regulation are likely to stifle innovation and the roll-out of smart technology.
- We therefore support Ofgem introducing a 'narrow' principle that encourages suppliers to consider the characteristics and preferences of customers and the comparability of their tariffs. We believe 'narrow' principles are more likely to achieve Ofgem's desired customer outcomes and deliver regulatory certainty for suppliers because these principles apply to discrete policy areas and are targeted at a well-defined and identifiable market failure.

Realise the potential of larger energy consumers to benefit from a smarter energy system

- We welcome this call for evidence's focus on the significant potential of encouraging industrial and commercial consumers to better manage their energy.
- Larger energy consumers (industrial, commercial and services sectors) account for over a third of all electricity and one quarter of carbon emissions. Moreover the CBI, in a 2013 report, '***Shining a Light: Uncovering the business energy efficiency opportunity***' has previously estimated that businesses

may be paying up to 15% too much for their energy by not installing more efficient energy systems. These savings could help boost the productivity of UK businesses.

- Centrica has launched a new distributed energy and power business, which is focused on using new monitoring, generation and optimisation technology to help larger energy consumers to use energy more efficiently, reduce their carbon emissions and even sell excess energy back to the grid.
- Earlier this year, the British Chambers of Commerce (in association with Scottish Gas) published an Energy Insight report, which sought the view of more than 2100 businesses on Energy Efficiency related matters. Many businesses highlighted that the area remains relatively unknown and complex and they don't have a good idea of the financial benefits of making their energy system more efficient.
- **We believe the industry, government, including the Scottish Government, and regulators should work together to highlight the importance of flexibility resources in the future energy system and the potential carbon and financial savings businesses could make by monitoring, managing and optimising their energy assets**. We believe an important first step in this journey is encouraging businesses to better monitor their energy. Our Panoramic Power Wireless Sensor Technology, which provides a detailed, real-time view of a business's energy usage, can be installed across a business's facilities within hours and has helped one business in the US save over $270,000 a year on their energy costs.

Ensure sufficient capacity and support the growth of new markets for flexibility

- The UK needs to ensure it maintains sufficient power capacity, whilst developing new markets for flexibility.
- The Capacity Market is a good mechanism to maintain sufficient capacity and bring forward investment in new, lower carbon capacity, such as Combined Cycle Gas Turbines (CCGTs).
- We believe more needs to be done to create new markets for flexibility.
- Renewables made up 25% of power generation in Q3 2016 and due to their intermittency more flexibility and balancing services are needed.
- We welcome National Grid's Power Responsive which is looking to bring forward more flexibility, not least because we observe that one of the current barriers is a lack of commercial opportunities. More network tenders for flexibility services at local and national level, (e.g. National Grid's Enhanced Frequency Response (EFR) tender where 200MW of battery storage projects were brought forward at a very competitive price) should be prioritised.
- Distributed Network Operators (DNOs) need to adopt a similar approach to managing their networks. Providing signals of their future system requirements will enable new flexibility providers to identify, innovate and develop the new services and technologies needed currently and into the future. When electric vehicles are further rolled out, there could be huge cost implications for local distribution networks. Designing procurement services and building flexibility capability now should help mitigate this risk. DNOs will need to adopt a more sophisticated and proactive approach to managing their networks, but their role should be identifying the flexibility services they need and buying these products competitively from the market. DNOs should not be supplying flexibility products to themselves or to the grid, as this will prevent competition, innovation and the transition to a smart, flexible energy system.
- We believe Centrica's Local Energy Market (LEM) trial in Cornwall will provide important lessons into how to create effective markets for energy at the distributed network level and we look forward to sharing our learnings with Government.
- The LEM is a £19m trial that will see the development of a virtual marketplace to provide participants with a platform to buy and sell energy and flexibility both to the grid and the wholesale

energy market. We will also be installing new generation and storage technology into over 150 properties, which will also be installing new generation and storage technology into over 150 properties, which will allow us to explore how individuals and businesses interact with the technology.

Case study - Centrica's £19m programme to explore flexible, smart energy solutions

Centrica's Distributed Energy & Power business is working on a pioneering trial in Cornwall that will test the use of flexible demand, generation and storage across both the domestic and business sectors.

The project will see the development of a virtual marketplace that will provide participants with a platform to buy and sell energy and flexibility both to the grid and the wholesale energy market. We will also be installing new generation and storage technology into over 100 properties, which will allow us to explore how individuals and businesses interact with the technology.

The three year trial is being delivered in partnership with the local distribution network operator Western Power Distribution, alongside National Grid and Exeter University. It is being funded by Centrica and the British Gas Energy for Tomorrow Fund alongside a £13m grant from the European Regional Development Fund.

We believe the trial will provide major findings that can inform the Government, National Grid and regulators about how the UK can best develop new and effective markets for flexible energy.

Programme highlights:

- Free supply and fit of micro-Combined Heat & Power (CHP) units and/or battery storage for around 100 homes
- Flexible energy audits and free supply and fit of energy asset/ technology upgrades for around 60 businesses
- New Centrica office to be established in Cornwall as a base for a 23-strong team of project managers, technical experts and software developers.

More information:

- Connected Home: https://www.centrica.com/about-us/what-we-do/connected-home
- Distributed Energy and Power: https://www.centrica.com/about-us/what-we-do/distributed-energy-and-power Cornwall Local Energy Market Trial: https://www.centrica.com/news/centrica-build-pioneering-local-energy-market-cornwall-0

We have seen the consultation on creating a regulatory framework for Local Heat and Energy Efficiency Strategies to look at area based energy efficiency programmes and our thoughts on this are picked up elsewhere in our response. At the same time the draft energy strategy suggests *'exploring* the potential to create a Government-owned energy company (GOEC) to help the growth of local and community energy projects'. We understand that thinking is at an early stage on this and that the specific shape and function is yet to be agreed. For that reason it is difficult to comment in detail on this proposal, however our initial thoughts are below.

Question 12 **- What are your views on the idea of a Government-owned energy company to support the development of local energy? In answering, please consider how a Government-owned company could address specific market failure or add value.**

It is difficult to answer this question in specific terms whilst there is a lack of detail about such a company might operate. In general terms we do not consider a Government owned company to be necessary or desirable. Centrica believes that energy markets need to be open and flexible. We believe that this requires a multi sector approach across all technologies, and diverse revenue opportunities - driven by new market dynamics – peer to peer/locational pricing/nodal markets etc. It is our view that a systemic approach to local markets (not simply seeing them in terms of transmission and distribution networks) will embed the best solutions. We believe that local markets will deliver on the above.

The creation of a local energy company is a very limited intervention with questionable benefits to end consumers in the long term. Using tax payers' money to set up an energy company is inconsistent with market principles that currently govern the energy market. In recent years we have seen a significant

amount of new private market entry and recent capacity market auctions and EFR tenders have shown a strong market response. Further such an approach raises State Aid concerns, and risks foreclosing a nascent market to other companies who have to raise capital privately. It is our view that policy should be focused on ensuring market arrangements are fair, charging is cost reflective, and there is sufficient opportunity for market participants to bid for tenders for ancillary services. Where we believe there should be a continuing role for joint public and private investment is through joint R&D projects

District heating and local energy networks

Section three also deals with local energy and district heating, and the role of local authorities working in partnership to deliver this alongside energy efficiency strategies.

We understand both from the draft energy strategy and from our conversations with the Scottish Government that there is a growing interest in the role of district heating in meeting future energy needs. Scottish Gas has historically played an active role in the renewable and low carbon heat market, having been involved in the delivery of district heating schemes. Since 2005 we have completed 23 district heating schemes. Including flagship schemes in Paisley, Inverclyde and Glasgow Broomhill.

Most of the schemes we have installed include: the installation of an energy control centre, heat connections and flat heating systems in addition to putting in a new or upgrading an existing heat network. We work principally with social housing providers and have been installing biomass/gas boilers to provide community heating systems. These schemes help communities benefit from lower energy bills, while reducing the properties' carbon footprint and improving living conditions for residents. Whilst we are not currently active investors in such schemes we nevertheless recognise their value in meeting carbon reduction targets.

Following our recent acquisition of ENER-G Combined Power, Scottish Gas now has an in-house gas Combined Heat and Power (CHP) delivery capability to meet the anticipated move in the market to CHP- led community/district heating networks. However, district heating schemes are often marginal investments, and very dependent on RHI and ECO funding. Policy certainty going forward is therefore necessary if investment in these schemes is to continue

Question 13 - What are your views on the idea of a Scottish Renewable Energy Bond to allow savers to invest in and support Scotland's renewable energy sector? In answering, please consider the possible roles of both the public and private sectors in such an arrangement.

We note that Scottish Renewables have published a discussion paper on how Scotland could widen the benefits of renewable energy by creating an energy fund which could raise investment capital through a bond scheme**.** We consider this to be a sensible approach.

Section Four: Delivering, Monitoring and Engagement

Question 14 - What ideas do you have about how Scottish Government, the private sector and the public sector can maximise the benefits of working in partnership to deliver the 2050 vision for energy in Scotland?

The review represents a unique opportunity to forge a stronger partnership between businesses and Government. This should be a partnership where the Government focuses on creating the conditions for

businesses of all sizes to grow and flourish across Scotland; and where businesses invest in the infrastructure, jobs, skills and technology that can upgrade our economy for a post-Brexit world.

By working together we can help deliver the Scottish Government's vision. In particular, we believe a major priority for the Scottish Government must be ensuring stability as we go through the Brexit process.

For the energy sector this means we must ensure three things: we maintain access to diverse sources of energy supplies, we create a relationship with Europe that keeps costs as low as possible for customers (we are a net importer of energy and Europe has a strong influence on UK wholesale energy prices), and we ensure continuity of existing European and UK policies that support inward investment.

The Government must also take the lead in tackling one of the major burdens on the UK economy: productivity. In 2015 the UK lagged the rest of the G7 by 19 percentage points. To tackle this, we need to upgrade our economy by investing in infrastructure, jobs, skills and technology. But these measures will fall short, unless businesses also play their part, embrace this strategy and invest in the UK's future. At Centrica we are focused on playing our part. We are investing in skills for the future, by training 1,200 apprentices a year and helping people back into work through the Movement to Work scheme.

We also believe smart energy will play a transformative role in helping customers to reduce their energy bills and businesses to lower their production costs and increase their productivity. We are leading the UK's smart meter rollout and investing in new technology through our Connected Home and Distributed Energy & Power businesses.

To ensure businesses, large and small, are able to play their part and deliver the growth and prosperity the UK needs, we believe the Government must ensure this strategy is a true partnership with industry by recognising the importance of long term policy certainty and competitive markets.

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