



Scottish Government
1H South
Victoria Quay
Edinburgh
EH6 6QQ

Email to: energystrategy@gov.scot

30 May 2017

Draft Energy Strategy – Consultation Response

EDF Energy is one of the UK's largest energy companies with activities throughout the energy chain. Our interests include nuclear, coal and gas-fired electricity generation, renewables, storage, and energy supply to end users. We have over five million electricity and gas customer accounts in the UK, including residential and business users.

EDF Energy is determined to be a trusted, socially responsible and innovative leader in tackling Scotland's future energy challenges. As the country's largest electricity generator, our priority remains the safe and reliable generation of low carbon power from our nuclear power stations at Torness and Hunterston and our wind farms. We are proud to serve business and residential customers across the country, helping them benefit from new technology and digital innovation. We are also proud of our strong research and development relationships with a number of Scottish universities. We make a positive contribution to the Scottish economy. We currently employ over 1300 people in Scotland plus significant numbers of contractors and people across the supply chain.

We appreciate the opportunity to respond to the Scottish Government's Draft Energy Strategy. Below are our key messages, which we expand in the attachment.

Future generation mix

We welcome Scotland's strong commitment to climate change action and recognition of the importance of Scotland's role in delivering a balanced generation mix in the Great Britain System.

We would like to see greater recognition of the important contribution that nuclear power makes to Scotland's generation mix and economy. EDF Energy's two nuclear power stations at Hunterston and Torness currently provide around a third of Scotland's generation and play a vital role in assuring the security and stability of Scotland's electricity system. Between them, these sites employ around 1100 staff and 49 apprentices, and in terms of salaries alone contribute over £80 million per annum to the local economy. Additionally, a wide range of Scottish companies are actively involved in the supply chain for our nuclear stations, both those in Scotland and elsewhere in the UK. The scheduled closure dates for Hunterston and Torness are 2023 and 2030. We believe that the most cost effective pathway for the decarbonisation of the Great Britain generation mix will involve the construction of new nuclear power stations. In the longer term, the Scottish Government should be open to possible new nuclear development in Scotland, such as Small Modular Reactors (SMRs).

EDF Energy
40 Grosvenor Place, Victoria
London SW1X 7EN
Tel +44 (0) 20 7752 2200

edfenergy.com

*EDF Energy plc.
Registered in England and Wales.
Registered No. 2366852.
Registered office: 40 Grosvenor Place,
Victoria, London SW1X 7EN*

We support the Scottish Government's aim of seeing more onshore wind development in Scotland. Onshore wind has an important role to play in the cost-effective decarbonisation of the Great Britain generation mix, and Scotland has excellent resources for onshore wind development. We are also pleased that the Scottish Government recognises the important contribution that island wind projects can make, both to cost-effective decarbonisation, and also to the economies of Scotland and the Scottish islands.

The Scottish Government's ambitious target of 50% of energy from renewables by 2030 will require strong progress on renewable heat in addition to the development of more renewable electricity generation in Scotland. However, we believe that in order to deliver the most cost-effective pathway to decarbonisation, the Scottish Government should focus on a decarbonisation target (recognising the contribution of all low-carbon technologies including nuclear) rather than a renewables target.

The transition to a low carbon electricity system in Great Britain should be driven by maintaining and strengthening the EMR (Electricity Market Reform) framework, including Carbon Price Support, the Capacity Market and Contracts for Difference. We believe that effective carbon pricing is the most efficient way to drive decarbonisation of the power sector, and we urge the Scottish Government to support policy measures to ensure that there is a strong price for carbon throughout the 2020s. This will assist the Scottish Government's objective of seeing more onshore wind development in Scotland.

A range of technologies is needed to ensure a low carbon, secure and affordable energy system. This includes new distributed energy resources, demand side response, aggregation and community energy schemes, combined with a centralised transmission system, and large synchronous generators continuing to play an essential role for system security and operability as well as the power they provide. EDF Energy is actively involved in developing a range of technologies to meet the future needs of the energy system, drawing on our significant R&D capabilities. For example, we are developing a battery storage project and local energy schemes, and we have a track record of community involvement in our renewable energy projects in Scotland.

The Scottish Energy Strategy, with a high level of renewables penetration, must consider the future stability of the power system in Scotland (e.g. inertia; ensuring renewable generation is able to reach demand centres; voltage levels; black start), taking into account the impacts of developments in heat and transport. With an increasingly intermittent system, the Scottish Government must consider how to work with the System Operator and the power industry to ensure that there is adequate reliable baseload and flexible generation on the system in Scotland.

Customer engagement

We agree with the Scottish Government's vision that the energy market should deliver fair outcomes for customers, and that enabling customer engagement is key to delivering this. EDF Energy has a strong track record of promoting customer engagement, and as a result, more than 40% of our domestic customers are on products that they have actively chosen, one of the highest proportions amongst large suppliers in the industry. We believe that the Scottish Government has a key role to play in promoting the benefits of customer engagement, to enable more customers in Scotland to choose the appropriate supplier and tariff.

We agree with the Scottish Government that new technologies and innovative tariffs can help to drive customer engagement. Smart meters have the potential to be a key enabler of the digital transformation in energy, and to increase customer engagement and achieve cost savings for customers. However, we are concerned that the current roll-out programme may not be delivering optimal outcomes for customers. In particular, many more SMETS1 meters are being fitted than originally envisaged, and they have higher costs, issues with interoperability, and are not as secure as second generation SMETS2 meters. We are calling on the UK Government to review the programme, in partnership with suppliers and other parties.

Energy Efficiency, Heat and Transport

EDF Energy supports the priorities and many of the actions set out in the consultation, including making energy efficiency a national infrastructure priority. The development of a Scottish Energy Efficiency Programme (SEEP) will help to identify and coordinate opportunities for reducing energy demand and increasing energy efficiency. Having a long term vision like that of SEEP will greatly improve confidence within the supply base, and help to grow the number of consumers who participate. The key role for local and central government in this will be to ensure that consumers, both domestic and non-domestic, are aware and engaged and therefore take advantage of those opportunities.

The success of the Scottish Government's approach to achieving these priorities and the targets set will largely depend on the national government's commitment to providing sufficient funding and a consistent and stable approach to policy across all levels of national and local government. A key way that this can be demonstrated is ensuring there is funding to support improvements to the government estate to maximise efficiency in the public sector. EDF Energy is committed to play our part in such activity and to advise and assist where we can in reducing the demand and increasing the efficiency of government building, business sites and home across Scotland.

The decarbonisation of heat requires a combination of "no regrets" actions which can be taken now and work to inform longer term decisions to be taken in the early 2020s. The short term actions should include improvement in quality standards, deployment of heat pumps in areas off the gas grid, and work to improve consumer understanding of low carbon heat technologies. Heat pumps in particular could offer clear benefits in Scotland due to the proportion of householders living in off gas areas.

We would also like to see further clarification around the details of the implementation in Scotland of the Energy Company Obligation (ECO) and the Warm Home Discount, and the progress of the Warm Homes Bill. Clarification is needed soon to ensure suppliers have sufficient time to prepare.

We welcome the Scottish Government's ambitions in the field of electric vehicles (EVs), which we believe have a key role to play in the decarbonisation of the transport sector. It will be important to consider the interaction between the development of EVs and the electricity system, particularly in relation to the charging arrangements for EVs. Arrangements should be developed that encourage the charging of EVs at off-peak times for the electricity system, minimising the need for additional investment in

generation or network capacity. This is likely to require a degree of automation. With the right arrangements in place, both customers and the electricity network should benefit. It should also be considered whether there would be additional value in using the ability of EVs to discharge electricity to the network at times when it is needed.

Our detailed responses are set out in the attachment to this letter. Should you wish to discuss any of the issues raised in our response or have any queries, please contact David Cameron 07875 111722, or myself.

I confirm that this letter and its attachment may be published on Scottish Government's website.

Yours sincerely,

A handwritten signature in black ink that reads "Angela Hepworth".

Angela Hepworth
Corporate Policy and Regulation Director

Attachment

Draft Energy Strategy

EDF Energy's response to your questions

EDF Energy operates two nuclear power stations in Scotland; Torness and Hunterston B. The total installed capacity is approximately 2200 MW, and in 2015 these stations generated 17.8 TWh, i.e. around 35% of total generation in Scotland and enough to meet about 49% of Scottish electricity demand. These power stations also play a vital role in assuring the security and stability of Scotland's electricity system, as the proportion of variable renewables has increased and other large coal-fired generating units have closed down. The Scottish Government must carefully consider how to ensure that the electricity system remains stable and secure.

EDF Energy is also one of the largest energy suppliers to both domestic and business customers in the UK, and has a growing portfolio of customers in Scotland, won in the competitive market. In the Scottish market, we supply over 5% of domestic customer accounts, which has doubled in the last three years, and supply 29% of business electricity by volume. This includes 98% of public sector sites through Scottish Procurement.

Chapter 3 – Meeting our energy supply needs

Q1. What are your views on the priorities presented in this chapter for energy supply over the coming decades? In answering, please consider whether the priorities are the right ones for delivering our vision.

The Scottish Government has highlighted the right goals for Scotland's future energy system, which include the continued sustainable and inclusive growth of Scotland's economy; secure reliable supplies of energy; affordable energy requirements; and long-term sustained decarbonisation. We welcome that the Scottish Government is looking to take a whole system approach to its energy strategy.

Scotland and the UK as a whole must make the transition to a low-carbon energy system.

EDF Energy believes that the transition to a low carbon electricity system should be driven by maintaining and strengthening the UK Government's EMR (Electricity Market Reform) framework, including Carbon Price Support, the Capacity Market and Contracts for Difference. This should be complemented by:

- Reform of network charging to ensure that all parties pay their fair share of network costs which are largely fixed. We support Ofgem's proposals for a Targeted Charging Review to address this issue.
- More efficient and transparent arrangements for procurement of ancillary services, to enable new and existing flexibility providers to offer a suite of services that reflects the holistic value of flexible assets to the system

The Scottish Government should work collaboratively with the UK Government to ensure that the chosen priorities, and the required actions to facilitate these, are consistent with the wider UK energy policy priorities, as set out in the UK's Industrial Strategy Green Paper, and the strategy is in line with the UK's and Scotland's decarbonisation targets¹. The Scottish Government's energy strategy should be consistent with a cost-effective pathway for the decarbonisation of the Great Britain energy system taken as a whole, recognising that the costs of the system are met by all Great Britain customers.

EDF Energy's Future Market Vision

We present our Future Market Vision for the Great Britain generation mix below, highlighting where we believe Scotland can contribute to this vision.

A significant part of the existing Great Britain generation fleet is expected to close by 2030, including all the currently operating coal-fired power stations, all bar one of the currently operating nuclear power stations, and also some older gas capacity. We estimate that the Great Britain system will require the construction of new gas-fired generation capable of producing around 40TWh/year and new low carbon generation producing around 190TWh/year by 2035. Around 50TWh of this output will come from projects already procured, including Hinkley Point C. This means that further decisions will need to be made about the procurement of a further 140TWh/year of new low carbon generation. We believe that Scotland is well placed to provide substantial amounts of new low carbon generation due to its good sites, wind resource and strong supply chains.

The resulting generation mix must provide the capacity and the resilience to ensure security of supply, it must ensure system stability and it must deliver very substantial progress towards full decarbonisation of the power sector. The new construction programme must be realistically deliverable, taking account of the availability of suitable sites and of capital and other resources and it should provide opportunities for the development of UK industry. It must also contribute to minimising whole system costs, taking account of both the costs directly borne by the generator and the impact on the costs of operating the system.

We believe that a generation mix in Great Britain that can meet these criteria will deliver around one third of its electricity from gas-fired generation, one-third from nuclear and one-third from renewable sources by around 2035. Scotland will make a significant contribution to the renewables component of this generation mix but, as explained below, the Scottish Government should also consider the role of nuclear and gas-fired generation.

We project that the amount of decentralised generation in Great Britain will continue to grow from 17% to 22% by volume by the mid-2030s. Therefore, while decentralised generation can make a significant contribution, large, centralised power stations will continue to provide the bulk of electricity used.

¹ Climate Change Act 2008 and The Climate Change (Scotland) Act 2009

Nuclear has an essential role in the Great Britain energy mix, as a reliable source of firm low carbon power and this will become increasingly important as we approach very low levels of generation carbon intensity. We project that a further 11GW of new nuclear could be delivered by 2035 after Hinkley Point C, although we believe the economically optimum solution would require more. To substitute this 11GW with a mixture of gas and renewables, might require around 55GW of alternative wind, solar and gas capacity with significantly higher costs to make the same contribution in terms of energy and firm capacity. We understand that current Scottish Government policy is not to approve any new nuclear power stations in Scotland, but we believe that the rationale for this policy should be reconsidered, and that as part of this strategy, the Scottish Government should consider the option of new nuclear in Scotland.

Small Modular Reactors (SMRs) may be particularly well suited to smaller systems and remote areas. Currently, the technology is still in the research phase, but with appropriate investment it may be possible to commercialise SMRs, which could then play an important role alongside conventional scale nuclear generation and other low carbon technologies in the electricity generation mix of the future. The option of deploying these technologies in Scotland as a form of low carbon generation, capable of operating flexibly and with a small physical footprint, should be kept open.

Renewable energy will mainly come from onshore and offshore wind. It will be essential to maximise the contribution from onshore wind as a low cost source of low carbon power, developing it in areas where it has the support of local communities. Onshore wind can be deployed rapidly as there is a pipeline of consented sites that have community support. Future site availability potential is up to 20 GW of onshore wind in the UK, mainly in Scotland. Onshore wind costs have reduced substantially since the CfD auction in 2014; onshore wind costs are now below most other low carbon technologies, in particular offshore wind, and further reductions are possible.

As a complement to onshore and offshore wind, EDF Energy welcomes the support from the Scottish Government for the development of non-mainland wind power (for example, located on Scottish islands) to enable the regional benefits of new electricity generation. EDF Energy is seeking to develop two wind farm projects on the Isle of Lewis, with a total capacity in 342MW, in a joint venture with AMEC Foster Wheeler. The development of island wind projects can make the best use of the excellent wind resource of non-mainland locations. This will drive local economic growth and employment through the high level of local added value in island economies. It will enable a new transmission connection to the mainland, providing additional security to the island's electricity supply.

Offshore wind remains important because of the scale of possible development. However, despite good progress in reducing costs, it remains significantly more expensive than onshore wind and we expect that there will continue to be wide variations in cost between offshore projects because of site conditions. Moreover, like all intermittent generation technologies, it will lead to additional system integration costs. While we expect the constraint on onshore wind development to be the availability of suitable sites, the constraint on offshore wind will be cost, managed through competition in CfD auctions.

Solar PV also has a role to play but its load factor in the UK is lower than in many other parts of the world because of northerly latitude and weather conditions. Most solar PV output occurs in summer and it is not able to deliver energy at times of winter peak demand when it is most needed. These factors will limit the value of solar PV in Scotland and in the UK as a whole.

We believe that the scope for new hydro power in Scotland and Great Britain is limited by availability of suitable sites.

As a high proportion of Scotland's renewables will be intermittent in nature, the cost of integration will need to be recognised. There are three key elements to the cost of integrating intermittent generation into the system. The impacts on transmission costs and the requirement for back-up capacity when the wind does not blow or the sun does not shine are fairly well understood. However, a third component, less often recognised, is the impact of curtailment (i.e. the cost of lost energy produced at times when it is not needed). As the penetration of intermittent generation increases, this element becomes increasingly important and contributes to increasing levels of system integration costs. While an estimate of around £10/MWh is reasonable at current levels of intermittent generation, we believe that this could increase to £15/MWh or more as the system decarbonises. We believe these integration costs, as well as the fact that there would be a reduced amount of inertia in a future renewables-focussed electricity generation mix in Scotland, will mean that these costs are likely to be significant in Scotland, and hence need to be considered as part of a whole system approach.

Our estimates of system integration costs take account of the use of "flexibility solutions" such as storage, Demand Side Response (DSR) and interconnection. It is, for example, possible to store surplus energy from solar PV to smooth the daily load curve. However, even with continued improvements in costs, battery storage will remain an expensive solution; it is capital intensive and will therefore tend to have greatest value when cycled very frequently. It is unrealistic to expect that it will ever be cost effective to use battery storage for seasonal storage. We welcome the Scottish Government's support for the development of innovative solutions, such as battery storage, to provide certain flexible solutions such as for frequency response. However, we believe that the Scottish energy strategy should also explicitly recognise the need for flexible generation throughout the Great Britain electricity system for when the intermittent renewables are unable to generate. We expect that this flexible generation will typically be gas-fired generation procured through the Great Britain Capacity Market.

Gas-fired generation will be necessary as part of the Great Britain energy mix throughout the 2020s and 2030s to provide flexible generation but the contribution it makes will be constrained by the need to reduce carbon emissions and so must continue to reduce over time. Its operating costs will be subject to commodity price risk.

When considering its future electricity generation mix, the Scottish Government should also consider the need to ensure system stability. For instance, the risks of increasing restoration times of electricity supplies in Scotland following a partial or complete de-

energisation of the electricity system (Black Start)² has been driven by the closure and planned closure of conventional generation. Additionally, with a decreasing amount of synchronous plant in the future, such as nuclear plant, there will be a reduction in system inertia, which could result in a less stable system when there are unexpected changes in demand or supply. The Western HVDC link and installed series capacitors will be critical to maintaining system stability, especially during outage conditions in summer; although this alone may not be adequate in the long-term. Scottish Government should carefully consider the system implications when developing its strategy, both in terms of what this means for generation mix in Scotland but also in the rest of the Great Britain system to minimise costs overall.

Decarbonisation of heat and transport

The next steps on decarbonisation in Scotland require action outside the electricity sector. The heat and transport sectors are important areas for focus and it is clearly essential to find the most cost-effective routes for decarbonisation of these sectors. In both cases, electrification can play a significant role, through heat pumps and electric vehicles (EVs). It is also essential to consider the impacts on local air quality (particulates and NOx) alongside issues related to decarbonisation and cost.

Decarbonisation of heat should be supported by incentives to invest in energy efficiency by business and domestic consumers, coupled with the application of innovative technologies to manage energy use. The decarbonisation of heat requires a combination of “no regrets” actions which can be taken now, and work to inform longer term decisions to be taken in the early 2020s. The short term actions should include improvement in quality standards, deployment of heat pumps in areas off the gas grid, and work to improve consumer understanding of low carbon heat technologies. Heat pumps in particular could offer clear benefits in Scotland due to the proportion of householders living in off gas areas. Therefore, the Scottish Government should build on activity to date to ensure a sustainable supply chain is created and to increase customer understanding and acceptance of this technology.

The work needed to inform longer term decisions will include research and development and well-designed pilot studies at sufficient scale to trial potential options. The Scottish Government should prioritise pilot studies for larger scale heat pumps due to their potential impact.

The role of hydrogen as a large-scale solution in the future is currently uncertain due to issues around how to produce the hydrogen, and at what costs. There is also some reliance on Carbon Capture and Storage (CCS), which is also an unproven technology. Pilot projects should begin at sufficient scale and diversity to help inform whether this can be a future option (as recommended by the Committee on Climate Change’s report Next

² As outlined in in a joint publication in 2016 by National Grid, SP Transmission and SHE Transmission titled ‘Security of Electricity Supply in Scotland’

Steps for UK heat policy)³. A CCS strategy is also required prior to significant consideration of hydrogen.

It will be important to carefully consider the challenges and opportunities that Electric Vehicles (EVs) will bring to ensure that the right decisions are made to ensure their uptake is cost-effective. This will require careful consideration of the impacts on electricity networks and how the charging of EVs should be managed. While the impact of EVs on total electricity demand will be manageable, there is the potential for significant cost impacts on areas of local distribution networks and the potential for either increased costs due to the increased costs if all the additional load from EVs charges at evening peak, or significant cost savings through the management of the impact of EVs on the daily profile of electricity demand, by charging at times when system demand is low, and release of power back to the network at times when it is needed. It is critical to develop the right policy framework, including the right charging arrangements for the use of networks, to drive the right solutions.

Q2. What are your views on the actions for Scottish Government set out in this chapter regarding energy supply? In answering, please consider whether the actions are both necessary and sufficient for delivering our vision

EDF Energy believes that the Scottish Government should recognise and promote the role of effective carbon pricing as the most efficient way to drive decarbonisation. The Scottish Government should make the case to the UK Government that it should maintain and strengthen the Carbon Price Floor.

It is essential to maintain a strong and rising carbon price signal for the power sector over the long-term. As the carbon intensity of the generation mix reduces, a rising carbon price will maintain the price signal for decarbonisation without increasing the impact on power prices. Continuing after the closure of Great Britain's unabated coal fleet, a strong carbon price will strengthen the economics of low carbon plant, thus reducing the cost of support through the CfD mechanism and helping to make the case for the development of onshore wind and other renewables.

A strong carbon price will also continue to support existing low carbon plant outside the CfD mechanism; it will favour efficient gas plants over less efficient plants and will also give the right economic signals to support the deployment of flexibility solutions such as storage or demand side response in competition with fossil fuelled peaking plants.

EDF Energy welcomes and supports the Scottish Government's action to "***call on the UK Government to provide a stable, supportive regulatory regime to provide certainty to renewable investors and developers - giving appropriate support for investment in renewable energy, establishing a route to market for onshore wind, and clarifying the future for the Levy Control Framework***". We support maintaining and strengthening the UK Government's EMR (Electricity Market Reform) framework, including Carbon Price Support, the Capacity Market and Contracts for

³ Committee on Climate Change's report Next Steps for UK heat policy (October 2016) [CCC: Next Steps for UK heat policy](#)

Difference. This should be complemented by reform of network charging arrangements to ensure that all parties pay their fair share of network costs, and improvements to the way in which ancillary services are procured by National Grid.

EDF Energy supports the Scottish Government in looking to “***seek to address grid constraints in Scotland for distributed power generation at local, regional and national level***”. With an increasing amount of distribution-connected generation, it is important that the System Operator is able to manage the system in an optimal and cost-effective manner; this will encourage cost-effective investment in the required network infrastructure when and where it is needed.

One of the actions proposed is to “***put in place measures which ensure that at least half of newly consented renewable energy projects will have an element of shared ownership by 2020***.” EDF Energy and its renewables joint venture EDF Energy Renewables (EDF ER) support the principle of shared community ownership (SCO) of onshore wind projects and other renewable developments. However, we have reservations about how this target would be quantified and whether it is realistic. EDF Energy believes that it is appropriate that all renewable projects should offer SCO, but we suggest that more work needs to be carried out to understand the underlying level of interest in this option from communities. Ultimately, shared ownership is but one investment opportunity among many and (as for any investment opportunity) there are many factors that can determine the level of interest and take up by an individual community. There is a role for the Scottish Government and Local Authorities to further engage local communities on the appropriate definition and scale of this target.

EDF Energy welcomes the action to “***consider how planning can support the future energy system, through policies within the current and future iterations of Scottish Planning Policy and the National Planning Framework***”. It is positive to see that Scottish Government is ensuring that there is a joined-up approach on planning policy in Scotland with the UK’s planning policies. EDF Energy believes that the 2014 Scottish Planning Policy has been a significant driver towards delivery of new infrastructure for the generation of low carbon electricity. In particular, we support the overarching Policy Presumption in favour of sustainable development and we believe that this should continue as the cornerstone of Scottish planning policy. However, the introduction of ‘Wild Land Areas’ as a new designation in 2014 has greatly reduced the capacity of high wind resource areas that may accommodate onshore wind development. We feel that there may be merit in looking again at the core areas and issuing clearer guidance on how they should be applied at the development management level. At present there is a very real danger that all wild land, of whatever intrinsic quality and importance is treated as a ‘no go area’ for onshore wind development. We also feel there is evidence of creep occurring whereby projects outside but close to wild land and national parks are considered against the criteria of wild land, and therefore believe that clear guidance needs to be established on this matter.

EDF Energy supports the Scottish Government in its intention to “***continue to offer financial support and advice to domestic and business customers of all sizes to uptake renewable heat technologies***”. The Scottish Government, alongside other

public sector bodies, has a role to play in helping businesses to navigate the existing support structures.

For support post-2021 when the Renewable Heat Incentive (RHI) ends, the Scottish Government could promote investment in more efficient energy use by providing some support for capital costs. Upfront costs are a considerable barrier to uptake and policy support such as improving financial incentives for off-gas grid properties can overcome this. There should be a move away from the current approach of incentives based on tariffs i.e. FIT/RHI to subsidising upfront costs of installation. This could be done by providing public sector loans and/or grants to energy efficient equipment or through tax incentives where possible.

We support the Scottish Government's efforts to encourage a greater use of heating networks across Scotland but note that gas heating projects will only provide a transitional route to decarbonisation. The Scottish Government's policy needs to ensure that other means of decarbonising heat are sufficiently supported, e.g. energy from waste, heat pumps and biogas plants.

EDF Energy does not agree with the Scottish Government's action to ***"reiterate the proposal for the UK Government to implement a 'cap and floor' regime to provide a more appropriate regime for PHS and work with key stakeholders to realise the opportunities and overcome the barriers to deploying new PHS capacity in Scotland;"***. We believe that pumped storage should be able to access support schemes on the same basis as other technologies. As pumped storage is not a low-carbon technology, it should justify its project investment based on revenues it can gain through the wholesale energy market (i.e. through energy arbitrage), ancillary services (frequency and balancing services that it may be able to offer) and the Capacity Market. We accept that the UK Government has introduced the cap and floor regime for interconnectors, but do not believe that it can be justified that this is extended to other technologies.

Q3. 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.

EDF Energy supports the Scottish Government's ambition on climate change action. However, we believe that the Scottish Government's 2030 target of 50% of its energy from renewables should be a low carbon target, which will include all low-carbon technologies, such as nuclear, rather than focussing on renewables. We believe that a focus on low-carbon will ensure that the Scottish Government reaches its ultimate goal of decarbonisation in the most cost-effective way. We expect renewables to play a pivotal role in Scotland in driving decarbonisation; EDF Energy Renewables has a strong track record of investing in renewables projects in Scotland.

EDF Energy expects Torness nuclear power station to be operational in 2030, providing low-carbon electricity. By targeting low-carbon energy, rather than renewables, the

Scottish Government would be able to include this contribution to its decarbonisation target.

The Scottish Government should also clearly link the rationale behind specific targets to the long-term 2050 target and the interim emissions reduction targets set by the Scottish Government following the advice of the Committee on Climate Change. The overall goal of any targets must be to promote decarbonisation in the most cost-effective manner. These targets should also be compatible with the most cost-effective pathway for the decarbonisation of the Great Britain electricity system as a whole. EDF Energy believes that a target of having 50% of energy from low-carbon sources in Scotland by 2030 would be compatible with EDF Energy's view of the most cost-effective pathway for the decarbonisation of the Great Britain power sector, which involves a generation mix of 1/3 nuclear, 1/3 renewables, 1/3 gas-fired (by volume) by 2035.

We believe that focussing on energy from solely renewables suggests precluding other technologies from the energy mix, or failing to recognise their contribution to decarbonisation. We believe that the current emphasis on renewables does not capture the full range of available and cost-effective solutions, as many potential decarbonisation solutions for power, heat and transport are low-carbon, but not necessarily from renewables. For example, some lower carbon technologies, which may be cost effective may not necessarily be renewable.

The proposed target of 50% of energy from renewables by 2030 requires strong progress on renewable heat and also compares renewable production with energy consumption. This methodology could mean that the power sector in Scotland could deliver greater than 100% by exporting to other areas of the UK. However, even considering this, with a potential contribution of 140% of electricity production compared to electricity consumption (Renewable energy in Scotland in 2030 – Ricardo report for FoE Scotland, RSPB Scotland and WWF), a great deal of progress in the decarbonisation of other areas of the Scottish energy will be required: 40% in renewable heat and 18% in renewable transport.

Q4. What are your views on the development of an appropriate target to encourage the full range of low and zero carbon energy technologies?

EDF Energy believes that the Scottish Energy Strategy should set out the most cost-effective way of meeting the legally binding 2050 emissions reduction target, as well as the interim targets that have been proposed by the Committee on Climate Change for 2020 and 2030. An emissions reduction target should be the over-arching target for the Scottish Energy Strategy, although a low-carbon energy target may complement this; a renewable energy target will not necessarily promote the most cost-effective path for decarbonisation.

Q5. What ideas do you have about how the onshore wind industry can achieve the viable commercial development of onshore wind in Scotland without subsidy?

The cost of onshore wind is progressively reducing, both in the UK and globally. As a result, the UK is getting close to a point at which the projected future wholesale market electricity prices could provide sufficient revenue for the most efficient onshore projects to recover their costs and make a sufficient return for investors. According to one possible approach to the definition of “subsidy”, at such a point the condition to be “without subsidy” will have been met. This will be a major achievement and reinforce the message that onshore wind already offers consumers one of the lowest cost sources of low carbon generation.

However, despite these low costs, it would not be possible to secure investment in these onshore wind projects on a purely merchant basis. A major reason for this is the risk of low gas prices for a sustained period in future, with an associated depressed electricity price. Unlike gas-fired generators, onshore wind generators do not have an inherent hedge against low gas and electricity prices. Neither are onshore wind operators likely to receive payments through capacity market contracts, which will help to maintain revenues for gas-fired generators when prices or output are lower. Onshore wind developers are also exposed to the risk of “cannibalisation” of revenues with increasing wind penetration.

As a result, the headline cost of onshore wind compared to the expected future wholesale market price is only part of the picture. Onshore wind projects will still need some form of revenue stabilisation mechanism to enable an investment, even if costs fall below future wholesale electricity prices.

More generally, there are a number of different definitions for the concepts of “subsidy” and “without subsidy” in the context of supporting new low carbon generation in the UK, in addition to a simple comparison with the wholesale price. Whatever the definition, we would highlight that system integration costs need to be taken into account. There is no consensus on these definitions and many do not consider the integration costs associated with this technology. As a result, focusing on the precise stage at which onshore wind has reached a threshold to qualify as developing “without subsidy” may not be the best guide to the extent to which onshore wind can contribute to the delivery of low carbon generation at least cost to the consumer.

Onshore wind is already implementing a series of actions to maintain the cost reductions achieved to date, including efficiencies in the supply chain and innovation in equipment design.

One aspect where local and national government can assist is in enabling larger, more efficient turbines in areas where these can be installed with acceptable effects on the local environment. In our response to the parallel Scottish Government consultation on the proposed Onshore Wind Policy Statement, we set out the opportunities in more detail.

The most effective way for government to enable further cost reduction for onshore wind is to give a clear signal of continued support for onshore wind over the long term, as part of a least cost pathway to low carbon generation by 2030. We believe there is a compelling case for substantial additional onshore wind development in Scotland and we have summarised the key elements of this case as follows. We believe that the focus should be on the role onshore wind can play as it continues to reduce costs, rather than defining a threshold for being “without subsidy”.

The Case for Onshore Wind

The UK has set itself challenging long-term targets for decarbonisation, including the 5th carbon budget out to 2032.

Scenarios analysis shows that delivery of these UK carbon reduction targets will require substantial decarbonisation of the electricity generation sector by 2030. As well as reducing direct power station emissions, this will require new low carbon options for heat and transport via electrification.

It is important that decarbonisation of the electricity sector is carried out in the most cost-effective way, to minimise the total cost to the consumer of decarbonisation. To deliver least cost decarbonisation, it is essential that the lowest cost low carbon technologies are deployed, subject to securing local support and meeting environmental requirements. Onshore wind costs have reduced substantially since the CfD auction in 2014. Onshore wind costs are now below most other low carbon technologies, in particular offshore wind, and further reductions are possible.

The onshore wind supply chain has a high level of UK content and a widespread regional distribution. It can play an important role in the Industrial Strategy for particular regions. Even after system integration costs (in the region of £10-£15/MWh) are taken into account, onshore wind now has a lower total LCOE than new build CCGT, the default for new fossil-fuelled generation.

Onshore wind can be deployed rapidly as there is a pipeline of consented sites that have community support. Provided that political concerns can be overcome, the binding constraint is likely to be site availability; National Grid’s 2016 Future Energy Scenarios estimate that there is potential for at least 20 GW of onshore wind in the UK. We expect that most of this capacity would be in Scotland.

However, despite low costs, onshore wind would still not be viable on a pure merchant basis under current market conditions and arrangements. The reasons include exposure to the risk of low gas prices and exposure to the risk of “cannibalisation” of revenues at high onshore wind outputs.

To enable further onshore wind deployment, a collective agreement on the need for further onshore wind development needs to be established as a first step. Once this is in place, a decision can be made on the appropriate mechanism to enable onshore wind investment to proceed.

Corporate PPAs will be helpful in evolving long term market mechanisms, but the available PPA volumes for the foreseeable future are far too low to bring forward the required level of onshore wind for decarbonisation to 2030.

The existing EMR package will continue to provide the right framework to support low carbon generation investment, including onshore wind. Setting a proper price for carbon remains essential for an efficient and market-based route to decarbonisation. Onshore wind has the capability to provide a number of grid support services cost effectively.

The driver for further deployment of onshore wind is the need to decarbonise the UK electricity supply at least cost to the consumer. Onshore wind has a key role to play in delivering this decarbonisation. There are issues that must be taken into account; however, with appropriate preparation, such challenges should be manageable at the projected levels of onshore wind. For example, managing high concentrations of intermittent onshore wind generation in certain areas of the country needs to be planned carefully, from the perspectives of operational stability and system costs.

Q6. What are your views on the potential future of Scotland's decommissioned thermal generation sites?

EDF Energy believes that where plant has been decommissioned, or is close to its decommissioning, consideration should be given to whether new generation assets could be built on such sites in the future. We note that EDF Energy's nuclear power station sites at Hunterston B and Torness could be appropriate sites for future nuclear power stations following their closure.

The Scottish Government should not prescribe the required technology type that could be constructed on decommissioned thermal sites, but we believe it is likely that the vast majority would be low-carbon.

Q7. What ideas do you have about the role of hydrogen in Scotland's energy mix and the development of hydrogen production in Scotland?

The role of hydrogen as a large-scale solution in the future is currently uncertain due to issues around how to produce the hydrogen, and at what costs. There is also some reliance on Carbon Capture and Storage (CCS), which is also an unproven technology. Pilot projects should be undertaken at sufficient scale and diversity to inform whether this can be a future option, as recommended by the Committee on Climate Change's (CCC) report Next Steps for UK heat policy. A CCS strategy is also required prior to significant consideration of hydrogen.

There are no cost-effective solutions for decarbonising the mains gas grid currently and therefore further analysis is required to determine whether there are sustainable solutions. For example, the impact of the use of high concentration hydrogen on the gas grid requires consideration, such as the technical and practical requirements of the current pipework (both high pressure and distribution grid) and any required replacement of

appliances. However, due to the level of uncertainty there is no merit in investing customers' money expanding the gas network until there is more clarity on the benefits, and that there is not a risk of stranded assets.

Chapter 4 – Transforming Scotland's energy use

Q8. 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.

EDF Energy supports the priorities and many of the actions set out in the consultation, including making energy efficiency a national infrastructure priority. The development of a Scottish Energy Efficiency Programme (SEEP) will help to identify and coordinate opportunities for reducing energy demand and increasing energy efficiency. The key role for local and central government in this will be to ensure that consumers are aware and engaged and therefore take advantage of those opportunities.

However, as explained in our response to the separate consultation on the Scottish Energy Efficiency Programme (SEEP), we do not agree that 'reduced demand and increased energy efficiency' should be prioritised in the shorter term (up to 2025) over decarbonising heat. Both should be progressed in parallel to avoid missing the opportunities that low risk options can provide, including a range of technologies such as heat pumps.

The success of the Scottish Government's approach to achieving these priorities and the targets set out will largely depend on national government's commitment to providing sufficient funding. Equally important is that developers and investors see a consistent approach to applying policy throughout all levels of government within Scotland both central and local. EDF Energy supports the timescales for the SEEP, which provide a helpful signal to investors, provided the application of policy remains relatively stable and consistent during that period. A key way that this can be demonstrated is ensuring there is funding to support improvements to the government estate to maximise efficiency in the public sector. EDF Energy is committed to play our part in such activity and to advise and assist where we can in reducing the demand and increasing the efficiency of government building, business sites and home across Scotland.

We also agree with the actions the Scottish Government has proposed to target the regulation of energy efficiency and heating provision across Scotland in both the domestic and non-domestic market. This approach will drive up quality throughout the supply chain, ensuring that a market delivers the right solutions, of a good standard and in the right places. This will help minimise costs and achieve value for money for consumers in the long term. The Scottish Government should focus on low risk options that will contribute to the decarbonisation of heat and support a "fabric first" approach in energy efficiency policy, which prioritises low technology energy efficiency improvements prior to the installation of other new technologies. Low risk choices (energy efficiency measures and heat pumps in off-gas grid areas) and further research/innovation should be prioritised in parallel and from the start of the SEEP.

More efficient use of energy (and low carbon/efficient heat) by businesses will also drive greater productivity and growth. Government has a key role to play in helping businesses understand how to access data and information to make the right choices to be more energy efficient. Government help with the capital costs of installing some technologies and infrastructure could also help take-up among businesses, especially where payback times can sometimes exceed shorter term budget concerns.

We agree that harnessing smart meters and other technologies will help bring better outcomes for consumers. We therefore support the Scottish Government working closely with the UK Government and Ofgem as they consider how best to remove barriers to the deployment of smart technologies through their call for evidence on 'A Smart, Flexible Energy System'.

It is important that the roll-out of smart meters is done cost-effectively and in a way that provides a good customer experience. We are concerned about the high volume of first generation SMETS1 meters being installed. These meters were intended to be used only at low volumes in the early stages of the programme; however, delays in core parts of the programme delivery, particularly in the availability of the central DCC systems, are compelling suppliers to install 2-3 times the number of SMETS1 meters originally envisaged. These meters are inferior to second generation SMETS2 meters in a number of ways including the lack of interoperability between suppliers, being of higher cost, an inability to deliver network benefits, and increased vulnerability to cyber security risks. We would like to work collaboratively with UK Government and across all industry participants to explore what solutions may be available to address these risks and ensure a successful programme with lasting benefits for customers and suppliers. We would ask that the Scottish Government encourages the UK government to review the smart meter programme to make sure roll-out is a success and maximises the benefits to consumers. We believe all stakeholders – including the UK Government, suppliers, the Data Communication Company (DCC) – should take stock and determine what should be done to achieve that success.

Q9. 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.

EDF Energy supports many of the actions set out which are aligned with the identified priorities. As mentioned in our response to Question 8, it will require commitment to funding and political will to ensure they succeed.

We particularly support Government, both central and local, within Scotland playing a key role in improving consumer understanding of how energy efficiency and low carbon heat technologies can minimise costs. Achieving decarbonisation will require a significant cultural shift to move people away from a gas-dependent heating and to adopt new, smarter forms of energy management. This will require greater consumer engagement than we currently see in the energy market.

As is recognised in the consultation, there is a low level of consumer engagement in the Scottish market which may be due to higher levels of customer loyalty to former regional suppliers - domestic customers in Scotland have the lowest switching rates in the energy supply market at 10% compared to 12% for Great Britain as a whole.⁴ In addition, consumers that are engaged will typically be higher income earners. However, as the Scottish Government recognises, new technology and innovative tariffs provide scope for increasing customer engagement and potentially helping tackle fuel poverty. EDF Energy has a strong track record of promoting customer engagement, and as a result, more than 40% of our domestic customers are on products that they have actively chosen, one of the highest proportions amongst large suppliers in the industry. We believe that the Scottish Government has a key role to play in promoting the benefits of customer engagement, to enable more customers in Scotland to choose the appropriate supplier and tariff.

To support this, the Scottish Government should support increased awareness of the Energy Switch Guarantee (ESG) to provide more confidence to consumers in the switching process and raise awareness of the benefits of finding the right tariff for their needs.

We have responded to the separate consultation on Heat and Energy Efficiency Strategies and Heating Regulation. Heating networks should be supported with regulation to improve standards across the supply chain. We are also generally supportive of a model of heating zones and concessions for developers but not supportive of compulsion of private sector building owners to link to heating networks as they may prohibit flexibility of approach. A better approach will be for the local Authorities to lead the way by identifying opportunities in existing public sector assets.

The roll-out and use of smart meters, across all consumers should have the benefit of increasing not only consumer awareness of efficiency opportunities but providing data to measure existing energy efficiency programmes against.

In particular, business consumers are awaiting the UK Government's consultation on a carbon and energy efficiency reporting mechanism, previously announced as part of the business energy efficiency and tax review in 2015. We support this as an approach to driving more investment in energy efficiency for large non-domestic customers. However, it is important that businesses get clarity on the intention ahead of implementation, which is assumed to be around 2019 to replace the Carbon Reduction Commitment (CRC), and to give certainty over the next steps for the Energy Savings Opportunity Scheme (ESOS). The Scottish Government should avoid creating any energy efficiency schemes for large non-domestic consumers that would create additional burdens on businesses operating across the UK. It will be equally important, in relation to the domestic market, that suppliers receive early clarity on any devolution plans for the Warm Home Discount and Energy Company Obligation from 2018 to ensure a smooth and effective delivery to benefit Scottish consumers.

⁴ Ofgem publication "Retail Energy Markets in 2016" 3 August 2016

Q10. 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 target of 30% by 2030 across the EU.

An overall energy efficiency target for Scotland may well depend largely on Local Authorities identifying needs and opportunities through the Local Heat and Energy Efficiency Strategies (LHEES) within their areas. However, Local Authorities need to be supported by central government to set and monitor local decarbonisation targets that are evidence-based and robust, and that align with national targets and priorities. The Scottish Government should ensure that the combined impact of all the Local Authorities' targets meets Scotland's national targets.

We would also advocate targets generally being set on the basis of the reduction of carbon emissions as opposed to setting targets specifically for renewable technology. The latter would limit the Scottish Government and Local Authorities' ability to make use of all available low carbon technologies in meeting targets.

Chapter 5 – Delivering smart, local energy system

Q11. What are your views on the priorities presented in Chapter 5 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.

We agree with the two priorities identified for supporting the development of Smart, Local Energy Systems:

- Directly supporting the demonstration and growth of new innovative projects; and
- Developing a strategic approach to future energy systems in partnership between communities, the private and public sectors

The energy system is going through significant transition as the sector decarbonises. The drivers of change include the deployment of new technologies, the growth of decentralised generation and the increasing ability of consumers to play an active role. We believe that a range of technologies is needed to ensure a low carbon, secure and affordable energy system. This includes new distributed energy resources, demand response, aggregation and community energy schemes which, in themselves, increase the diversity of financing options for this energy transition. These technologies need to be combined with a centralised transmission system and large synchronous generators continuing to play an essential role for system security and operability and for the power they provide. Innovation funding will be important to enabling this transition.

EDF Energy is strongly committed to innovation:

- EDF Group works closely with UK universities to support research and innovative products which will bring real benefits to customers and support our existing and future low carbon electricity generation activities.

- We partner with Local Authorities. For example, in Barkantine we are rolling out new heat metering technology in order to provide a more responsive service to customers.
- EDF Energy R&D (a separate UK subsidiary jointly owned by EDF Energy and our parent company, EDF SA) has delivered key innovations in the UK, drawing on the knowledge and experience from innovation/R&D worldwide and applying it to the UK.
- Within our Customers Business, we have launched a dedicated innovation platform called BlueLab to accelerate new ideas and solutions and harness the latest smart technologies at home for the benefit of customers.
- We provide energy services and heating solutions as part of a joint venture with Dalkia, part of the EDF Group. EDF Energy Services UK are working on a number of projects in the UK to provide energy performance contracts, and heating networks and infrastructure across domestic, public sector and commercial customers.

We believe research and development and innovation is essential to understanding our customers' needs and developing ways to meet these needs. Our work is important to us in achieving our vision of a sustainable, low carbon society. Our engagement in innovation enables us to draw on the experience of EDF Group, to develop and test new technologies and business models and to engage with customers to understand their needs and to tailor solutions to individual customer characteristics.

Innovation funding is available through existing channels such as Innovate UK and subsequent Catapults. The Scottish Government should target support towards areas that cannot access these funding channels. On a local level, many domestic and non-domestic consumers are put off by both the upfront cost of investing, and the perceived complexity of existing support mechanisms. The Scottish Government could promote investment in more efficient energy use and decarbonisation of heat by providing both help to consumers to navigate the existing support structures, and financial support for capital costs. This could be done by providing public sector loans and/or grants to energy efficient equipment or through tax incentives where possible. Investment in innovative technologies for low carbon energy for transport and heating should also be a priority, along with improving energy efficiency in buildings.

We agree with the principle of SEEP, whereby the Scottish Government can support effective and robust trials and demonstration projects prior to any commitment to long-term, large scale financial support. We believe that there will be benefit in researching international solutions, where the basic innovation has been developed and only specific learning for Scottish applications is necessary. There are a number of international companies which have a presence in Scotland and have experience which may be business as usual for them, but innovative to Scotland and the UK. This innovation may go beyond big impact schemes such as district heating, and could include overseas solutions for rural areas at the individual and community level.

We agree that the Scottish Government should develop a strategic approach to future energy systems in partnership between private and public bodies and expand on this in our answer to Question 12.

Q12. What are your views on the actions for Scottish Government set out in Chapter 5 regarding smart, local energy systems? In answering, please consider whether the actions are both necessary and sufficient for delivering our vision.

We agree with the consultation proposal for continued support under Community and Renewable Energy Scheme (CARES) for community and local renewable energy schemes.

More generally, we agree with the consultation proposal to continue to support low carbon investors through a variety of existing Scottish Government grant and loan support schemes. However, these can only function effectively if there is also continued access by projects to a national mechanism for financial support, such as the existing Contract for Difference.

We agree with the aim of developing future energy systems in partnership between communities, the private and public sectors. EDF Energy and its renewables joint venture EDF Energy Renewables (EDF ER) support the principle of shared community ownership (SCO) of onshore wind projects and other renewable developments.

In enabling shared community ownership, there is a role for clear guidelines on how shared ownership in a project can be developed. Based on our own experience, we recommend that each step of the guidance should give flexibility to find a mutually agreeable path between the parties, rather than being prescriptive. This flexibility would include, for example, the point at which communities become financially involved or exposed, the percentage or capacity of the project to be shared and the cost base of the transaction.

Local Authorities could have a supporting role to play by partnering with communities to provide skills to enable SCO.

Local Heat and Energy Efficiency Strategies (LHEES) will play a key role in identifying the opportunities and needs of different areas, and are therefore important in identifying the right partnerships across the private and public sectors. This will largely depend on the types of customers, and buildings in each area. However, through these strategies the Local Authorities will need to maintain oversight and regulation where heating networks are developed as the most appropriate solution to ensure a standardised approach to supply chain provision, consumer protection, and quality of service and supply. This should ultimately lower costs across the networks.

Q13. 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.

If a Government-owned energy company (GOEC) is taken forward it will be important that it focusses on those areas where it can support the Scottish Government's strategy. Therefore, we would recommend the focus is on energy policy objectives that are proving challenging to deliver. However, many of the functions suggested could be effectively performed by existing bodies or government agencies. Therefore, if a GOEC is taken forward it should focus on acting as an overarching body:

- Enabling the reinvestment of funds back into communities. A GOEC could enable the growth of local and community energy projects by providing enabling funding, guarantees and advice. Alternatively, the existing Scottish Investment Bank could expand its activities in local and community energy.
- The GOEC could assist in de-risking of capital intensive projects such as district heating networks, particularly in the early stages. This would benefit the uptake of district heating.
- Scottish Government has the ability through its Scottish Procurement Electricity Frameworks contract for energy to sleeve large PPAs, however, it has not exercised this option to date. A GOEC could take on this function and, by applying a wider range of risk criteria to counterparties, it could assist projects to proceed. The Non-domestic Energy Efficiency Framework set up by Scottish Procurement has had little take up so far despite offering up to £50k investigation costs. A GOEC could have a role in altering the structure to enable wider access and provide an easier route to market.

We have the following comments on the proposed action to explore the development of a regulatory framework for Local Heat and Energy Efficiency Strategies that will support area-based energy efficiency programmes, in conjunction with COSLA and local authorities.

The key areas on which the Scottish Government should focus support for customers are:

- Help towards capital investment on energy efficient measures.
- The provision of information and education on energy efficiency opportunities.
- Regulation and standards within the supply chain.

The main barrier to developing heat networks in the UK and therefore attracting connection across networks, is the initial investment in network infrastructure. This is characterised by high upfront costs and an uncertain level of demand. Many larger scale heat projects require significant upfront investment with long payback periods (up to 15 years) in which Local Authorities especially can be put off the risk of investments and long contracts due to budget constraints and uncertainty. This is despite the potential long-term social and environmental benefits, particularly if scale can be achieved.

Individual network contracts or concessions should be linked to the requirements of the developer to receive a reasonable rate of return, but no longer. Periods of 15 years or more may be required depending on the individual investments made. Developers need to have assurance that such support will not change in a way that will impact on the attractiveness of a business case over such a long timescale.

Q14. 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 public and private sectors in such an arrangement.

EDF Energy can see the benefit in the creation of a Scottish Renewable Energy bond where there is an identified market failure which could be addressed by such a bond. To be attractive to savers, returns would need to be competitive with the market place or offer other benefits such as lower risk (Scottish Government acting as guarantor). The fund would be supportive to communities both in terms of opportunities for investment and access to funding for projects. The scope would be dependent on the size of the fund, but if it is of limited size, it would be better targeted at smaller scale projects, not eligible for FITS.

**EDF Energy
May 2016**

Appendix

EDF Energy and EDF Energy Renewables Activities in Scotland

Customers

As the largest supplier of electricity to Britain's public and private sectors, we are proud to be powering Scotland. We have a growing portfolio of customers in Scotland, won in the competitive market. In the Scottish market we supply over 5% of domestic customer accounts, which has doubled in the last three years, and supply 29% of business electricity by volume. As part of our contract with Scottish Procurement, we have been supplying electricity to over 98% public sector sites since April 2013 – these include schools, universities, hospitals and museums. We are also responsible for providing low carbon electricity to Scotland's rail network, as well as Edinburgh's tram system.

We are keen to build on this foundation, by being the energy partner of choice for Scottish business and residential customers. We want to help them make the most of their energy consumption and production and make it easy for them to benefit from new technologies, so they can reduce their energy, carbon emissions and costs; whether that is by providing tools to monitor energy, the expertise to help identify potential savings, or the engineering skills to install energy saving equipment.

Generation

EDF Energy operates the Hunterston B and Torness nuclear power stations in Scotland. Our nuclear power stations generate 34% of Scotland's electricity, which represents 49% of demand in Scotland; EDF Energy is safely extending the life of its operating nuclear power stations in Scotland. Hunterston B is expected to operate to around 2023 and Torness is expected to operate to around 2030.

Torness

In 2015, Torness produced enough electricity to power 2.1 million homes and avoided 7 million tonnes of carbon – the equivalent of taking 3.3 million cars off the road.

Now the station is set to supply Scotland's homes and business for even longer after the announcement that its expected life has been extended to 2030.

The station has a dedicated workforce of around 550 full time staff and 200 contract partners many of whom worked hard on the detailed technical and safety reviews that showed that we could safely prolong its operating life beyond the original date of 2023.

We also have 27 apprentices, many of whom grew up nearby, who are building their skills in engineering and can look forward to a brighter future as a result of this decision.

We are proud to be part of the East Lothian community; most of our workforce lives in the area and while they continue to put money back into the local economy, we will continue to invest in our links with small businesses and community events like the Dunbar SciFest.

Hunterston

Since Hunterston B power station first started generating electricity in 1976, it has supplied the National Grid with around 270 TWh of low carbon electricity – that is enough electricity to heat around 90 billion kettles. In 2015, the station generated enough electricity to power 1.8 million homes and the carbon avoided was the equivalent to taking 2.8 million passenger cars off the road.

Hunterston B plays an important part in the North Ayrshire community. Many of our 25 engineering apprentices come from the local area and are drawn from some of the schools that pass through our visitor centre every year. The station currently has 540 full time staff and around 250 contract partners but it has employed thousands of local people over the years and we have seen millions of pounds invested in the community whether through our relationships with local businesses or the support we give to community groups and projects.

Hunterston has a wonderful geographical location and a world leading technological design, but more importantly a team of people who are committed to safely and efficiently producing low carbon electricity.

EDF Energy Renewables

EDF Energy Renewables is an experienced wind farm developer and operator with sites spanning the length and breadth of the UK. In Scotland we already operate seven sites totalling 317MW – enough to supply the needs of around 139,500 homes. We have committed investments to add a further 219MW of installed capacity with projects already consented or under construction, including Dorenell wind farm near Dufftown in Moray, one of the largest onshore wind projects due to be built in Scotland and another 800 megawatts in planning or development.

Our commitment is to make a real contribution to the country's targets for renewable energy and the reduction of CO2 emissions. We also want to remain sensitive to the environment and the economic and social needs of the local communities near our sites. We think that by working together we can achieve the low carbon future the country needs.

[Please note these figures are based on onshore turbines operating at 26.22% capacity and offshore turbines operating at 35.96% (2010-2014 average load factor for onshore wind from Digest of UK Energy Statistics) and assuming 4,115 is the average UK household electricity consumption in kW hours (based on DECCs "Energy Consumption in the UK" (July 2015).]

East Kilbride

EDF Energy's East Kilbride office provides vital support to our fleet of nuclear power stations and our entire UK business, including Hunterston and Torness, and to the safe, reliable generation of low carbon electricity for our customers.

Our facility in East Kilbride is a key provider of direct employment in the local area, helping to bring economic stability and job security to the region. Our people are key to our

success; approximately 240 staff and contractors currently work at our East Kilbride office. It employs professional people in a variety of specialist (and in some cases unique to East Kilbride within the UK) engineering, scientific, legal, finance, analytical, HR, training and communication roles.

We are committed to engaging with and supporting our local communities. Employees at the East Kilbride office take part in a range of programmes to promote engineering and science at all levels, and often help local schools provide education through various events designed to inspire our future workforce. As part of that commitment staff at East Kilbride have developed links to inspire 6 – 14 year olds in STEM (Science, Technology, Engineering and Maths) and sponsor education bodies such as EDT (Engineering Development Trust).

The office is also engaged in a wide variety of charitable causes in the local community where staff willingly contribute their time, talents, effort and money to a range of good causes.

Research and Development

Working with Scottish universities and research centres, EDF Energy has strong research and development relationships with several Scottish universities. Since 2007 the EDF Energy Advanced Diagnostic Centre at the University of Strathclyde has delivered research for the nuclear power industry. The successes of this programme are the delivery of multiple inspection tools for day-to-day use by Graphite Core Inspection Team, delivering value and impact from research to the life extension of our fleet of stations across the UK. As well as the three academic posts we support at the University of Strathclyde, we also fund a Royal Academy of Engineering Research Chair (RAEng) at Glasgow University. This post is working to develop new predictive modelling techniques for structural integrity assessment in nuclear power stations.

Since 2011 our collaboration with Glasgow Caledonian University has changed the way power cables and motors are monitored at our power stations, helping us reduce maintenance and repair costs while continuing to reliably supply power to the UK network. We are committed to continuing this relationship and a new three year PhD research post was appointed earlier this year. The collaboration extends to Renewables with three Engineering Doctorates co-supervised with the Universities of Strathclyde and Edinburgh, aiming at achieving our cost reduction ambition of Offshore Wind energy. One of the projects is delivered in collaboration with the Scottish Association for Marine Science (SAMS).