Scottish Renewables Consultation Response
Draft Energy Strategy

Introduction

Scottish Renewables is the voice of the renewable energy industry in Scotland, representing over 270 organisations working across the full range of technologies providing clean, sustainable, low-carbon heat, power and transport to Britain's homes and businesses.

We welcome the publication of the Scottish Government's draft Energy Strategy (herein 'the Strategy'), and support the Government's high-level aims of decarbonising Scotland's energy production and use. The emissions reduction efforts required through the Climate Change Plan (CCP) are extremely challenging, but the need to accelerate the shift to low-carbon energy has never been clearer. The proposed policy mechanisms outlined in the Strategy are necessary, but we question whether they are sufficient on their own to deliver its vision. We, therefore, recommend the Strategy:

- develops clear action plans to outline the practical steps which will deliver the Strategy's targets and vision
- outlines the critical decision points that will play a role in determining the future of Scotland's energy supply
- ensures all devolved policy levers are maximised to deliver the scale of transformation in energy supply and use the Strategy requires

We welcome the Strategy's commitment to continue to engage positively with the UK Government and wider UK institutions, such as Ofgem, and we underline the importance of such inter-governmental working. In addition, the Scottish and UK government need to ensure that changes to the UK's relationship with Europe do not impact on its attractiveness for inward investment, and that our universities and businesses continue to benefit from access to funds to support research, innovation and infrastructure.

Our detailed comments on the Strategy's proposals are outlined below.

1. **What are your views on the priorities presented in Chapter 3 for energy supply over the coming decades? Are they the right ones for delivering our vision?**

The ambitions and targets contained in the Strategy are extremely challenging, requiring substantial emissions reduction efforts across all parts of our energy system. Scottish Renewables, therefore, understands and supports the need to take a flexible approach to decarbonisation. This will enable to us to take advantage of innovations in technologies and system management as they come to market, ensuring the transition is delivered as cost effectively as possible.

However, this flexibility must be balanced against the needs of industry to have a degree of certainty over the direction of policy, giving confidence in market opportunities and stimulating the required private sector investments. Our detailed comments in relation to the targets relating directly to renewable energy are outlined below, but we believe 'increasing the generation of renewable and low-carbon energy' is a priority that is absolutely critical to delivering the Scottish Government's vision.

Renewable energy technologies are now central to our energy system, delivering significant benefits to Scotland's economy and helping deliver on its challenging climate change ambitions. In 2015, renewable electricity generation displaced 13.4 million tonnes of carbon dioxide (CO_2) in Scotland alone[1]. Scotland continues to be the UK's renewable powerhouse and renewables are now Scotland's largest generator of power[2]. The sector produces the equivalent of 15% of Scotland's energy use across electricity, heat and

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[1] http://www.parliament.uk/business/publications/written-questions-answers-statements/written-question/Commons/2016-09-05/45055/
[2] http://www.gov.scot/Topics/Statistics/Browse/Business/Energy/Database

transport. UK Government research also shows the most established forms of renewables, such as onshore wind and solar, are now among the lowest-cost forms of new power generation[3].

The industrial benefits of this strategic transformation are as impressive as the environmental ones. According to the Office for National Statistics (ONS), the renewable energy sector in Scotland supported 26,000 FTE jobs in 2015 and generated almost £8 billion in turnover[4]. The industrial impact of Scotland's renewable energy sector can be felt across the whole country, building on Scotland's existing strengths to deliver the industries of the future. Scottish Renewables has published 'Industrial Impact: The Power of Scotland's Renewables Sector'[5] to provide a snapshot of these impressive and far reaching impacts. Research by Scottish Renewables in December 2016 showed Scottish renewable energy businesses have also been involved in projects worth £125.3 million in 43 countries around the world - in every continent bar Antarctica[6].

Renewable energy can clearly play a key role in the delivery of the UK Government's Industrial Strategy, and the Scottish Government's Energy Strategy should help to promote the benefits of the sector in this context. Scottish Renewables supports the challenge set out in the Industrial Strategy Green Paper to ensure the shift to a low-carbon economy is done in a way that minimises cost to UK businesses, taxpayers and consumers. However, in order to achieve this, the UK Government must ensure that the energy market is competitive and can deliver low-cost, clean energy supplies to replace retiring capacity and upgrade our infrastructure to meet future demand from the increased electrification of heat and transport systems and production of alternative fuels (e.g. hydrogen).

Prioritising increased generation of renewable and low-carbon energy will, therefore, help both the UK and Scottish governments achieve their ambitions and deliver a strong low-carbon economy which shares the benefits across our communities, creating a vibrant climate for innovation, investment and high value jobs.

There is currently a lack of clarity about what any new relationship between the UK and the EU will look like. Therefore, it is very difficult to assess how any future relationship would affect, either positively or negatively, the renewable energy sector in Scotland. Energy is an international business, and the global transition to a low-carbon economy presents a huge opportunity for Scottish and UK companies to export their goods and services around the world. We need to ensure that changes to our relationship with Europe do not impact on the UK and Scotland's attractiveness for investment.

2. **What are your views on the actions for Scottish Government set out in Chapter 3 regarding energy supply? Are they necessary and sufficient for delivering our vision?**

Our response to this question is focused on the role of renewable energy technologies in delivering the Scottish Government's energy supply ambitions. For comment on the role of hydrogen and CCS please see question 7. For comment on increasing the flexibility, efficiency and resilience of the system as a whole, please see questions 11 – 12.

Scottish Renewables welcomes the Strategy's aim to completely decarbonise the electricity sector by 2027 and reduce CO_2 grid intensity to below 50g per kilowatt hour. We also support the actions outlined in Chapter 3 to achieve this. We understand that the Strategy doesn't include all of the work being undertaken by the Scottish Government to support the sector and a variety of actions continue as usual. However, we question whether these alone are sufficient to deliver the Strategy's vision and targets. Given the scale of transformative change required, it is critical that the Scottish Government maximises the use of the devolved policy levers it has available - such as planning, public procurement, building standards, Non Domestic Rates (business rates), as well as innovation and project funding. A continuation of 'business as usual' is unlikely to deliver the required increase in capacity.

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[3] BEIS Electricity Generation Costs -
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/566567/BEIS_Electricity_Generation_Cost_Report.pdf
[4]
https://www.ons.gov.uk/economy/environmentalaccounts/datasets/lowcarbonandrenewableenergyeconomyfirstestimatesdataset
[5] https://www.scottishrenewables.com/publications/industrial-impact-power-scotlands-renewable-sector/
[6] https://www.scottishrenewables.com/news/global-reach-scot-renewables-revealed/

Therefore, in addition to the actions outlined in Chapter 3 we recommend the Scottish Government undertakes the following:

Planning

- Work with stakeholders to make the consenting process more coherent, increasing certainty for all parties, by improving consistency of interpretation of planning guidelines and supporting and guiding effective pre-application discussions between planning authorities and developers
- Confirm what interventions will be introduced to improve the efficiency of the planning process to ensure that performance is strengthened in line with the impending increase in fees
- Work with stakeholders to ensure planning guidelines encourage consideration of the latest, most efficient technologies, promoting the maximisation of energy yield at project sites
- Create a supportive policy and regulatory environment for the redeveloping, replanting and repowering of existing wind farms
- Ensure the new Crown Estate Scotland supports the delivery of competitive offshore renewable energy projects in Scottish waters[7]
- Undertake a comprehensive review of the offshore renewables consenting process to learn from and build on recent experience from both the UK and Scottish systems, delivering a robust consenting regime which supports Scottish projects to be as competitive as possible

Networks and Innovation

- Work with stakeholders to lower the cost and increase access to the electricity network, making the best use of existing infrastructure with the integration of new technologies such as active network management, storage and demand-side response
- Build on the success of existing showcase demonstrators of energy system innovation, and promotes Scotland's geography and policy environment as the go-to geography for innovative energy system demonstrations
- Produce a strategy for energy innovation to make Scotland an internationally recognised centre of excellence in energy systems and storage, and to maximise the economic impact of renewable energy related R&D
- Take an active role in regulation across energy networks and markets, to ensure already successful innovation projects can be rolled-out across the system
- Continue grant and loan support schemes such as the Renewable Energy Investment Fund, Home Energy Scotland Loan, the Energy Company Obligation, the Scottish Energy Efficiency Programme and the Low Carbon Infrastructure Transition Programme, ensuring they are sufficiently resourced and coordinated to deliver the scale required
- Further consider the significant potential that digital solutions and 'big data' analysis offers in managing the network more effectively
- Support activity to renew key parts of network infrastructure to avoid losses occurred due to ageing equipment and increase overall efficiency

Heat

- Take immediate steps to maximise the uptake of renewable heat projects supported by the UK RHI scheme and delivered between now and 2021
- Develop a clear action plan for the decarbonisation of heat that will bring forward the pipeline of projects that need to be delivered from 2020 – 2032 in order to achieve the vision
- Consider the recommendations set out in Scottish Renewables' Vision for Low-Carbon Heat in Scotland and Biomass Heat in Scotland policy papers, to take advantage of the benefits offered by the full range of renewable heat and low-carbon technologies and fuels
- Determine and sets targets for renewable and low-carbon heat in the public sector, and mandates the public sector to achieve these, focusing on meeting 2020 and 2030 targets
- Utilise government support agencies to work with major private sector energy users and industry in Scotland to decarbonise their energy use and develop a low-carbon energy strategy for each sector

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[7] Please see our consultation response on the Long Term Management of The Crown Estate in Scotland, available at https://www.scottishrenewables.com/publications/long-term-management-crown-estate-scotland/

- Ensure that projects which use their energy on-site are not disproportionally affected by the business rates system
- Adopt a stronger package of regulation and support which builds investor and consumer confidence to assist with the development of heat networks
- Set a target for the proportion of renewable heat supplying heat networks
- Continues to assess building standards to assess impact on the uptake of low-carbon heat technologies
- Produce a strategy for heat innovation to make Scotland an internationally recognised centre of excellence in heat and hydrogen related activities, and to maximise the economic impact of CHP and hydrogen systems in heat decarbonisation

3. **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? Consider the ambition and feasibility of such a target**

Scotland's ambitious climate change and renewable energy targets have signalled a clear intent for the country to lead the way in the transition to a low-carbon economy. In January 2016, Scottish Renewables published 'Renewed Ambitions: A Plan for Renewable Energy in Scotland'[8] which set out the renewable energy industry's key objectives and policy requirements to build on our enormous success to date and ensure the ongoing growth of our sector.

Research has shown Scotland needs to meet at least half of its overall energy needs from renewables in 2030 if we are to meet our climate change targets at lowest cost[9]. Our top priority was, therefore, to see the Scottish Government set a new target for Scotland to produce the equivalent of at least 50% of all energy use from renewable sources by 2030.

As such, Scottish Renewables strongly supports the proposal in the draft Energy Strategy for a new 2030 'all-energy' target for the equivalent of 50% of Scotland's heat, transport and electricity consumption to be supplied from renewable sources. The target provides a strong signal that renewable energy will be at the heart of Scotland's economy and climate change ambitions

Achieving this ambitious new target will require strategic leadership from the next Scottish Government to drive the development of the sector, increase its competitiveness and spearhead the development and deployment of new technologies.

We believe the target is challenging, but feasible. Work undertaken by Ricardo AEA for WWF Scotland used the MARKAL model to find the minimum cost approach to Scotland meeting its emission reduction targets. The outputs suggest renewables should account for 40% of heat demand, 18% of transport demand, and around 145% of electricity demand in 2030[10].

The Strategy suggests 11 – 17GW of installed renewable energy capacity is required by 2030. However, it is not made explicit whether this accounts for anticipated increases in electrification of the heat and transport sectors or only the decarbonisation of the electricity sector, and whether this is additional to the current 8GW of installed capacity or a cumulative total. Scottish Renewables continues to recommend that current installed renewable electricity capacity needs to more than double (from the current 8.6GW baseline) by 2030. With a 12GW pipeline of pre-operational renewable power projects in Scotland, we believe it would be prudent to maximise the deployment of this capacity as part of a 'low-regrets' strategy, minimising reliance on less mature technologies to reach our decarbonisation goals.

CCS plays an important role in the CCP and the Strategy and is critical to the projection of a negative emissions scenario in the electricity sector. However, as the Strategy recognises, CCS remains a nascent technology requiring further investment and development before it is commercially viable. Scottish

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[8] https://www.scottishrenewables.com/publications/renewed-ambitions-plan-renewable-energy-scotland/

[9] http://assets.wwf.org.uk/downloads/ricardo_energy__environment___renewable_energy_in_scotland_2030_2016.pdf

[10] http://assets.wwf.org.uk/downloads/ricardo_energy__environment___renewable_energy_in_scotland_2030_2016.pdf

Renewables, therefore, believes it is prudent to maximise the deployment of existing low-carbon and renewable technologies, as a 'low or no regrets' option, while CCS technology continues to develop.

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

While we welcome the draft Strategy's ambition, the pathways set out in the Climate Change Plan to supply 80% of domestic and 94% of nondomestic buildings' heat with low-carbon technologies by 2032 are extremely challenging and will require significant effort.

The Strategy currently contains little detail surrounding the policies that will deliver these ambitious heat targets, what technologies are considered to be 'low-carbon' and how the transition will be funded. Many of the recommendations within the 'Scotland's Energy Efficiency Programme' (SEEP) and 'Heat & Energy Efficiency Strategies and Regulation of District Heating' (LHEES) consultations are to be welcomed. However, given the significant role played by the decarbonisation of heat in Scotland's emissions pathway, it is critical that a detailed sector road map outlining the technologies considered 'low-carbon' and 'renewable', while considering funding requirements, is delivered and implemented as quickly as possible. Steps should also be taken to increase the number of renewable heat projects being deployed in Scotland over the next three to four years, capitalising on the available support under the RHI.

We welcome the commitment to deliver a whole-system bioenergy action plan following publication of the final Climate Change Plan. Scottish Renewables' recent papers 'A Vision for Low-Carbon Heat in Scotland'[11] and 'Biomass Heat in Scotland: 16 Priorities for Action'[12] provide further information on our recommended policies to achieve our targets and raise awareness of the positive contribution this sector can make to individuals and communities.

In order to encourage the full range of low and zero carbon energy technologies to come forward we would like to see the introduction of further targets for the proportion of heat to be delivered from renewable sources. These include setting a target for the uptake of renewable or low-carbon technologies within public sector buildings and an indication of how much of the target of 1.5TWh of heat to be delivered by district heating by 2020 needs to come from renewable sources.

Scottish Renewables believes all new and existing renewable energy and carbon targets should be made material considerations in national planning policy and consideration should be given to how best to ensure all local authorities deliver a reasonable share of carbon targets. This could be done through the introduction of a carbon reduction target for each local authority.

5. **What ideas do you have about how we can achieve commercial development of onshore wind in Scotland without subsidy?**

Scottish Renewables recognises the Strategy's overall focus on reducing costs across all renewable energy technologies. Costs continue to fall across the sector and the most established renewables, like onshore wind and solar PV, are now among the lowest-cost forms of new power generation, as evidenced in UK Government research[13]. As the Strategy notes, however, it is imperative that deployment continues to unlock further cost reductions.

A recent study for Scottish Renewables by Baringa Partners found that a new Pot 1 CfD auction for established renewable technologies in 2018/19 could deliver around 1GW of the most competitive new onshore wind capacity at no extra cost to consumers over the life of the contract and could even pay back more to the public purse. This analysis was based on the latest evidence of cost reductions as a result of innovation, decreasing turbine prices and the use of auctions to ensure competition. 1GW of onshore wind capacity can meet the equivalent annual demand of 600,000 homes.

The capacity delivered through the auction – most of which is expected to be in Scotland - would result in

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[11] https://www.scottishrenewables.com/publications/vision-low-carbon-heat-scotland/

[12] https://www.scottishrenewables.com/publications/biomass-heat-scotland-16-priorities-action/

[13] BEIS Electricity Generation Costs - https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/566567/BEIS_Electricity_Generation_Cost_Report.pdf

more than £1 billion of private sector investment in clean energy generation across the country, and would displace some 8 million tonnes of CO_2 over the lifetime of the projects. Crucially, The CfD mechanism still has a fundamental role to play, offering a low-risk route to market. Scottish Renewables, therefore, believes the UK Government must hold a new Pot 1 CfD auction for established technologies in 2018/19.

It is important to stress that this outcome currently only applies to the most competitive 1GW of projects in the development pipeline. Scotland has over 5.4GW of onshore wind either in planning or consented and awaiting construction.

This significant additional capacity in the system can play a crucial role in helping to meet the Scottish and UK Government's energy ambitions. It is therefore vital that the Scottish Government continues to work with industry to reduce the cost of power and maximise the competitiveness of all Scottish projects through policy and regulation within its devolved powers.

In our publication 'Renewed Ambitions: Defining the Future of Renewable Energy in Scotland' we called on the Scottish Government to create the conditions for Scottish onshore wind to be the lowest cost anywhere in the EU15. While Scottish Renewables welcomes the Scottish Government's desire to support a route to market for onshore wind through the three areas of activity identified, we believe additional actions will be required to bring forward the volume of capacity needed to meet the targets. Many of these actions are outlined in the report 'Opportunities for Cost Reduction for Onshore Wind in Scotland' prepared for Scottish Renewables by Everoze. Detailed comments on these actions and required support for onshore wind can be found in our response to the Onshore Wind Policy Statement.

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

The Scottish Government must maximise the decarbonisation of the energy system if it is to meet its carbon targets. Therefore, while Scottish Renewables makes no comment on the role of non-renewable technologies in this context, future uses of decommissioned thermal sites must meet the tests of keeping the system within relevant carbon budgets while providing energy security at the lowest possible cost.

7. **What ideas do you have about how we can develop the role of hydrogen in Scotland's energy mix?**

Scottish Renewables supports activity to explore the potential role for hydrogen in the energy system and supports proposals to fund innovative projects involving hydrogen. Hydrogen holds significant potential to decarbonise both the heat and transport sectors and we, therefore, look forward to engaging in the development of the UK hydrogen route map.

However, this is one area where information regarding timelines for critical decision points would be particularly useful in order to understand the delivery pathway envisaged and ensure coherent delivery of the Strategy's ambitions. We recognise there are a number of key decisions in relation to the regulation of the gas network which will impact the timescales and pathways for a broader roll-out of hydrogen and that these are reflected in the current heat decarbonisation trajectories.

Scottish Renewables has argued that the current heat decarbonisation trajectories are extremely challenging and a more consistent emissions reduction pathway for the domestic and services sectors should be considered. This could be achieved by targeting the use of existing low-carbon heat technologies where possible, as early as possible. As highlighted in the Committee on Climate Change report 'Next steps for UK heat policy'[14], gas boilers typically have a lifetime of around 15 years. Therefore, in order to meet the 2032 target contained in the CCP, where there is a requirement for a new boiler, low-carbon systems will have to be installed now to avoid the need for premature scrappage. Further information on decision points would enable stakeholders to more meaningfully engage in this debate.

In addition, there are direct synergies between the development of hydrogen and CCS technologies which must be considered. We, therefore, welcome the Strategy's focus on assessing opportunities for carbon capture demonstration and utilisation projects in Scotland; in particular projects combining CCS and

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[14] https://www.theccc.org.uk/publication/next-steps-for-uk-heat-policy/

bioenergy. However, it is important that focus on the importance of carbon storage is not lost. The Scottish Government must, therefore, ensure existing critical infrastructure, including key oil and gas pipelines, are protected and retained for use with CCS.

We welcome the Scottish Government's commitment to maintain pressure on the UK Government to align its CCS strategy with Scottish energy priorities as commercialisation of CCS is unlikely without support from the UK Government. We are, therefore, concerned by the recent energy generation projections from BEIS, which show no CCS in the UK's energy mix until 2032. Given the role played by CCS in the Scottish Government's plans for the decarbonisation of the electricity sector, we request clarification on the impact of this on the TIMES modelling and whether the Scottish Government now envisages an even greater role for renewable energy technologies.

8. **What are your views on the priorities presented in Chapter 4 for transforming energy use over the coming decade? Are they the right ones for delivering our vision?**

Scottish Renewables broadly supports the priorities outlines in Chapter 4 for transforming energy use over the coming decade. However, it is our understanding that SEEP will also focus on heat decarbonisation as well as 'addressing the need to reduce demand and increase energy efficiency'. It is import that this point is recognised in the Strategy. Further comments on this can be found in our response to the SEEP consultation.

9. **What are your views on the actions for Scottish Government set out in Chapter 4 regarding transforming energy use? Are they necessary and sufficient?**

After heat, transport is the biggest decarbonisation challenge facing the Strategy. In relation to supporting the introduction of viable, lower carbon alternatives across all modes of transport, Scottish Renewables' interests relate principally to the electrification of rail and road transport, the impact of electric vehicles as a form of storage on the electricity system, and the role of sustainable biofuels.

Published analysis from Ricardo AEA shows that emissions from transport must fall by 40% by 2030 with renewable technologies providing a fifth of the energy consumed[15]. Under their scenario, this would be achieved through the electrification of vehicles and increased energy efficiency. However, the CCP only envisages an emissions reduction of 31% by 2032. We, therefore, query why more effort is not being targeted in this area and would welcome sight of the underpinning research carried out by Element Energy on behalf of the Scottish Government.

Scottish Renewables has previously called on the Scottish Government to refresh its existing transport strategy to maximise the electrification and decarbonisation of the transport system. We believe electrification - alongside hydrogen and biofuels - powered by renewables, offers the key to sustainable, low-carbon mobility for Scotland. The UK Government's Industrial Strategy Green Paper suggests that along with the decarbonisation benefits, electric vehicles have the potential to provide electricity storage and demand flexibility that could provide benefits to consumers and our electricity system. To that end, the UK Government is already investing over £600 million in support to accelerate the transition to ultra-low emissions vehicles and has created the Office for Low Emissions Vehicles to catalyse the transition.

It is important that the Scottish Government are at least as ambitious in this area. We, therefore, support the action to refresh 'Switched on Scotland'. The refreshed strategy should ensure that by 2030, the majority of new cars and vans purchased should be based on electric drives and powered by renewable and low-carbon sources, with heavy vehicles increasingly low-carbon. It should also:

- Build on existing incentives for sustainable vehicles (electric, hydrogen and sustainable biofuel) by allowing use of bus lanes, providing free parking in public sector owned and managed zones and facilities, and expanding the provision of charging and re-fuelling points
- Ensure consistent and comprehensive reference is made across policy documentation to the need for greater action to decarbonise aviation and shipping given the expected growth in emissions from the sectors in coming decades

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[15]

http://assets.wwf.org.uk/downloads/ricardo_energy__environment___renewable_energy_in_scotland_2030_2016.pdf

- Plan for the use of sustainable biofuel to be targeted to those sectors with the most challenging routes to decarbonisation, such as HGVs and aviation, as well as heat

In relation to the actions relating to heat and energy efficiency, please see our responses to the LHEES[16] and SEEP consultations.

We welcome the Scottish Government's consideration of innovation across the retail market where this benefits consumers, contributes to developing a smart energy system, and supports renewable generation. Energy markets have been going through considerable change – we have seen new market participants, new business models, and innovative community projects, a trend we believe is likely to continue. We would encourage careful consideration of the impacts that innovation across the retail market could have on the energy system and the objectives of the Strategy, and welcome the Scottish Government's recognition of Ofgem's review of its consumer regulation framework.

Required investment in infrastructure needs to be directed towards technologies and assets that support the development of a smart and flexible energy system, as detailed in the National Infrastructure Commission's 'Smart Power' report.

10. What ideas do you have about what energy efficiency target we should set for Scotland, and how it should be measured? Please consider the EU ambition to implement an energy efficiency target of 30% by 2030 across the EU.

Scottish Renewables supports the setting of an energy efficiency target.

11. **What are your views on the priorities presented in Chapter 5 for developing smart, local energy systems? Are the priorities the right ones for delivering our vision?**

With our energy system becoming more decentralised, and our generation and demand portfolio changing, our energy system is already undergoing a period of fundamental transformation. While we support recent analysis that this presents a significant opportunity, with consumers saving up to £40bn by 2050, there is some concern that regulation has the potential to act as a barrier to this transition.

Currently, while policy ambitions both in the Strategy and at a Westminster level are to develop a decentralised and flexible energy system, we are faced with a regulatory landscape often acting in opposition to this transition. Regulation needs to both 'catch up' with the system changes we have seen to date and needs to consistently be designed to support a flexible energy system and to enable industry to come forward with confidence.

We would welcome the Scottish Government taking considered positions on policy and regulatory issues, including at a UK level, which are preventing industry from supporting the governments' ambitions. Similarly, we would welcome the Scottish Government assessing which policy levers it can employ to promote system flexibility, grow low-carbon generation and enable industry to work to deliver the energy strategy's ambitions. Suggested additional areas of action are outlined in response to Question 12.

As set out in the attached data sheet at annex A, a large number of innovation projects considering smart, local energy systems have taken place in Scotland. From large-scale network operator driven projects to community scale feasibility assessments, Scotland has been at the forefront of energy systems innovation. Through active participation in policy debates surrounding network regulation, Scottish Government can harness the exceptional results from these innovation projects both to help meet the objectives of the Strategy, but equally to ensure Scotland remains a global leader in this field.

Scottish Renewables believes that local authorities should play a key role in developing and driving forward smart, local energy systems. To that end, we support the creation and implementation of Local Heat and Energy Efficiency Strategies as proposed in the consultation. While we broadly agree with the approach outlined in the Strategy and the LHEES consultation, we have some concerns with the proposal which are outlined in our full consultation response, available on our website.

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[16] https://www.scottishrenewables.com/publications/consultation-response-heat-and-energy-efficiency-s/

It is important when considering the priorities that energy system demonstration projects need to take a whole system approach. In developing this strategy, the Scottish Government needs to enable both companies and communities to access data and information, so transparency and sharing of the results of demonstrations is vital.

12. **What are your views on the actions for Scottish Government set out in Chapter 5 regarding smart, local energy systems? Are the actions both necessary and sufficient for delivering our vision?**

The steps required to realise the ambitions presented in the draft Energy Strategy have the potential to accelerate the pace of change across our energy system and to prompt additional changes within Scotland's energy landscape. To realise the benefits of a smart energy system, this transition will require strong leadership and careful management, with policy ambition reflected in regulation.

Areas which we would like the Strategy to consider further to realise the ambition of delivering smart, local energy systems are outlined below.

A. Network Charging Principles:

Network charging is a complex area with potential for knock-on effects across the energy system. It is important that any changes to the charging regime should prioritise creating a level playing field across system users.

Currently there is a great deal of regulatory change surrounding network charging. National Grid has indicated that it intends to conduct a review of commercial arrangements for electricity network charging, a number of recent Connection and Use of System Code (CUSC) Modification proposals seek to change charging methodologies, and Ofgem has indicated a charging work group will be established.

Given the web of complexities and dependencies within network charging it is our position that the consideration of network charging should be tackled holistically, with network charges representing a cost-reflective and fair recovery of costs.

We would welcome the Scottish Government's continued support in advocating for these principles.

B. Grid Constraints and Network Development:

Realising the ambitions presented in the Strategy will be wholly contingent on the physical constraints of our energy system, and how that system develops to become more flexible.

Electricity network operation is heavily regulated across the GB system and coordinated centrally. However, we would welcome the Scottish Government going further in setting out clear policy positions and utilising its policy levers to ensure that regulation on the network supports the development of a smart, flexible system in Scotland, allows for the continued development of low-carbon generation, and supports the overall objectives of the Strategy.

The Scottish electricity network faces a number of challenges, many of which are beginning to present themselves in other parts of the UK. With the network in Scotland particularly constrained, Scotland has been at the forefront of efforts to innovate, maximising the use of the networks and integrating the electricity network with other technologies, such as hydrogen[17]. We welcome the Scottish Government's commitment to seek to address grid constraints at both a regional and national level and we would encourage the Scottish Government to drive the 'roll-out' of lessons learned in Scotland.

Actively managing the electricity network has had much success in Scotland. Scottish Power Energy Networks' (SPEN) Accelerating Renewables Connections[18] (ARC) project used active network management (ANM) solutions and innovative commercial contracts to facilitate the connection of an additional 113MW of renewable generation to the network, deferring significant reinforcement costs.

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[17] http://brightgreenhydrogen.org.uk/home/levenmouth-community-energy-project-2/levenmouth-community-energy-project/
[18] https://www.spenergynetworks.co.uk/userfiles/file/ARC_Closedown_Report.pdf

Scottish and Southern Electricity Networks (SSEN) is conducting a similar project in the Northern Isles, using ANM alongside energy storage and adding an electric boiler to the local district heating system[19]. As discussed in Q11, we believe there is a particular opportunity for Scotland to harness results of innovation projects such as these, and be a world leader in energy systems innovation. .

It is important to note that different sources of flexibility (from renewable generation, demand-side response and interconnection) will have different impacts on our energy system and on the physical network. For example, a large volume of distributed energy storage has a different impact on the system compared to a smaller number of large plants. Different options will require different responses from the network operators and, as recently set out in a report by UKERC[20], will influence the amount of new low-carbon capacity required. In order to allow industry to react appropriately, we would welcome further signals from the Scottish Government on what flexibility enablers it seeks to deliver.

Scottish Distribution Network Operators (DNOs) have a strong track record of successfully innovating. For example, SPEN recently consulted on its vision to move from a DNO to a Distribution System Operator (DSO)[21]. Industry has responded to these proposals, and the shift from a DNO to DSO has also been considered by Ofgem and BEIS. We would welcome the Scottish Government setting out its position on this shift, and assessing whether it presents particular opportunities to develop flexible systems in Scotland.

C. Barriers to co-locating energy storage with existing generation:

Co-locating energy storage alongside both existing and new renewable generation sites is seen as having particular benefits in enabling system flexibility and increasing low-carbon generation.

With much of Scotland's grid network heavily constrained, co-locating allows the temporal shifting of generation and smoothing of the generation profile, which may increase the amount of generation reaching the network.

There are however a number of existing regulatory barriers to co-location:

- **Grid Requirements**: Metering arrangements and requirements for the sharing of Transmission Entry Capacity (TEC) are required to progress co-location. Regulation has yet to be fully developed to enable this.

- **Renewables Support**: With regulation and legislation pre-dating the advent of this scale of electricity storage to the market, there is little guidance or clarity on how co-location with sites receiving existing renewables support can work in practice.

For existing sites accredited under the Feed-in Tariff, Renewables Obligation or Contracts for Difference there is uncertainty as to how co-location may affect these income streams, and concern that adding storage (where it, for example, may trigger a re-accreditation process) could jeopardise access to those revenues.

Opening up a project to the level of risk associated with the loss of, or a change to, renewables support is a severe disincentive to investment in co-location.

- **Planning and Land Rights**

Storage remains a new consideration for most planning bodies, and there is little guidance for planners. Alterations to existing planning permissions may have unintended consequences, including for renewable support schemes.

Similarly, land rights granted by the landowner to the generator may only account for certain technologies and preclude the addition of energy storage. Renegotiations of leases may be required.

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[19] https://www.ssepd.co.uk/NINES/
[20] http://www.ukerc.ac.uk/publications/security-of-electricity-supply-in-a-low-carbon-britain.html
[21] https://www.spenergynetworks.co.uk/pages/dso_vision_consultation.aspx

Where the Scottish Government is able, providing more certainty for developers and stakeholders would be welcome in driving this area forward. A clear position from the Scottish Government supporting the development of co-location, and work to that effect with UK bodies would be welcomed by industry.

- **Planning Regime**

There can be Use Class confusion around the treatment of battery storage applications, and clarification of its treatment as generation or bespoke regulatory treatment is needed, as well as guidance to local planning authorities on storage applications in general.

D. Implementing Innovation:

It is our position that driving innovation in the following areas can enable the development of a flexible, secure, cost-effective and low-carbon energy system, and support the ambitions set out in the draft Energy Strategy:

- **Flexible Networks**: The Committee on Climate Change states that achieving our carbon budgets with a 'more flexible power system' has the potential to save consumers £3bn-3.5bn per year[22]. Securing this flexibility will require a range of new technologies such as Active Network Management (ANM) systems, demand-side response and storage, and will encompass efforts to better operate networks, including transitioning to a DSO. Scotland is already host to a huge volume of successful innovation projects delivering clear results. There is a clear opportunity for Scotland to become a leader in this field through the roll-out of these projects.

- **Energy Storage:** Significant volumes of energy storage have been awarded contracts in both the Enhanced Frequency Response services and the Capacity Market tenders. However, storage technologies have a number of other benefits which are not currently priced in the market (including enabling increased renewables capacity and potentially deferring network upgrades). Innovation, both directed at storage technologies themselves and in the mechanisms to encourage storage technologies to market will be required to realise these benefits.

- **Energy Systems Integration**: We support the whole systems approach taken in the draft strategy which we believe is required to facilitate a transition to a smart and flexible energy system. Holistically considering electricity, heat and transport will allow us to drive efficiencies in our system and tackle the energy trilemma. Developing new technologies, market structures and business models will be essential.

- **Low-Carbon Heat:** The draft Energy Strategy shows clear ambition to decarbonise the sector, but this will mean innovation to fully develop new technologies, support their large-scale deployment and integrate them into the wider energy system.

- **Innovative Renewable Generation:** If we are to stay within our climate budgets, and deliver a secure, low-cost and low-carbon energy system, increased renewable generation capacity will be required.

E. Unintended consequences of system changes: security of supply and exporter status:

The changes to our energy system envisaged in the Strategy have the potential to prompt additional change within Scotland's energy landscape.

Scotland's position as a net exporter of electricity is likely to change if we are to meet the Strategy's target for the equivalent of 50% of all Scotland's heat, transport and electricity consumption to be supplied from renewable sources due to the likely increased electrification of heat and transport. The impacts of such a shift require due consideration.

Security of supply continues to be a consideration in energy policy, particularly with limited system capability for black start and a lack of system inertia. As numbers of large plant in Scotland decrease, the

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[22] https://www.e3g.org/docs/Whole-system_cost_of_variable_renewables_in_future_GB_electricity_system.pdf

security of Scotland's system will become increasingly scrutinised[23]. A smart, flexible energy system, as envisaged in the strategy, will require sophisticated management. The Scottish Government's position on security supply in Scotland vis-à-vis the rest of the GB network would be welcome, as would an indication of what policy levers the Scottish Government could consider using to ensure secure supplies for energy consumers.

13. **What are your views on the idea of a Government-owned energy company to support the development of local energy? How could a Government-owned company address specific market failure or add value?**

Scottish Renewables has previously called on the Scottish Government to ensure Scotland's public sector leads the next chapter of our energy evolution. We are, therefore, encouraged to see the Scottish Government exploring the role of an organisation such as this. We also agree that a Government-owned energy company must add value to existing organisations and schemes, and address specific market failures.

The Scottish Government's new targets for community and locally owned energy, and shared ownership, are extremely ambitious. A significant step change in the delivery rates of shared ownership schemes is required if the target is to be met. Scottish Renewables has prepared a position paper on shared ownership which outlines the key principles that we believe must be followed as we work towards meeting this target[24]. A Government-owned energy company could have an important role in facilitating the delivery of these targets.

A wide range of support is already available to communities wishing to take forward their own energy projects, but it is often difficult to understand exactly what is available and how support can be accessed. Rather than introducing new schemes, or a new delivery mechanism, a Government owned energy company could play an important role as a 'one-stop-shop' or 'front door' to the range of funds and initiatives available. This would help communities navigate this often complex and confusing landscape.

It could also be home to our proposed 'Scottish Community Energy Fund' (SCEF) which is detailed below. One of the aims of SCEF would be to accelerate the deployment of community renewable energy projects across Scotland by improving access to finance and mobilising existing public support for the sector. This would bring direct benefits to the communities that choose to pursue schemes. SCEF would increase the visibility and relevance of community energy to the people of Scotland and encourage community organisations to investigate what projects might be possible in their local areas, including not just generation assets but also energy storage and renewable heat.

14. **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? Consider possible roles of both the public and private sectors in such an arrangement.**

Scottish Renewables supports the proposal to create a Scottish Renewable Energy Bond which will allow savers and investors across Scotland to have a stake in the renewable energy sector and open up ownership of renewable energy. This will allow savers to generate a rate of return on investment from the growth of the industry and bring in capital to finance future development at an attractive rate to developers.

The concept of a Renewable Energy Bond is not new and various 'green bond' opportunities are available in the market (including ISA's, crowd funds and traditional bonds). However, it is our view that a Scottish Renewable energy bond should focus on renewable energy investment, be easily accessible to savers and provide a reasonable risk and return profile.

While there is broad support for the principle of a 'Renewable Energy Bond' it is important to note that delivering a new financial product of this scale would represent a sizeable challenge requiring significant legal and commercial expertise.

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[23] http://www.climatexchange.org.uk/reducing-emissions/security-electricity-supply/
[24] https://www.scottishrenewables.com/membership-required/

With this in mind, Snell Bridge has developed a discussion paper on behalf of Scottish Renewables to explore one option of how such a bond could be delivered[25]. It envisages the transfer of community renewable assets currently held within the Renewable Energy Investment Fund (REIF) to a new fund (the "Scottish Community Energy Fund" or "SCEF") which would be open to direct investment from members of the public.

This proposal is at a very early stage of development and we would encourage Scottish Government to work with the investment community and renewables industry in order to fully consider such concepts and remaining issues, such as;

- Risk Management: Care needs to be taken to ensure that investors in SCEF are not exposed to undue risk

- Governance: an appropriate governance structure would need to be put in place in order to protect the interests of investors in SCEF and mitigate any potential conflicts of interest

- Liquidity: It is likely that liquidity would be attractive to SCEF's potential investors. This could be achieved through stock market listing or the creation of an over the counter trading opportunity based on independent valuation, as is the case in some private companies. Alternatively, it may be possible to partner with an online platform in order to provide a trading facility.

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

Many of our comments outlined above include ideas about how the Scottish Government, the private sector and the public sector can maximise the benefits of working in partnership - in particular, the ideas around the creation of the Scottish Community Energy Fund and heat.

16. **What ideas do you have about how the delivery of the Energy Strategy should be monitored?**

Scottish Renewables welcomes the commitment within the Strategy to publish an Annual Energy Statement which will take account of the Climate Change Plan monitoring framework and relevant energy indicators.

Given the stretching targets contained within both documents, we would suggest that interim milestones or targets are given due consideration. This would help to continue to focus effort and ensure the trajectory of emissions reductions remains achievable.

As stated in the introduction, further information decision point timelines would also be helpful in refining the current document into a fully comprehensive Energy Strategy which provides a meaningful pathway out to 2050. Coupling these decision points with interim milestones and targets will further enable effective monitoring of the Strategy. Periodic reviews of the Strategy should also be considered to enable it to adapt to new technologies and maximise the benefits.

The presentation of the outputs from the TIMES model means it is currently not possible to compare or assess the relative efficacy of policies contained within the draft CCP. The draft CCP also does not provide any information on the constraints that were used with the model beyond the emissions reductions targets and delivery at lowest cost. We therefore welcome the commitment to develop SMART policies to support monitoring and look for further information on the data and constraints used in the Scottish TIMES model.

17. **What are your views on the proposed approach to deepening public engagement set out in chapter 6?**

The implementation of the Strategy will require significant changes to the ways we use and generate energy. In particular, the targets to supply 80% of domestic and 94% of non-domestic buildings' heat from low-carbon technologies by 2032 will require individuals and business owners as well as the public sector to share the Scottish Government's ambitions.

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[25] https://www.scottishrenewables.com/publications/scottish-renewable-energy-bond-discussion/

To turn that ambition into action will require a coordinated communications plan targeting marketing, media and education. Unfortunately the Strategy's current plans for public engagement require more detailed consideration. For example, it is not clear how communities will be encouraged to hold a 'local conversations' or what resources will be provided to them to enable them to do so in a meaningful and informed way. Organisations such as Local Energy Scotland, Home Energy Scotland and Community Energy Scotland, who already have strong links within communities, should be resourced to proactively stimulate the local conversations. It is critical that all sections of society are empowered to effectively engage. This will require a degree of support and structure from national organisations.

In addition, an intensive national public awareness and education campaign is required to support these local conversations and deliver buy-in and support, ensuring that the people of Scotland are aware of the Energy Strategy's intentions, the benefits it will deliver, and how they can help meet Scotland's new ambitions. Delivery of a coordinated communications and marketing plan across government, stakeholders, the renewables sector and academia is essential. The sharing of successes from innovative approaches and new models for energy systems must also be widely shared with local communities to increase the awareness of what can be achieved.

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Annex A – Innovation Projects in Scotland

The below table of innovation projects across Scotland has been compiled by Scottish Renewables. We recognise that this data set will be incomplete and will evolve over time.

Project Name	Funding Source	Project Category	Website
Accelerating Renewable Connections (ARC)	**Low Carbon Network Funding (LCNF)**	**Grid Management**	https://www.spenergynetworks.co.uk/pages/arc_accelerating_renewable_connections.aspx
Orkney Smart Grid	**SSEN, Smarter Grid Solutions**	**Grid Management**	https://www.ssepd.co.uk/OrkneySmartGrid/
Northern Isles New Energy Solutions (NINES)	**LCNF. SSEN + Stakeholders.**	**Grid Management**	https://www.ssepd.co.uk/NINES/
Flexible Networks	**LCNF, SPEN**	**Grid Management**	https://www.spenergynetworks.co.uk/pages/flexible_networks_for_a_low_carbon_future.aspx
Gigha Battery Project	**DECC, Community Energy Scotland - consortium approach**	**Storage, local energy systems**	http://www.communityenergyscotland.org.uk/gigha-battery-overview.asp
Surf 'f' Turf	**Community Energy Scotland, Local Energy Challenge Fund**	**local energy systems**	http://www.communityenergyscotland.org.uk/surf-n-turf.asp
Tower Power	**Local Energy Challenge Fund, Community Energy Scotland**	**local energy systems, innovative supply models**	http://www.communityenergyscotland.org.uk/towerpower.asp
Clyde Gateway	**LCNF, SPEN**	**Grid Management**	http://www.smarternetworks.org/Project.aspx?ProjectID=378
ACCESS	**Local Energy Challenge Fund**	**Local energy systems**	http://www.communityenergyscotland.org.uk/access.asp
Caol District Heating Scheme	**Local Energy Challenge Fund, Highland Council**	**Heat**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2014/caol-district-heating-scheme/
Community Microgrid Accelerator	**Local Energy Challenge Fund, Community Energy Scotland**	**Grid Management**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2014/community-microgrid-accelerator/
Demonstration of localised grid balancing	**Local Energy Challenge Fund, Power Networks Demonstration Centre**	**Grid Management**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2014/demonstration-of-localised-grid-balancing/
Levenmouth Community Energy Project	**Local Energy Challenge Fund,**	**Low-carbon transport and energy storage**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/capital-demonstration-projects/round-1-2015/levenmouth-community-energy-project/
Machrihanish renewables supply micro grid	**Local Energy Challenge Fund, Community Energy Scotland**	**Grid Management**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2014/machrihanish-renewables-supply-micro-grid/
Orkney Distribution grid - smart demand side management commercial scale deployment trial	**Local Energy Challenge Fund,**	**Grid Management**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2014/orkney-distribution-grid-smart-demand-side-management-commercial-scale-deployment-trial/

River source heat pump district heat network scheme	**Local Energy Challenge Fund**	**Low-carbon heat**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2014/river-source-heat-pump-district-heat-network-scheme/
Sunamp Fuel Poverty Reduction Project	**Local Energy Challenge Fund**	**local energy systems**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2014/sunamp-fuel-poverty-reduction-project/
The Conversion of curtailed energy on Eday to hydrogen for the benefit of the local community	**Local Energy Challenge Fund**	**Local eneryg systesm, hydrogen**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2014/the-conversion-of-curtailed-energy-on-eday-to-hydrogen-for-the-benefit-of-the-local-community/
Using virtual power plants to integrate renewable energy resources and demand in remote communities	**Local Energy Challenge Fund**	**Grid Management**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2014/using-virtual-power-plants-to-integrate-renewable-energy-resources-and-demand-in-remote-communities/
Local Energy Challenge Fund - Development projects 2015 - Round 2			
Montrose Local Energy Project	**Local Energy Challenge Fund**	**Local Energy Systems**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2015/montrose-local-energy-project/
Algal Solutions for Local Energy Economcy	**Local Energy Challenge Fund**	**Local Energy Systems**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2015/algal-solutions-for-local-energy-economy/
Blackwood grey fleet to green fleet	**Local Energy Challenge Fund**	**Local Energy Systems**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2015/blackwood-grey-fleet-to-green-fleet/
Urban Link	**Local Energy Challenge Fund**	**Local Energy Systems, demand management, storage**	http://www.localenergyscotland.org/media/91757/GCF139-UrbanLink-Final-Report.pdf
H3 Hillfoots Heat and Hydropower	**Local Energy Challenge Fund**	**Local Energy Systems**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2015/h3-hillfoots-heat-and-hydropower/
Outer Hebrides Local Energy Hub (OHLEH)	**Local Energy Challenge Fund**	**Local Energy Systems, Hydrogen**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2015/outer-hebrides-local-energy-hub-(ohleh)/
Wellpark (Glasgow) - Community Heat and Power Project	**Local Energy Challenge Fund**	**Local energy systems, innovative supply models, district heating**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2015/wellpark-(glasgow)-%E2%80%93-community-heat-and-power-project/
Energise Galashiels	**Local Energy Challenge Fund**	**Local energy systems, technology innovation**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2015/energise-galashiels/

Fintry Development Trust Smart Meter Commercialisation	**Local Energy Challenge Fund**	**Innovative supply models**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2015/fintry-development-trust-smart-meter-commercialisation/
Glasgow's Infrared Heat Demonstration Project	**Local Energy Challenge Fund**	**local energy systems, technology innovation**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2015/glasgow%E2%80%99s-infrared-heat-demonstration-project/
Large Scale ASHP District Heating Exemplar	**Local Energy Challenge Fund**	**local energy systems, district heating**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2015/large-scale-ashp-district-heating-exemplar/
Linlithgow Energy Corridor - Heat from the Street	**Local Energy Challenge Fund**	**District heating, local energy systems, technology innovation**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2015/linlithgow-energy-corridor-%E2%80%9Cheat-from-the-street%E2%80%9D/
River Tay Heat Pump District Heating	**Local Energy Challenge Fund**	**District heating, local energy systems, technology innovation**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2015/river-tay-heat-pump-district-heating/
Ensuring Future Energy Security for Knoydart	**Local Energy Challenge Fund**	**local energy systems**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2015/ensuring-future-energy-security-for-knoydart/
Heat Smart Orkney	**Local Energy Challenge Fund**	**local energy systems, grid management**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2015/heat-smart-orkney/
Green Gas Grids	**Local Energy Challenge Fund**	**local energy systems, technology innovation**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2015/green-gas-grids/
Wind to Agri-Energy	**Local Energy Challenge Fund**	**technology innovation, local energy systems**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2015/wind-to-agri-energy/
Energy Bridge	**Local Energy Challenge Fund**	**technology innovation, local energy systems**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2015/energy-bridge/
Pairc Niseaboist Community Energy Project	**Local Energy Challenge Fund**	**Local energy systems, technology innovation**	http://www.westharristrust.org/info/wave-energy-2/pairc-niseaboist-community-energy-project/
Action Highland Highway	**Local Energy Challenge Fund**	**local energy systems**	http://www.localenergyscotland.org/funding-resources/funding/local-energy-challenge-fund/development-projects/development-projects-2015/action-highland-highway/
CARES (2016)			
Integration of a 25kW/50kWh zinc-bromine battery	**CARES, University of Strathclyde**	**Storage, local energy systems**	http://www.localenergyscotland.org/news-events/2016/october/local-energy-projects-receive-%C2%A3600k-from-infrastructure-and-innovation-fund/
Arran Community Energy IIF	**Cares**	**local energy systems**	http://www.localenergyscotland.org/news-events/2016/october/local-energy-projects-receive-%C2%A3600k-from-infrastructure-and-innovation-fund/
Heat Pump and Biomass District Heating	**CARES, Findhorn Foudnation College**	**District heating**	http://www.localenergyscotland.org/news-events/2016/october/local-energy-projects-receive-%C2%A3600k-from-infrastructure-and-innovation-fund/
Energyfields	**Cares, University of Strathclyde, Veitch Cooper LTD**	**technology innovation**	http://www.localenergyscotland.org/news-events/2016/october/local-energy-projects-receive-%C2%A3600k-from-infrastructure-and-innovation-fund/

University of Strathclyde/GAIA wind IIF	**cares**	**technology innovation**	http://www.localenergyscotland.org/news-events/2016/october/local-energy-projects-receive-%C2%A3600k-from-infrastructure-and-innovation-fund/
South Uist Estate Energy Options – Storas Uibhist Ltd	**CARES**	**local energy systems**	http://www.localenergyscotland.org/news-events/2016/october/local-energy-projects-receive-%C2%A3600k-from-infrastructure-and-innovation-fund/
Carsphairn Community Energy Storage Scheme (CCESS)	**CARES**	**energy storage, local energy systems**	http://www.localenergyscotland.org/news-events/2016/october/local-energy-projects-receive-%C2%A3600k-from-infrastructure-and-innovation-fund/
West Harris and Barvas Local Supply	**CARES**	**local energy systems, innovative supply models**	http://www.localenergyscotland.org/news-events/2016/october/local-energy-projects-receive-%C2%A3600k-from-infrastructure-and-innovation-fund/
Energy Options for Habost Business Units	**CARES**	**local energy systems**	http://www.localenergyscotland.org/news-events/2016/october/local-energy-projects-receive-%C2%A3600k-from-infrastructure-and-innovation-fund/
Heat from the Sound	**CARES**	**low-carbon heat**	http://www.localenergyscotland.org/news-events/2016/october/local-energy-projects-receive-%C2%A3600k-from-infrastructure-and-innovation-fund/
Community Micro-grid Learning Resource	**CARES**	**grid management**	http://www.localenergyscotland.org/news-events/2016/october/local-energy-projects-receive-%C2%A3600k-from-infrastructure-and-innovation-fund/
Community Share IIF	**CARES**	**local energy systems**	http://www.localenergyscotland.org/news-events/2016/october/local-energy-projects-receive-%C2%A3600k-from-infrastructure-and-innovation-fund/
Lochmaddy Warmth from Water Feasibility Study	**CARES**	**low-carbon heat**	http://www.localenergyscotland.org/news-events/2016/october/local-energy-projects-receive-%C2%A3600k-from-infrastructure-and-innovation-fund/
Greenmyres Energy Hub	**CARES**	**local energy systems**	http://www.localenergyscotland.org/news-events/2016/october/local-energy-projects-receive-%C2%A3600k-from-infrastructure-and-innovation-fund/
Resource Efficient Solutions IIF	**CARES**	**local energy systems**	http://www.localenergyscotland.org/news-events/2016/october/local-energy-projects-receive-%C2%A3600k-from-infrastructure-and-innovation-fund/
LCITP - 2017			
Fair Isle Unified Low Carbon Electricity Storage and Generation Project	**LCITP**	**Local energy systems**	http://www.gov.scot/Topics/Business-Industry/Energy/Action/lowcarbon/LCITP/TransformDemonstrate
Project Alchemy: turning low value residues into high value products	**LCITP**	**technology innovation**	http://www.gov.scot/Topics/Business-Industry/Energy/Action/lowcarbon/LCITP/TransformDemonstrate
REStore Demonstrator	**LCITP**	**storage**	http://www.gov.scot/Topics/Business-Industry/Energy/Action/lowcarbon/LCITP/TransformDemonstrate
Tackling Fuel Poverty and Grid Balacning	**LCITP**	**low-carbon heat, local energy systems**	http://www.gov.scot/Topics/Business-Industry/Energy/Action/lowcarbon/LCITP/TransformDemonstrate

with Smart Electric Storage Heat			
Glenrothes Next Generation Heat	LCITP	low-carbon heat	http://www.gov.scot/Topics/Business-Industry/Energy/Action/lowcarbon/LCITP/TransformDemonstrate
Star Renewable Energy ESCO	LCIPT	district heating	http://www.gov.scot/Topics/Business-Industry/Energy/Action/lowcarbon/LCITP/TransformDemonstrate
Stirling Renewable Heat Demonstration Project	LCIPT	low-carbon heat	http://www.gov.scot/Topics/Business-Industry/Energy/Action/lowcarbon/LCITP/TransformDemonstrate
Queens Quay and Clydebank District Heating Network	LCIPT	district heating	http://www.gov.scot/Topics/Business-Industry/Energy/Action/lowcarbon/LCITP/TransformDemonstrate
Clyde Gateway Wastewater Heat Recovery Project	LCITP	district heating	http://www.gov.scot/Topics/Business-Industry/Energy/Action/lowcarbon/LCITP/TransformDemonstrate
Low Carbon District Energy Hub	LCITP	low-carbon heat	http://www.gov.scot/Topics/Business-Industry/Energy/Action/lowcarbon/LCITP/TransformDemonstrate
Wastewater Heat Recovery Bandwidth Demonstration Project	LCITP	low-carbon heat	http://www.gov.scot/Topics/Business-Industry/Energy/Action/lowcarbon/LCITP/TransformDemonstrate
Hunterston Energy Storage Project	LCIPT	storage	http://www.gov.scot/Topics/Business-Industry/Energy/Action/lowcarbon/LCITP/TransformDemonstrate
Dundee and Angus Residual Waste Combined Heat and Power Project	LCIPT	low-carbon heat	http://www.gov.scot/Topics/Business-Industry/Energy/Action/lowcarbon/LCITP/TransformDemonstrate