

A Joint Business Plan for Unlocking Investment in Scotland's Energy Sector

Scottish Energy Advisory Board

Energy Task Force

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Foreword

We are living in unprecedented times. As highlighted by the sixth assessment report in 2021 by the Intergovernmental Panel on Climate Change (IPCC), the climate emergency is upon us and, furthermore, the Coronavirus pandemic has had a devastating impact across the economy. We must act now to respond to both, and the energy sector recognises the crucial role it has to play in ensuring our climate change targets are met, as well as providing jobs that will help our economy recover.

Collective action from government and industry across the energy sector is needed to unlock barriers to investment, create jobs, boost domestic supply chains, and help Scotland achieve its full potential.

That is why the Energy Task Force, a sub-group of the established Scottish Energy Advisory Board, has produced this Joint Business Plan for Unlocking Investment in Scotland's Energy Sector. The Business Plan focuses on the actions a number of stakeholders need to take in order to attract investment in projects that support net zero, and that will generate economic benefit across Scotland and the wider UK over the next few years.

The Business Plan has been developed in partnership with a number of key businesses and stakeholders across the energy sector. With thanks to all those who contributed, this joint effort has identified the actions which can be taken now to help Scotland's green recovery, facilitate investments, jobs and projects, and outlines the important role of collaboration between key private and public sector stakeholders to realise major benefits.

The Joint Business Plan for Unlocking Investment in Scotland's Energy Sector acknowledges the importance of industry's role in establishing a green recovery, and recognises that there are longer term issues which remain vital to meeting our net-zero targets.

This plan is intended to serve as a confident indication of our intent to take significant action now, to enable a green recovery and net zero economy while creating opportunities for the people of Scotland now and securing a brighter future.



Michael Matheson MSP
Cabinet Secretary for
Net Zero, Energy and
Transport

A blue ink signature of Michael Matheson, written in a cursive style.



Professor Sir Jim McDonald
Co-chair of the Scottish Energy
Advisory Board

A blue ink signature of Professor Sir Jim McDonald, written in a cursive style.

Introduction

- The impact of the COVID-19 pandemic is unlike anything we have ever seen, and the case for a green economic recovery is clear. At the same time we mustn't lose sight of the importance of delivering on Scotland's net zero promises.
- Collective action across the energy sector is needed now to unlock barriers to investment, create jobs, boost domestic supply chains, and help Scotland achieve its full potential.
- This Joint Business Plan for Unlocking Investment in Scotland's Energy Sector focusses on the actions a number of stakeholders need to take in order to unlock investment in projects that support net zero, and will generate economic benefit across Scotland and the wider UK over the next few years.
- There are separate but aligned plans focussed on the skills (e.g. Climate Emergency Skills Action Plan) and changes to supply chains (e.g. Strategic Investment Assessment) required as Scotland transitions to net zero, this business plan focuses specifically on actions to unlock investment at all scales.
- The business plan also acknowledges that there are more substantial issues that need addressing to unlock further economic benefit in the longer term including, for example, transmission network charging, hydrogen for domestic heating etc.
- The projects we have included are examples only and will each need to be considered carefully in their own right. We anticipate that many more projects could be initiated if we are able to unlock the barriers we have identified in this plan.
- The business plan acknowledges that industry will play a fundamental role in working across all the actions identified to help remove the barriers and unlock a green recovery.

Summary

Objectives

1

Identify Project Examples & Impact

What projects can industry deliver to support the green recovery and how many jobs will these create?

2

Identify Key Barriers

What are the key barriers to progressing the projects in the near term?

3

Identify Actions to Remove Barriers

How can these barriers be unlocked and who is best placed to do so?

Participants



Structure

Output

8 Industry organisations

77 Projects identified

Divided into 7 categories

27 barriers identified

75 actions identified

Categories

1 Decarbonising Electricity

Unlocking existing project pipelines and encouraging new developments.

2 Decarbonising Heat

Electrifying heat, supplied by clean, green renewable energy.

3 Decarbonising Transport

Electrification of transport with niche roles for green hydrogen.

4 Industrial & Negative Emissions Technologies

Enabled CCS and hydrogen and further the deployment of Smart System Deployment, including Distributed energy resources and Demand Side Response schemes.

5 Oil & Gas Transition

Decarbonising supply and production, transitioning skills and capabilities.

6 Enabling Infrastructure

Investment in networks and pipes.

7 Developing Technologies

Unlocking technologies currently restricted by an absence of policy and regulatory frameworks.

Key Themes and Actions

Addressing each of the barriers identified in the Annex is important to unlock green investment, but four themes in particular stand out:

Key Themes

1 Planning

Streamline the planning process to reflect the criticality of the climate emergency.

2 Regulation

The current regulatory framework does not allow Scotland's network companies to make the investment necessary to connect net zero projects at the pace and scale required.

3 Financial viability

Projects that will deliver net zero and the associated economic benefits need to be financially viable for investors.

4 A just transition

The energy transition must ensure that we build a greener, fairer and more equal society and economy.

Key Actions

Ensure that via NPF4 the materiality of climate change is elevated within the planning decision making process.

Ensure that Local Authorities and other statutory bodies are sufficiently resourced in order to deliver net zero.

Scotland should take a coordinated approach to building evidence for network investment for net zero.

Engagement with Ofgem will be critical.

TNUOS remains a major barrier for investment in Scotland which needs to be address in the longer term

Appropriate, stable and sufficiently sized Contracts for Difference (CfD), capacity market, and balancing mechanisms are all central to delivering long term investment.

Market structures and support mechanisms are also required to unlock technologies such as pumped storage, hydrogen, CCS and large scale battery deployment.

The Scottish Government's Place Principle should be used throughout the project lifecycle to ensure involvement of local communities, and to support inclusive and sustainable economic growth.

Supporting the transition of the oil and gas workforce and supply chain is important and provides a pool of transferable skills and capabilities.

Respond to actions identified in the report of the Just Transition Commission "A national mission for a fairer, greener Scotland."

Annex

Decarbonising Electricity

Barriers and actions

Barrier #1: Climate Emergency Placed at the Centre of the Planning and Energy Consenting Process ●○○○

- Ensure consultees and decision makers are resourced appropriately, responding within statutory timescales and accelerated PLI processes if they are required.
 - Focus on granting consents in a timely manner ahead of key project milestones.
 - Update of the Landscape Capacity / Sensitivity framework to better reflect landscape baseline and current turbine technology followed by subsequent updates of individual Local Authority analysis.
 - Review of planning requirements and fees for solar developments.
 - NPF4 reflects the criticality of the climate emergency in the planning balance and implementation in the decision making processes of relevant consultees.
 - Look to investigate avenues to make a presumption in favour of repowering and life extension of existing projects to avoid backsliding against progress to Net Zero.
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Barrier #2: Aviation Constraints On Wind Energy Deployment Consistent With Net Zero ●●○○

- Develop a strategic, integrated and cost effective approach to civil and military radar impact mitigation, recognising that wind generation is part of the baseline airspace environment when informing future radar procurement.
 - Engagement with aviation and planning stakeholders to develop a consistent approach to aviation lighting including reduced lighting schemes and deployment of alternative technologies (e.g. radar activated lighting).
 - Clear guidance on how aviation lighting should be considered in the planning balance taking into account the climate emergency.
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Barrier #3: Network Investment Required to Enable Connection of Low Carbon Generation and Emerging Demand Loads ●●●○

- Anticipatory investment in grid infrastructure to ensure timely and cost effective access for new generation.
 - Take measure to reform network charging (i.e. TNUOS) to ensure renewable generation in Scotland can remain competitive.
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Decarbonising Electricity

Barriers and actions

Barrier #4: Current Revenue and Price Stability Mechanisms Insufficient To Deliver New Generation At The Scale Required

- Maximising the capacity and budget the UK Contracts For Difference (CfD) Auction Round 4.
 - Clarity on timing and indicative capacities of future CfD auctions to encourage investment in new developments.
 - Accelerate the deployment of storage technologies by ensuring a level playing field with high carbon flexible generation and considering policy options to stabilise revenues.
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Results

- Supports the Scottish Government ambition to deliver, subject to consultation, between 8 and 12 GW of additional installed onshore wind by 2030.
 - Unlocks the construction of renewable energy projects at scale in the short to medium term.
 - Encourages continued investment in existing development pipelines and in new project development.
 - Provides the framework to support a stable and consistent delivery programme of renewable generation assets to meet long term decarbonisation targets, encourage local supply chain development and have lasting economic impact.
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Example projects

- Stranoch Wind Farm (EDF Renewables)
100MW onshore wind farm in Dumfries and Galloway.
- Heathland Wind Farm (EDF Renewables)
84MW onshore wind farm in South Lanarkshire.
- Stornoway Wind Farm (Lewis Wind Power)
180MW onshore wind farm on the Isle of Lewis.
- Arecleoch Extension Wind Farm and Battery Storage (Scottish Power Renewables) 73MW onshore wind farm, 20MW storage.
- Whitelee Hybrid (Scottish Power Renewables)
30MW solar, 50MW battery storage, 20MW hydrogen.
- Berwick Bank Offshore Wind Farm (SSE Renewables)
World's largest, 4.1GW , wind farm in the Firth of Forth.

Decarbonising Heat

Barriers and actions

Barrier #1: Set Out a Stable And Long-Term Policy Framework for Heat in Buildings



- Regulatory framework for both energy efficiency and zero emissions heating systems to drive change.
- Develop the clear evidence base and analysis of cost effective pathways.
- Implement a robust public engagement strategy to change attitudes and raise awareness.

Barrier #2: Financial Barriers to Creating Commercially Viable Projects



- Review of the Non-Domestic Rates application on District Energy Networks (notwithstanding the reductions proposed in the Heat in Buildings Strategy)*.
- Capital support for zero emission heat deployment, including gap funding to support deployment (similar to Heat Networks Investment Project (HNIP)) ahead of the longer term design of market frameworks to support delivery.
- Review barriers and support for wider distribution of PV and Storage solution to support localised networks in order to unlock investment and ensure these technologies are cost effective.
- Develop innovative financing mechanism and consumer protects to help property owners invest in improving their properties.
- Review of barriers to electrification of heat including gap between cost of electricity and gas and the impact of social and environmental levies.

Barrier #3: How to Maximise Opportunities in a Place Based Way



- Encouraging Local Authorities to look at solutions on a place based basis, for example through expansion of Area Based Schemes to include heat supply measures as well as energy efficiency.
- Encouragement for Public Sector bodies to move faster on previously identified District Heat Network options.
- Resource support for Local Authorities to develop and deliver LHEES plans.
- Review and integration of policy through development planning, with a focus on delivery.
- Energy Industry to work with Scottish Government and Local Authorities to identify investment opportunities and investible projects, to develop a longer term pipeline.

* NDR liabilities are a matter for the independent assessors

Decarbonising Heat

Barriers and actions

Barrier #4: Building Standards and Policy To Support New Technology ● ● ○ ○

- Reviewing Distribution Charging regime, specifically the impacts of TNUoS and DNUoS charging, that makes small scale local networks economically challenging.
 - Review of local planning policy to support implementation.
 - Review of new home standards to enable and expedite transition from gas.
 - Implement the provisions set out in the Heat Networks (Scotland) Bill to establish a new Heat Networks Regulatory framework in Scotland to increase confidence and begin de-risking investment.
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Results

- Decarbonises the single biggest element of energy use in Scotland.
 - Establishes and builds out Scottish supply chain.
 - Provides apprenticeships and opportunities for skills development.
 - Provides reskilling opportunities for existing heating engineers.
 - Ensures the benefits of decarbonisation are felt in all parts of the country.
 - Delivers low-cost green energy.
 - Delivers technological and commercial innovation.
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Example projects

- ScottishPower NetZero Ready Homes and Streets.
- Edinburgh City Council Decentralised Energy Systems.
- Glasgow City Council Decentralised Energy Systems.
- North Lanarkshire Council Placemaking.
- Smart Local Energy System Demonstrator.
- Jubilee Hospital Glasgow.

Decarbonising Transport

Barriers and actions

Barrier #1: Network and Renewable Generation Investment Required to Enable Electrification of Transport

- Addressing the barriers as set out in slide 8 and 13 covering decarbonisation of electricity is essential in order to ensure the infrastructure and renewable generation are available to support the electrification of transport, in particular:
 - Allowing investment, including anticipatory investment, in electricity networks.
 - Delivery of public charging points based on ensuring fair access for all.
-

Barrier #2: Need to Develop Support for the Effective Deployment of Green Hydrogen

- Ensure appropriate deployment of funding to support the development of green hydrogen projects.
 - Ensure transparency about the GHG and CO2 implications of blue hydrogen projects.
 - Ensure Renewable Transport Fuel Obligation (RTFO) provides a stable long-term signal for investors.
 - Sector level targets similar to those for the phase out of new petrol and diesel vans and cars to stimulate take-up.
-

Results

- Creation of export manufacture/assembly opportunities for Scotland via deployment of green hydrogen in areas such as heavy duty vehicles.
 - Creates jobs and sends clear signals to Scottish supply chain.
 - Drives Electric Vehicle (EV) adoption in line with Scottish Government targets.
 - Delivers efficient and effective electrification of rail in line with Scottish Government aims.
 - Potential for sectors such as shipping to achieve zero carbon in a very short timeframe.
 - A DNO led public charging model, ensuring no areas are left behind reduces costs for consumers via Distribution Network Operators (DNO) delivery.
 - Stimulates innovation and deployment of low carbon solutions.
 - Hydrogen can provide a solution to decarbonise 'hard to decarbonise' areas such as heavy transport.
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Decarbonising Transport

Example projects

- **Roll Out of DNO Led Public Charging (Scotland and GB)**
First pilot project PACE is demonstrating the benefits of an alternative public EV charger delivery model with significant savings and replicable models. Scaling up PACE could deliver:
 - £26m connection savings in Scotland calculated on 10% of all publicly available chargers by 2050.
 - £310m connection savings across GB calculated on 10% of all publicly available chargers by 2050.
- **Green Hydrogen for Glasgow**
ScottishPower's partnership offers an 'end to end' market solution for reducing vehicle emissions through the provision of green hydrogen. A proposed green hydrogen production facility will be operated using wind and solar power to operate a 10MW electrolyser. The project aims to supply green hydrogen within the next two years, to support fleets of heavy duty vehicles.

Industrial and Negative Emissions Technologies

Barriers and actions

Barrier #1: Need for CO2 Transport & Storage Infrastructure

- Direct government support for offshore Transportation & Storage (T&S) infrastructure for initial investment.
 - New economic regulation framework of T&S infrastructure with appropriate risk/return balance.
 - Framework for transfer and re-use of assets between current offshore operators and future T&S businesses.
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Barrier #2: Need for Incentivisation for Industrial Capture and Fuel Switching

- Use of auction revenues from certificates to promote deep decarbonisation efforts: fuel switching electricity, hydrogen and CCS.
 - Industrial Capture Contracts based on CfD type model.
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Barrier #3: Need for Localised Initiatives Related to Blue Hydrogen

- Gas transportation rules to allow for localised hydrogen blending.
 - Consideration of 100% blue hydrogen heating in areas in proximity to industrial locations.
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Barrier #4: Need for Power Generation with Carbon Capture

- Extend CfD model to power generation with CCS.
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Barrier #5: Need for Support for Supply Chain to Develop Solutions

- Clarify supply chain CCS and hydrogen capabilities through joint mapping project.
 - Develop consortia to bid for emerging opportunities in/around North Sea.
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Barrier #6: Need for Infrastructure to Support Operations

- Review local infrastructure (e.g. rail and harbours) to ensure that it provides adequate access to fabrication sites (e.g. for imported carbon storage).
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Barrier #7: Need to develop business models which will encourage negative emission technologies

- UKG and SG to consider procuring negative emissions removal units from a portfolio of NET plants to offset part [25-50%] of the public sector emissions inventory.
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Industrial and Negative Emissions Technologies

Results

- Maintaining existing industrial activity in Scotland and providing scope for new types
 - Scotland as a leading destination for management of national, UK and global CO₂ via disposal and storage through Acorn project and extensions of that.
 - Supply chain benefits from transition of oil and gas expertise
 - Transfer of jobs and skills from oil and gas sector
 - Incentivise technology deployment and drive down costs
-

Example projects

- Acorn CO₂ T&S and carbon capture plant (Pale Blue Dot)
Enabler for CCS at scale in Scotland. Anticipated it will deliver 340,000T/year of CO₂ reductions, and provide infrastructure to deliver 20MT/year of emissions reduction for Scotland / the UK
- ONE Supply Chain Transformation
Delivery of market opportunities to the Scottish supply chain, diversification workshops, and launch of industry challenges in collaboration.
- ONE Energy Transition Zone
Integrated economic development project with focus on land assembly and infrastructure to attract high-value manufacturing for offshore wind and hydrogen. It will support supply chain transformation, test facilities and new skills.
- ONE Hydrogen Aberdeen Vision
A dedicated pipeline from St Fergus to Aberdeen to allow the city to become one of the first UK towns to be heated by hydrogen
- Dreamcatcher Direct Air Capture project (Pale Blue Dot and Carbon Engineering) in North East Scotland

Oil & Gas Transition

Barriers and actions

Barrier #1: Levels of Investment Required to Reduce Operational Emissions of Oil and Gas Production ●●○○

- Implement a Robust Emission Trading Scheme that provides a level playing field and prevents delocalisation (carbon leakage).
 - Implementation of new OGA Strategy.
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Barrier #2: Lack of Investment Required to Support Offshore Electrification ○●○○

- Use of auction revenues for certificates to promote deep decarbonisation efforts: fuel switching electricity invest in cables transformers.
 - Coordinated investment to achieve economies of scale in different parts of UKCS basin (OGA responsible).
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Barrier #3: Complex Skills Landscape and Risk of an Unmanaged Transition for the Oil and Gas Workforce ●●○○

- Continued support for the Energy Skills Alliance and it's initiatives
 - Continued support for North Sea Transition Deal
 - Alignment with UK green skills initiatives (e.g. Green Jobs Task Force)
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Barrier #4: Need for Greater Support for the Supply Chain to Continue Developing ●●○○

- Provide international support for supply chain companies active in the supply decarbonisation and energy transition space (e.g. through bodies like SCDI)
 - Showcase downstream local capabilities in emissions reduction for use in offshore application
 - Support cross-sector knowledge sharing e.g. with marine renewables cluster
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Results

- Continued oil and gas production and development to provide secure energy sources during transition
 - Scotland as a leading global provider of low emission oil and gas.
 - Jobs and maintaining supply chain in support of energy transition
 - Integrated offshore electricity networks with renewables and taking advantage of synergies
 - Integrated energy companies and supply chains across offshore sector
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Example projects

- Orion project (Renewables / O&G Integration) Provision of clean energy from renewables. Orion will de-risk future hubs via learnings and technology identification. It will create employment across Scotland, deliver between £31 and £220bn in economic impact and aid offshore electrification.
- Alternative Fuel Gas Technology Zero-carbon retrofit solution for existing gas turbines, enabling to run a blend of 100% zero carbon fuel. It will result in significant inward investment and sustain significant number of O&G jobs.
- Axis Tension Leg Buoy (TLB) Floating Wind Foundation FEED study to generate employment, subsequent fabrication and demonstration deployment activity, generating £5-6m. Resulting in significant job creation in Scottish fabrication and reduction of CO2 emissions.
- QL Tech PowerLink Enabling green power from shore to offshore assets. Demonstration unit to be built and tested in Aberdeen resulting in new product line with Scottish IP, and global potential.

Enabling Infrastructure

Barriers and actions

Barrier #1: Electricity Transmission Networks Require Investment Ahead of Need to Connect Low Carbon Generation Out to 2030

- Ofgem to prioritise approval of the needs cases and reopeners for transmission investment to support Scottish Net Zero targets and timeline.
 - SG to actively support network companies in building a strong needs case in the context of Scottish net zero targets.
 - Clear direction / requirement to build new transmission infrastructure for example through the Networks Option Assessment (NOA) process run by NGESO and RIIO-T2 reopeners.
 - Swift planning and consenting decisions by SG and LAs.
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Barrier #2: Electricity Distribution Networks Require Investment Ahead of Need to Connect Heat Pumps and Electric Vehicles

- Ofgem to have a statutory objective to support the delivery of net zero that recognises and supports the delivery of SG's net zero target, in particular explicitly considering Scottish decarbonisation targets and pathways for decarbonisation of heat and transport when considering ED2 business plans, Green Recovery funding and other opportunities for strategic investment.
 - SG to support DNOs in building business plans and justifying proposals for network investment in the context of Scottish net zero pathway.
 - DNOs to place increased emphasis on justifying investment against SG targets within the limits of Ofgem's RIIO-Price control framework.
-

Barrier #3: Market and regulatory frameworks need to develop to encourage and reward the flexibility needed for a secure and operable net zero electricity system

- Ensure that market and regulatory frameworks continue to encourage and reward demand side response, energy storage and other forms of flexibility for reducing system costs such as balancing the electricity system or supporting efficient use of electricity systems.
-

Barrier #4: Gas Networks Across Scotland Require Investment Ahead of Need to Transport Green Gas Including Low Carbon Hydrogen

- UK Government to prioritise the development of the safety case, legislation and regulations are in place to allow blending of hydrogen, to 20% by volume, into the public gas networks.
 - UK Government to provide clear policy lead and certainty on role of gas networks in supporting net zero.
 - Scottish Gas Network Owners (SGN and NGG) to invest in activities to prepare the gas network for 100% hydrogen.
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Enabling Infrastructure

Results

- RIIO T2 business plans allow SSEN and SPEN to deliver £3.4 Bn of investment between 2021 and 2026.
- NOA 6 allows for investments of £3.2 Bn by SSEN and £2.3 bn by SPEN between now and the early 2030s.
- The ability to develop, connect and operate up to 11 GW of offshore wind and equivalent growth of onshore wind.
- Ofgem's Green Recovery Process agrees to additional investment in Scotland's distribution networks during 2021-23 in line with proposed 300M GB budget.
- The RIIO-ED2 process agree substantial investment (2023-2028).
- Ability to connect at least 800,000 Heat Pumps across Scotland by 2030.
- Ability to charge around 900,000 Electric Vehicles in Scotland by 2030.
- Gas blending could facilitate the delivery of up to 4 TWh of low carbon hydrogen to Scottish Consumers and the injection of up to 23 TWh of low carbon hydrogen into the gas transmission system at St. Fergus for use across Britain.

Example projects

- 2021 NOA gives 'proceed' decision to 4 x East Coast transmission interconnectors between Scotland and England with estimated investment value of £7.5 Bn.
- Delivery of interconnectors to Shetland, Orkney and Western Isles to increase connectivity and unlock remote island wind projects.
- Project PACE style optioneering studies to identify around 430 optimal public EV charger connection points. Optioneering would involving £5M of resource investment.
- Replacement of low-capacity customer connections and Low Voltage cabling across off-gas grid areas in Scotland.
- Aberdeen Vision project to initially inject 2% Low Carbon Hydrogen into the gas transmission network at St. Fergus (saving 320,000 tonnes of CO₂ across GB) and working towards a 100% hydrogen gas network in Aberdeen saving more than 1.2 M tonnes of CO₂.

Developing Technologies

Barriers and actions

Barrier #1 Need for Market Mechanisms to Provide Investment Signals For Storage and Flexibility Technologies/Systems ○ ● ● ○

- A de-risking mechanism is urgently needed to provide the investment signal to enable the delivery of crucial Pumped Storage Hydro (PSH) projects by 2030.
 - This should be addressed through the joint BEIS and Ofgem Smart Systems and Flexibility Plan 2.0, looking at options such as introducing a Cap and Floor mechanism for long-duration storage, such as that administered by Ofgem for interconnectors.
 - Market and regulatory frameworks must also continue to incentivise and reward demand side response and other forms of flexibility to reduce system costs via balancing and supporting the efficient use of electricity systems.
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Barrier #2: Need for Commercial, Policy and Regulatory Framework and Funding to Support UK CCUS at Scale ● ● ● ○

- Whilst BEIS have published their response to their consultation on CCUS business models, further clarity is needed to bring forward the investment decisions for critical decarbonisation infrastructure.
 - This must include the creation of a stable policy framework, including business model and financial frameworks for blue hydrogen and for CCUS, in order to build confidence and enable the development of the first CCUS facilities in the UK to be commissioned from the mid-2020s.
 - Funding for CCS/Hydrogen infrastructure is also crucial to open up shipping lanes for CO2 import/ hydrogen export.
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Barrier #3: Need for Frameworks to Enable Large Scale Green Hydrogen Production and Integration Into Energy Systems ○ ● ● ○

- Enabling large scale green hydrogen production and integration into wider energy systems will require stable policy frameworks including business models and financial instruments to stimulate investment.
 - Deployment funding would also help reduce the prohibitive financial gap between production premium and viable user prices.
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Barrier #4: Reform of Contracts for Difference (CfD) Required to Enable Wave and Tidal Generation ○ ● ○ ○

- Targeted and effective support is required within the CfD mechanism for wave and tidal generation in the form of a reserved quantum for marine projects to compete for within pot 2. There may also be a role for the CfD in supporting the production of green hydrogen from renewable sources such as wave and tidal.
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Developing Technologies

Barriers and actions

Barrier #5: Need for Access to Affordable Electricity Offshore

- Anticipatory investment in offshore grid infrastructure to ensure power to offshore installations, enable integrated renewable generation and development of offshore energy hubs.
 - Commercial models allowing for integrated oil, gas and renewable projects.
 - Complete review of offshore networks policy and ensure alignment with Crown Estate Scotland.
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Results

- Storage technologies are crucial for a high renewables system, to store excess wind output and discharge at times of low wind.
 - Imperial College estimate that three PSH schemes of 4.5GW capacity, 90GWh storage would save up to £690m per year in energy system costs by 2050.
 - CCS will be required to reach net zero by delivering emissions reductions in hard-to-abate industrial sectors.
 - CCS crucial to support Hydrogen as green hydrogen won't be at scale for some time.
 - Flexible low-carbon power-CCS needed to replace unabated fossil fuel generation.
 - Large-scale green hydrogen production may be important in balancing generation and demand, providing flexibility.
 - Scottish waters have potential to generate 10% of Europe's wave power and 25% of Europe's offshore wind and tidal.
 - Access to affordable electricity offshore, enabling electrification of assets.
 - Impactful CO2 emissions reduction offshore.
 - Potential for wider energy integration in the UKCS.
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Developing Technologies

Example projects

- Coire Glas (SSE)
Could generate continuously for up to 20 hours at full capacity (1.5GW) or for significantly longer at lower capacity. It would have 200x the energy storage capacity of the world's largest battery.
- Acorn Project (Pale Blue Dot)
Low-cost, low-risk, carbon capture and storage project that provides fundamental CO2 mitigation infrastructure essential for meeting the Scottish/UK Net Zero targets.
- Peterhead CCS (SSE)
Important flexible generation through decarbonised thermal at Peterhead; creating 1000+ jobs and £1.5bn GVA.
- CNS Electrification
Create economies of scale, electrify offshore assets, abatement of offshore emissions, potential for integrated energy hubs offshore.



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