



National Developments – Response Form

Please use the table below to let us know about projects you think may be suitable for national development status. You can also tell us your views on the existing national developments in National Planning Framework 3, referencing their name and number, and providing reasons as to why they should maintain their status. Please use a separate table for each project or development. **Please fill in a [Respondent Information Form](#) and return it with this form to scotplan@gov.scot.**

Name of proposed national development	Gas Networks & Industrial Clusters
Brief description of proposed national development	<p>The UK government’s 2050 ‘net zero’ target, and the Scottish Government’s 2030 and 2045 ‘net zero’ targets necessitate the need to reduce emissions and fully decarbonise the whole economy, including power, industry, transport, agriculture and domestic sectors. Significant change, timely investment in the correct areas and an overall plan for a viable solution is essential to progress this. Failure to act quickly could have significant detrimental impacts on the global climate and be a significant missed opportunity for Scotland to be a global leader in the chosen solutions. No current energy systems model predictions show that full electrification can meet the UK’s climate change targets when the full economy is included. Carbon capture and storage (CCS) and the production of renewable and low carbon hydrogen will have significant roles to play in providing a reliable, sustainable energy mix for the future. These technologies are particularly well suited to space heating and high energy use industrial activities. In addition, the use of CCS on processes with biogenic feedstocks enables carbon negative energy and hydrogen production. Carbon negative processes are an essential constituent of the energy mix for the path to ‘net zero’. Existing gas networks will need to be adapted or expanded and new networks will be required to service the demand for CO2 collection and hydrogen supply.</p> <p>Scotland has an opportunity to lead the development of this technology, which can help it meet an earlier net zero GHG target dates. The East of Scotland is uniquely suited to the early development of clean hydrogen. This is due to a combination of factors including; access to United Kingdom Continental Shelf (UKCS) gas, access to CO2 storage via an early CCS project, as series of Industrial Clusters associated with the gas distribution network, existing hydrogen activity along the East Coast, potential for recovery of hydrogen from industrial processes, blending and then conversion into gas distribution networks and the strong supply chain in the region.</p> <p>SGN and Wood will partner to undertake the Gas Network & Industrial Cluster study, due to commence in May 2020 The aims of the project will be to investigate an alternative approach of re-using and further developing the existing local and national gas networks as a viable alternative to full electrification. Further, this study will work to clarify the various uncertainties which exist in this sector based on the currently available information (e.g. what is viable, required and/or possible). The east coast of Scotland is proposed as a case study to investigate options to attain ‘net zero’ in the short and medium term, and a negative carbon footprint through deep decarbonisation in the longer term. This area of the UK is an ideal test case due to the existing infrastructure (on and offshore), proximity to onshore and offshore renewable energy resources, and location of major carbon emitters. It will integrate with the existing Acorn CCUS and hydrogen, Aberdeen Vision and</p>

	<p>Dolphyn Projects to provide a holistic and comprehensive assessment of the role of hydrogen in decarbonisation of the region and identify practical delivery solutions.</p> <p>The following objectives have been established for the Project:</p> <ul style="list-style-type: none"> • Investigate an alternative approach of re-using and further developing the existing local and national gas networks as a viable alternative to full electrification. • Address the various uncertainties which exist in this sector based on the currently available information. • Identify and understand relevant existing information, study work and project development which has already been undertaken. • Provide a high-level assessment of the primary uses for hydrogen including where those uses will be geographically located within the target area and future requirements for CO2 collection, transportation and storage beyond 2045. • Develop a roadmap of 'low regret' steps to be undertaken to achieve the vision, within achievable timescales, of the potential demand for hydrogen use and distribution and future requirements for CO2 collection, transportation and storage beyond 2045. • Undertake a financial analysis of the concept that shall cover total cost, spend profile, key investment points, and potential costs to industry users. • Develop the concept of an offshore hydrogen supergrid to distribute hydrogen, from on- and off-shore throughout the North Sea Region. <p>As noted recent and ongoing work on Acorn, Aberdeen Vision and Dolphyn projects will be integrated into the Industrial Cluster project that will commence in May 2020 to provide a med to long term regional solution for the east coast of Scotland and beyond.</p>
<p>Location of proposed national development (information in a GIS format is welcome if available)</p>	<p>The below maps lay out the locations of the project as the expands through the various development phases.</p>

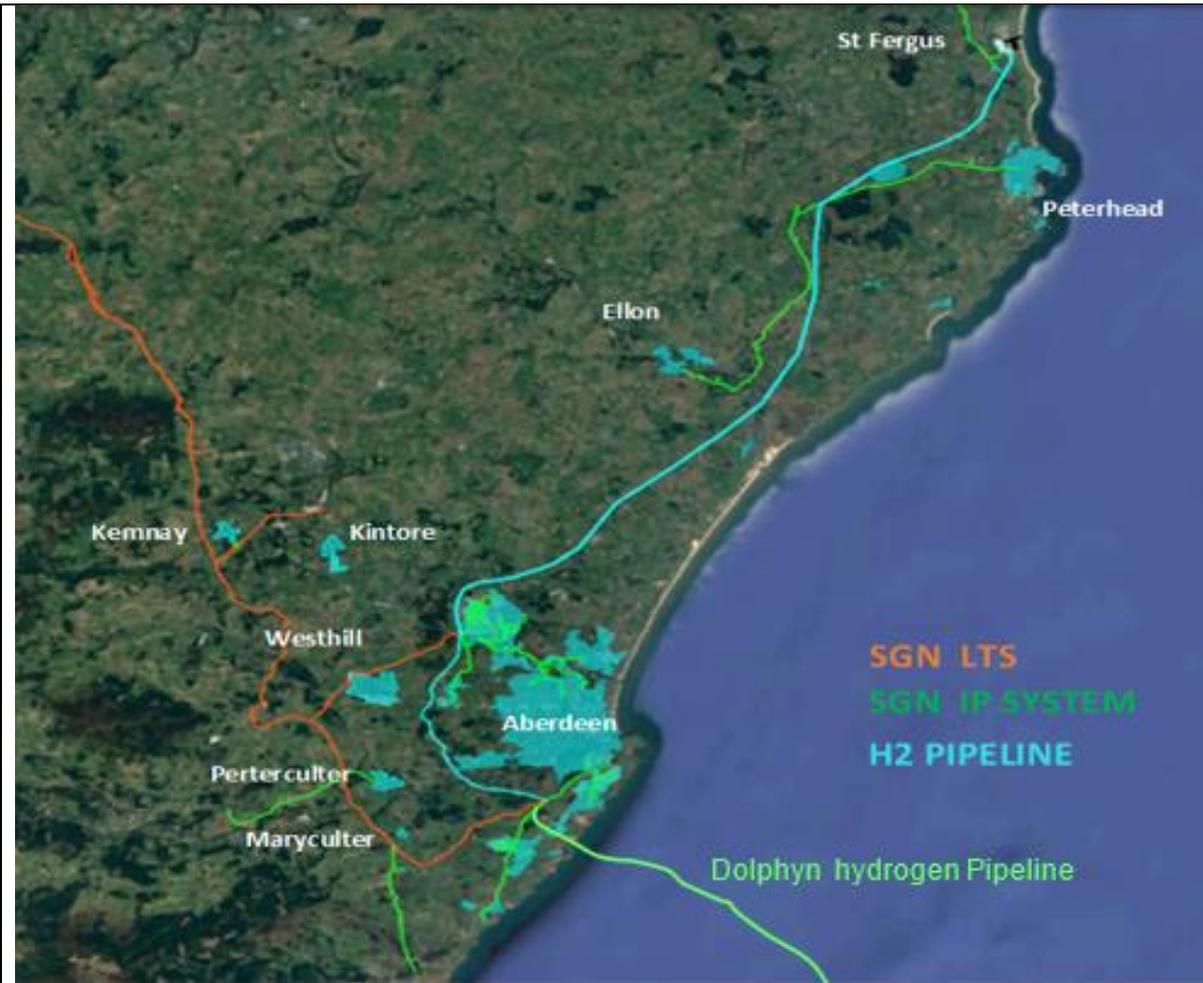


Image 1 – Aberdeen Vision and Dolphyn Projects Hydrogen Pipeline integration into Aberdeen Gas Network.

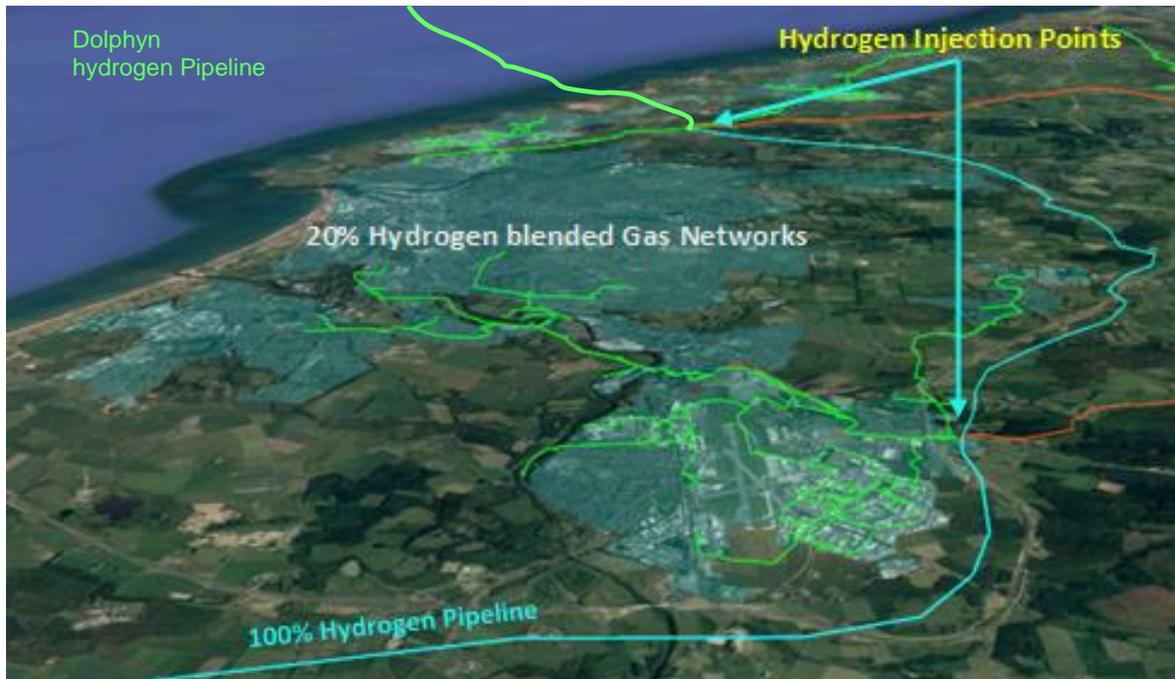


Image 2 – City of Aberdeen Blended Gas Networks (with hydrogen injection locations).

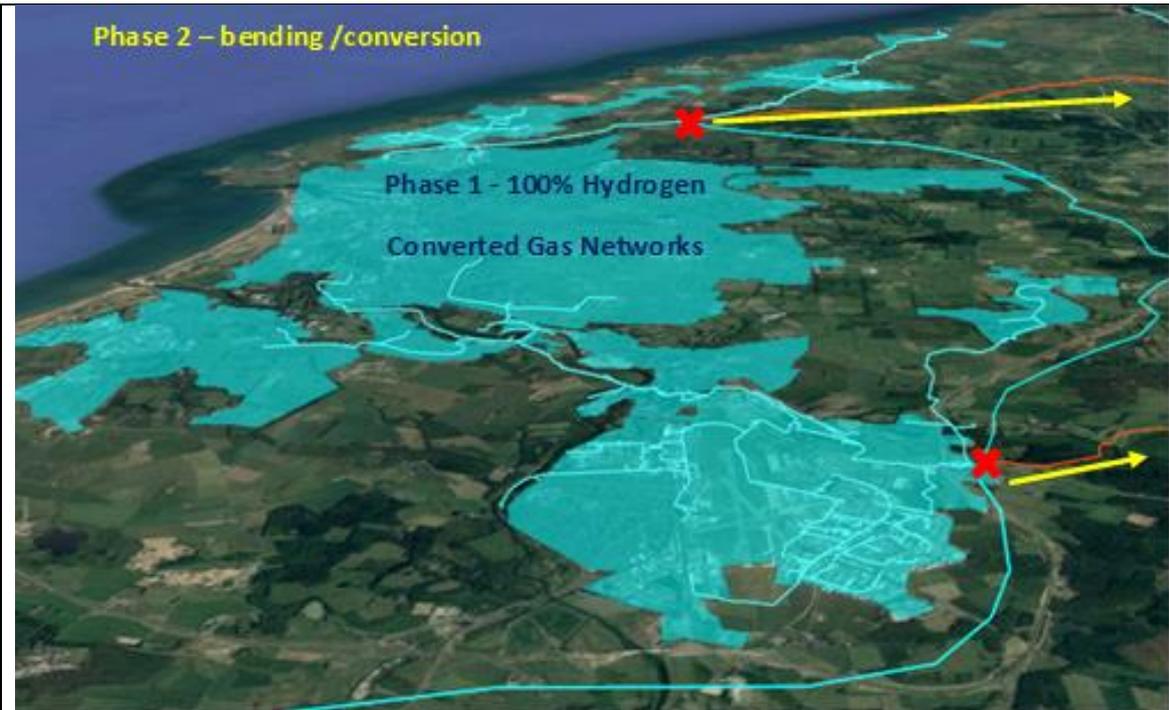


Image 3 – Conversion to 100% and expansion into to Phase 2 -Aberdeenshire (via existing LTS gas networks)



Image 4 – Potential Hydrogen Transport Refuelling Stations

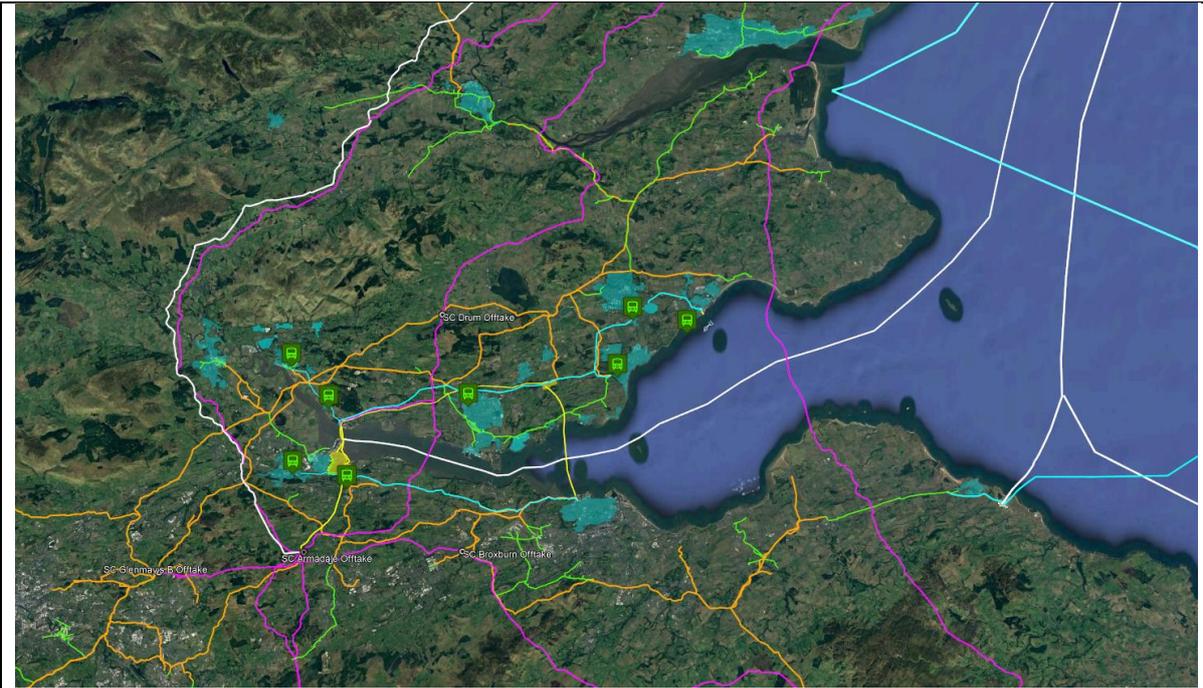


Image 5 –Local Hydrogen Production & Industrial CO2 Capture - showing potential H2 and CO2 network networks and integration into the existing gas networks. Nb. Shows potential CO2 shipping routes and Hydrogen super grid

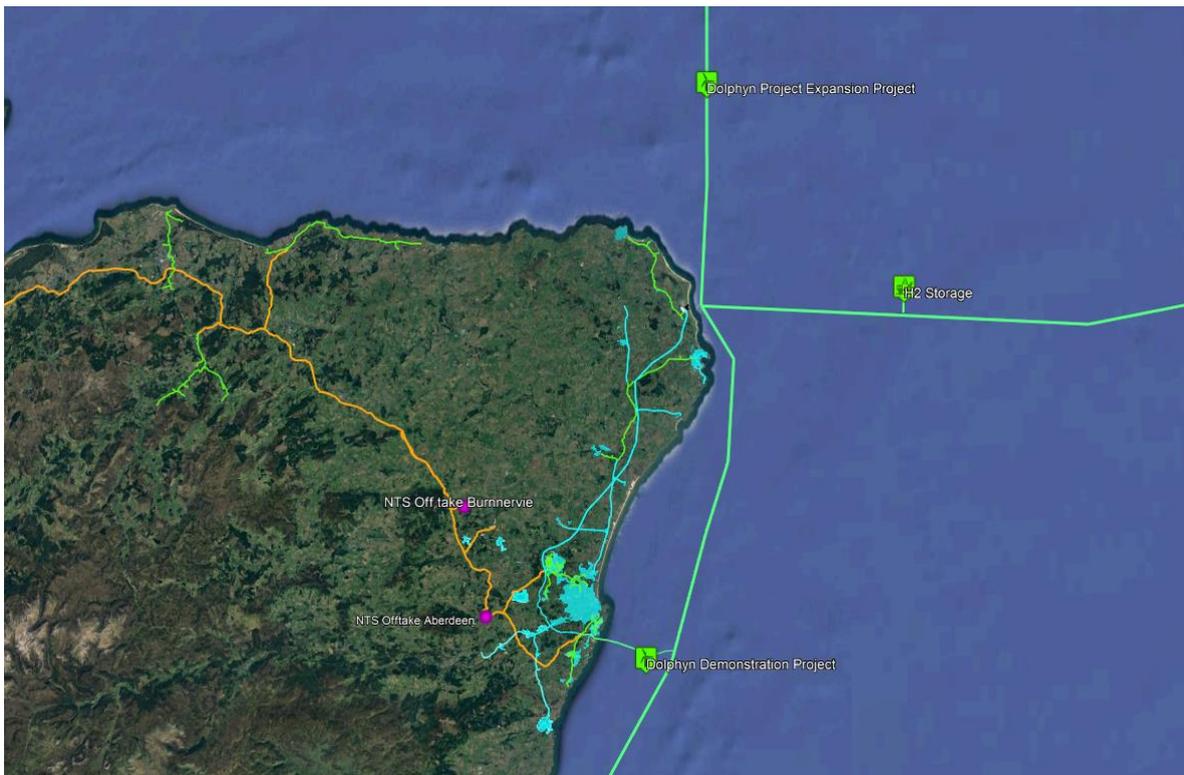


Image 6 – Off Shore Hydrogen Super Grid, Potential Storage Locations and Integration of Dolphyn Northern Expansion Project.

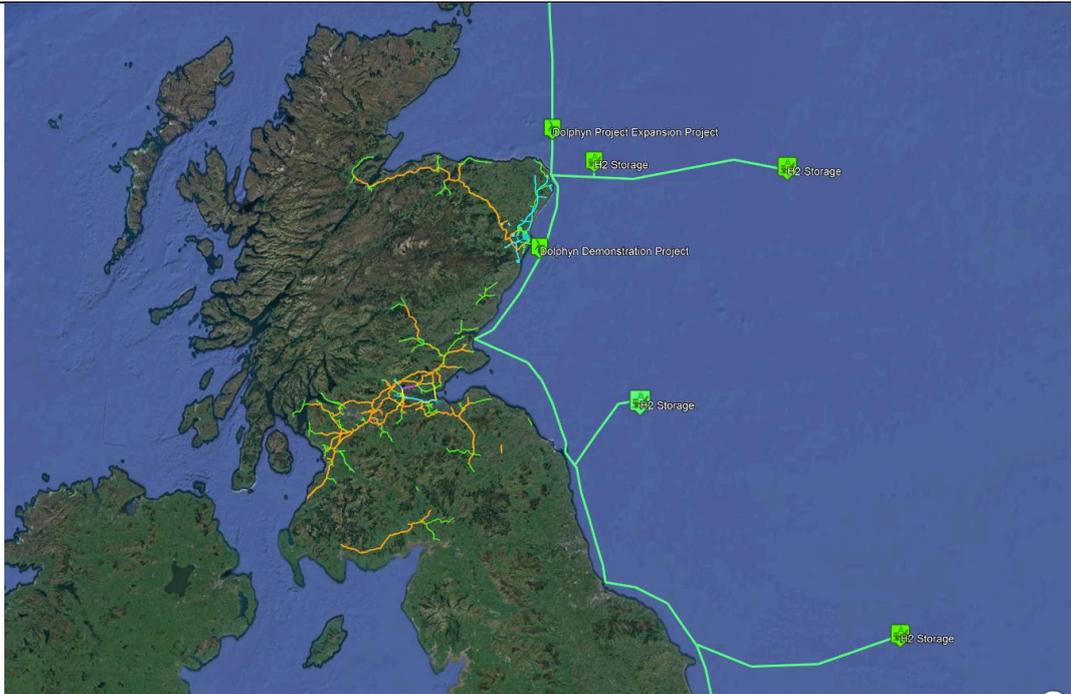


Image 7 – Off Shore Hydrogen Super Grid Build Out.

What part or parts of the development requires planning permission or other consent?

The Industrial Clusters project is initially a study only however the outputs will include a series of practical steps which will be required to deliver the key objectives. These will include:-

- Construction of new or refurbishment of existing pipeline(s) to provide for the transportation of captured carbon dioxide, including change of use from transporting existing substances.
- Offshore CO2 storage sites and refurbishment of existing offshore pipelines.
- Construction of pumping and/or compression equipment required for a CO2 transportation pipeline(s) and for shipping.
- Construction of buildings or structures for carbon capture, transportation and/or storage plant and facilities.
- Hydrogen production plant with carbon capture at various industrial locations such as St Fergus, Mossmorran and Grangemouth
- Construction of structures for bulk hydrogen storage and transportation, Construction of hydrogen transport and storage pipeline infrastructure.
- New or repurposed pipeline infrastructure both offshore and on shore to deliver Hydrogen for heat, industry and transport
- Development of hydrogen fuelling infrastructure at key freight hubs such as Grangemouth, Alloa and Dunfermline
- Hydrogen refuelling infrastructure to support hydrogen for other transport uses such as rail and marine.
- Port facilities at Peterhead and Grangemouth / Firth of Forth for the transportation of captured CO2.
- Onshore/near-shore geological storage of bulk hydrogen.
- Above ground storage of compressed Hydrogen or Liquid Hydrogen carriers.
- Construction of an offshore hydrogen supergrid collecting hydrogen from offshore wind farms and onshore hydrogen producers for delivery to points of demand in the UK and Europe

<p>When would the development be complete or operational?</p>	<p>Any solution will have to be phased to allow for technology advancements, investment timescales, and policy developments. The following timescales and high-level considerations are proposed as part of this study:</p> <ul style="list-style-type: none"> • Short-term (to 2030) – focus on ‘low-lost’ and ‘no-regret’ options to lay foundations of future developments and step towards changing the current energy/carbon use culture and reliance. Technologies to consider should include blended H2 /natural gas networks, localised 100% renewable networks, increased green energy use, carbon capture on major existing emitters and (blue) hydrogen generation. • Medium-term (to 2045 / 2050) – Further development of the short-term solutions to increase the scale of CCS and green energy generations and to increase the geographic coverage where these solutions are deployed. The result will be a balanced net zero situation where emissions have been minimised and are offset by negative emission technologies. • Longer-term (to 2100) – deep de-carbonisation, using offshore wind base load to generate electricity and green hydrogen for use as an energy storage medium, an input into industrial processes, a transport fuel, and export commodity. The use of fossil fuels for energy generation and storage should have ceased and have been replaced entirely. Remaining captured CO2 emissions will be from biogenic sources and biomass fed hydrogen generation and unavoidable emissions arising from industrial process chemistry, such as in lime and glass production.
<p>Is the development already formally recognised – for example identified in a development plan, has planning permission, in receipt of funding etc.</p>	<p>The Industrial Cluster Project will commence in May 2020 with an anticipated completion date in early 2021 so is not yet formally recognised in any Development Plan at Local or National level. However, the scope of the project outputs is likely to be transformational and so it is essential that the Project is recognised in the new National Planning Framework.</p>

Contribution of proposed national development to the national development criteria (maximum 500 words):

Climate change

No current energy systems model predictions show that electrification can meet the UK's climate change targets when the full economy is included. Carbon capture and storage (CCS) and the production of renewable and low carbon hydrogen will have significant roles to play in providing a reliable, sustainable energy mix for the future. These technologies are particularly well suited to space heating high energy use industrial activities and transport. In addition, the use of CCS on processes with biogenic feedstocks enables carbon negative energy and hydrogen production. Carbon negative processes are an essential constituent of the energy mix for the path to 'net zero'. Existing gas networks will need to be adapted or expanded and new networks will be required to service the demand for CO2 collection and hydrogen supply.

The Scottish Government's ambition to transition to a net zero emissions economy has been set out in a number of key policy documents¹²³⁴. It is anticipated that hydrogen will play a critical role in meeting the Government's objectives as it has the capacity to contribute to key sectors which have so far proved difficult to decarbonise, notably heat, transport and some industrial activities.

In addition to climate mitigation, a hydrogen network will provide opportunities for optionality in decarbonising the energy system. A network of CCS and Hydrogen infrastructure enables options to produce, use and export hydrogen for energy and heat, creating new opportunities for trade, investment and international relationships.

People

CCUS and hydrogen Infrastructure will help to secure a sustainable future for industries that currently are key pillars of Scotland's economy and that are subject to the energy transition, as well as stimulate interest from international businesses, who will be looking to build carbon-neutral industrial sites in the vicinity of proven transport and storage options.

Inclusive Growth

The Industrial Clusters Project along with the Aberdeen Vision and Dolphyn Projects will help to protect the sustainability of communities and provide employment opportunities that would enhance place and contribute towards economic stability in those areas that most require certainty in a time of change.

Failure to act quickly may become a missed opportunity for Scotland to become a global leader in the chosen solutions.

Place

The development of low carbon plans to allow industrial clusters to move towards an economic and environmentally sustainable future will be vital in securing long term prosperity and employment opportunities in these industries. It can assist in the development of new and innovative industrial activity with new products and areas of expertise. The decarbonisation of the gas network will play a significant role in the delivery of Scotland's net zero targets. The transformation and reuse of oil and gas infrastructure and the redirection of oil and gas expertise will have important implications for the prosperity of the whole of Scotland and the East of Scotland in particular, ensuring continued employment, sustainable and low carbon economic activity.

Keep In Touch

¹ *The Climate Change Plan: third report on proposals and policies 2018-2032 (RPP3) (Feb 2018)*

² *The future of energy in Scotland: Scottish energy strategy (Dec 2017)*

³ *Energy Efficient Scotland: route map (May 2018)*

⁴ *Scotland's electricity and gas networks: vision to 2030 (Mar 2019)*

For more information and other resources



<http://www.transformingplanning.scot>



<https://blogs.gov.scot/planning-architecture/>



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