Gas Networks Ireland's submission to the Department of the Environment, Climate and Communications Consultation on the Offshore Renewable Energy (ORE) Future Framework Policy Statement

15th February 2024

Introduction

Gas Networks Ireland welcome the opportunity to respond to DECC's Public Consultation on the offshore renewable energy (ORE) Future Framework Policy Statement.

Gas Networks Ireland fully support the Government's target to provide 80% of Ireland's electricity from renewable sources by 2030, with at least 5GW coming from Offshore Wind Energy and the long-term targets of 20GW by 2040; and at least 37 GW in total by 2050. We also support the Climate Action Plan 2023 target of 2GW of offshore wind to be in development by 2030 for non-grid use, such as green hydrogen development.

For Ireland to achieve its 2030 offshore renewable energy target, as well as an expected offshore wind energy capacity of 37 GW by 2050, Gas Networks Ireland feel it appropriate that we should plan our future energy system 'as a whole' and ensure that our offshore renewable energy is utilised to its full potential, with green hydrogen production providing an alternative route to market for intermittent offshore renewable energy which might otherwise be curtailed and indeed the opportunity to develop renewable generation dedicated to the production of green hydrogen. As set out in its Energy System Integration Strategy, the EU believes that Energy System Integration will be key to unlocking our clean energy future. The relationship between offshore wind and hydrogen production is clearly recognised in Actions 8 and 20 of the National Hydrogen Strategy:

- ***"Through the development of the National Industrial Strategy for Offshore Wind, assess the feasible potential for end uses such as eFuels, decarbonised manufacturing and export of Hydrogen and its derivatives."***
- ***"Through the expert advisory group on skills established under the Offshore Wind Delivery Task force, continue to assess, and support the future skill needs of the offshore wind and renewable hydrogen sectors."***

Therefore, Gas Networks Ireland welcome the in-depth economic analysis provided by AFRY Managing Consultants and BVG Associates. These reports show a clear and profound role for hydrogen in the future energy system and in ensuring that Ireland's ORE resources are maximised. Similar studies around Europe have yielded equivalent results and indicate the competitive role gas/hydrogen networks will play in securing a competitive price for Irish hydrogen in the UK and EU.

Finally, we fully support the proposed Action 20 of the Future Framework,

- ***"Assess renewable hydrogen and renewable hydrogen derivatives transport options, including assessing the viability of potential hydrogen export pipeline routes by 2040."***

Consultation Questions

1(a) Has this section adequately identified the general key priorities for ORE delivery in Ireland? Are there additional priorities that should be integrated into the holistic, plan-led approach?

Gas Networks Ireland agree with all the key priorities that are included. **However, we believe that energy system integration should also be a key priority for the Future Framework**. The progression of energy system integration must be implemented by developing Designated Marine Area Plans for dedicated offshore wind earmarked for both onshore and offshore hydrogen production. This approach has been carried out in other European jurisdictions. In January 2023, Germany's Federal Maritime and Hydrographic Agency (BSH) outlined the first offshore hydrogen zone in the North Sea, SEN-1. SEN-1 spans over 100 square kilometres in the North Sea and will allow for an electrolysis capacity of up to 1 GW to be tested and connected with a hydrogen pipeline[1].

The North Sea Wind Power Hub Programme, which is financed by the Connecting Europe Facility of the European Union, Gasunie, Energinet, and Tennet has modelled the integration of offshore wind in the North Sea into the energy system in three ways:

- Direct export of electricity all the way from the offshore sites to the onshore energy system to serve electricity demand;
- Production of hydrogen in landing zones. From here, hydrogen is transported in pipelines to serve hydrogen demand in the onshore energy system; and
- Production of hydrogen at offshore sites. Offshore pipelines supply the onshore hydrogen demand.

The results of this study which were made available to Gas Networks Ireland through the North Sea Energy Cooperative have concluded that offshore production of hydrogen resulted in a greater utilisation of electrical infrastructure; there is a decreased need for platforms when electrolysers are placed offshore and the cost of water treatment for offshore production of hydrogen is ~€0.01/kg. We anticipate this study will be published in the coming weeks and will be happy to provide further information upon publication of the report.

The study supports the Dutch government announcement to designate an offshore wind area for large-scale offshore hydrogen production where an existing natural gas pipeline in its proximity will be reused for green hydrogen transport to land to be integrated into an onshore hydrogen network[2].

Implementing similar sector coupling in Ireland should focus on how to integrate electricity and gas infrastructure to maximise the potential for ORE. Studies should be carried out to identify how best to optimise the use of new and existing infrastructure. Similar studies have been undertaken in the UK, most recently by the Net Zero Technology Centre[3]. To encourage

[1] Offshore hydrogen | Germany plans 1GW of wind-powered green H2 production at sea, with pipeline to shore | Hydrogen news and intelligence (hydrogeninsight.com)
[2] The Netherlands Chooses Site for World's Largest Offshore Wind-to-Hydrogen Project | Offshore Wind
[3] News & Insights - Net Zero Technology Centre (netzerotc.com)

cross-border energy system integration, a common Irish Sea marine offshore energy plan should be developed in coordination with the UK, identifying future common infrastructure which could link Irish energy production with UK market.

1(b) Has each key priority been adequately described and considered all relevant components?

Gas Networks Ireland support the priority of industrial alignment and believe the delivery of energy infrastructure and port facilities will be critical to the delivery of our ORE potential. **However, we feel that this priority should be expanded to include the delivery of offshore hydrogen hybrid networks. Hydrogen hybrid networks consist of 100% dedicated hydrogen pipelines developed offshore.** The hydrogen pipeline network is connected via offshore nodes and enables offshore hydrogen production and connection to numerous landing locations in Ireland for domestic consumption and storage, and in neighbouring countries to facilitate export. A hydrogen hybrid network takes advantage of the transport capacity of hydrogen pipelines, enabling the transport of large-scale quantities of energy. They also benefit the medium-term storage that can be offered from linepack, where the pipeline itself is used as a pressure vessel to store hydrogen, and a link to storage facilities in other countries which have access to onshore geology suitable to large scale hydrogen storage. These projects could be classified as Projects of Common/Mutual Interest which would enable EU funding to be secured for the capital infrastructure costs.

Other jurisdictions have developed frameworks and policy signals which speak to the production of Hydrogen offshore and consequentially the development of offshore hydrogen networks. In the Netherlands for example, the Offshore Wind Energy Plans 2030-2050[4] speak to the consideration of offshore hydrogen production and transport:

"Offshore wind farms generate electricity and the Government expects that some of this will eventually be used to produce hydrogen, initially at coastal locations onshore, but later offshore too. The Government is therefore working with a 'hub-based' approach for the rollout of new offshore wind energy projects. Offshore energy hubs are network nodes connected directly to the offshore wind farms. Transmission cables and pipelines from the hubs then transport the energy generated by the wind farms to land either in the form of electricity or hydrogen."

The same publication announced that a 'North Sea Energy Infrastructure Plan', is being drawn up and is scheduled for release in early 2024. Among the measures to be addressed in this strategic plan will be the identification of where, when and what type of infrastructure is needed for:

"production of hydrogen at sea and scenarios for reusing existing gas infrastructure for hydrogen transport".

In Germany, among the 'short-term measures' included in the updated National Hydrogen Strategy (July 2023)[5] is the procurement of 500 MW of electrolysis for offshore production

[4] Offshore Wind Energy Plans 2030-2050 (rvo.nl)
[5] National Hydrogen Strategy Update (energypartnership.jp) and Associated Insights by Eversheds Sutherland

for green hydrogen, to tender each year between 2023 and 2028, through the implementation of the newly introduced auction scheme foreseen in the Offshore Wind Energy Act.

The AquaVentus project[6], a collaboration of approximately 100 partners based in the North Sea region, is a relevant example of where offshore hydrogen production and hydrogen hybrid pipelines are being implemented to deliver hydrogen direct to market. As part of this initiative, the AquaDuctus project[7] will deliver pipeline connections from offshore wind turbines, alleviating the need for electricity cable connections. This will provide a non-grid route to market for large scale offshore wind, increasing the overall penetration of renewables into the national energy mix.

Key to decarbonising Ireland's economy and maximising the economic benefits of ORE will be the delivery of dedicated offshore wind production coupled with offshore hydrogen production. While this is recognised within the economic analysis **Workstream 3 - Renewable Hydrogen, the role for hybrid hydrogen pipelines offshore is not addressed within the industrial alignment priority.**

Given the nascent stage of development of the ORE and green hydrogen sector in Ireland, it would be prudent to keep all options open to allow for potential technical and cost developments, to enable Ireland to maximise its ORE potential.

1(e) What frameworks and/or supports are required for alternate routes to market such as CPPAs, Power-to-X projects, interconnector-hybrid projects, and export projects?

Gas Networks Ireland believe that the proposed Future Framework should address the route to market for all grid and non-grid wind production, including power to hydrogen. The Future Framework policy statement is informed by economic market analysis conducted to assess the viability of ORE targets and potential export opportunities. **Workstream 3 - Renewable Hydrogen,** identifies the role hydrogen will play in decarbonising the Irish economy and in exporting large proportions of our renewable energy surplus. The *"37 GW well connected"* scenario described in **Workstream 4 - Export Viability,** shows that total in-year export benefits rise to €5.2 billion by 2050, of which 80% is due to hydrogen exports.

Key to maximising this potential will be the delivery of dedicated offshore wind for offshore hydrogen production to avoid all grid constraint. **While the potential for hydrogen is recognised within the economic analysis, the role for hybrid hydrogen networks is not addressed within the proposed framework.**

In terms of supports required to enable alternate routes to market we point to different models currently being tested in other markets, including state subsidised Contract for Difference (CfD) models in Germany, the UK and France. However such schemes are predicated on the transportation infrastructure being in place. As per the National Hydrogen Strategy, hydrogen infrastructure in Ireland is expected to roll out initially across several

[6] AquaVentus Förderverein e.V.
[7] AquaDuctus - AquaVentus Förderverein e.V.

regional clusters where production, high priority demand uses and large-scale storage are co-located. The further expansion and linking of these clusters into a national integrated hydrogen network will be key to creating a liquid mature hydrogen market, with the repurposing of existing natural gas pipelines being favourable for financial viability, given that the repurposing of natural gas pipelines could provide a vehicle for large scale transportation of hydrogen at a fraction of the cost of building new hydrogen pipelines. The early hydrogen clusters could be leveraged as enabling infrastructure to provide an alternative route to market for ORE through established support models such as CfDs.

2(a) What grid infrastructure should be of particular focus in facilitating the build-out of capacity to support ORE generation targets?

Gas Networks Ireland support the build out of electrical grid to support offshore wind development, but in order to optimise the energy system a hydrogen hybrid network should also be developed. A description of hydrogen hybrid networks and the first steps required to develop them, the role they will have in helping Ireland achieving our ORE generation targets as part of an integrated energy system, the economic benefit that may be achieved as a result, and examples of where they are being deployed in other regions have been addressed in our responses to Q1.

4(a) What structures, measures, and interventions can the State and State agencies implement to assist in the development of a long-term, sustainable skills and workforce pipeline? Provide any recommendations on what the State can do to promote careers in ORE across a range of educational backgrounds and movement from other relevant sectors.

Gas Networks Ireland believe the establishment of an applied Centre of Excellence has a lot of merit. Pillar 4 of the Net Zero Industry Act is ***"Enhancing Skills"*** with the aim of ensuring the availability of a skilled workforce for the clean energy transition by supporting the establishment of Net-Zero Industry Academies, focusing on net-zero technologies to provide upskilling and reskilling programmes with the support and oversight by the Net-Zero Europe Platform.

The SFI Research Centres model has successfully encouraged research and innovation in Ireland through collaboration between industry and academia. The Centre for Energy, Climate and Marine (MaREI) has led the way in energy research in Ireland but competes for funding with other research bodies. **The development of one Centre of Excellence for the full energy system value chain** would help to bring all research groups and industry together, fostering even greater collaboration nationally and internationally, providing graduates with a route to employment within the energy sector in Ireland, and strengthening the focus on a technology neutral pathway to achieving our net zero ambitions.

Gas Networks Ireland have seen the benefit of industry/academic partnerships at our Network Innovation Centre in Dublin where we have collaborated with UCD on the Hy-Test project where various domestic appliances were successfully tested with blends of natural gas with up to 20% hydrogen and were found to operate in a safe and effective manner.

4(d) How can Government ensure policy is kept in line with evolving technological innovation and developments in ORE devices? What structures and government procedures should be implemented to future-proof the ORE planning process and account for technological shifts?

Gas Networks Ireland believe that the introduction of an Innovation Working Group reporting to the Offshore Wind Delivery Taskforce would be beneficial. Such a Working Group would disseminate technological advancements to the wider Taskforce, keeping the Government up to date with developments in what is a fast-moving sector. Membership of the Working Group should include members of key SFI research centres and research institutes, representing both industry and academia.

An Integrated System Planning Working Group would help ensure that future ORE planning considers the whole energy system, avoiding a siloed approach. As stated previously, sector coupling in Ireland with a focus on how to integrate electricity and gas infrastructure will be key to maximising the potential for ORE.