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By email to: energyconsultation@decc.gov.ie

28th October 2022

Subject: Review of the Security of Energy Supply of Ireland's Electricity and Natural Gas Systems Consultation

Dear Sir/Madam,

Galetech Energy Developments (GED), part of the Galetech Group, would like to thank the Department of Environment, Climate and Communications (DECC) for the opportunity to provide a submission on the *Review of the Security of Energy Supply of Ireland's Electricity and Natural Gas Systems Consultation*.

Introduction

Founded in 2000, GED has been developing onshore wind, solar and storage projects over the past 22 years and more recently we have entered the offshore wind space with two projects of GW scale in the early stages of development off the south coast of Ireland. GED is part of the wider Galetech Group involved in project development, management, and related services in the renewables sector. With over 100 employees, the group is Irish owned with its headquarters in Cavan and offices across our business divisions located in Cork, Athy and Limerick. We have delivered 495MW of wind projects, we are developing an onshore pipeline of 615MW, two GW scale offshore wind projects (in partnership with Storm, a Belgian wind farm developer and operator) and we own and operate 56.5MW of our own assets in Ireland in partnership with ESB and Greencoat Capital. The environment and the communities in which we work are central to our values, ethos and development approach. While Ireland is our home and core market, we develop projects in other countries and provide services to other clients internationally. We both export our Irish based knowledge and bring back our experience from working with our global partners and clients. Further details available on our website www.galetechgroup.com.

In our response, we have selected a number of questions/sections from the consultation that we feel we can meaningfully contribute to and we set out our responses below.

A summary of our key messages:

- Ireland urgently needs to transition away from our current dependence on fossil fuels, towards an electricity system, and indeed a wider energy system, based on clean renewable energy.

- A subsea green hydrogen pipeline interconnector from Ireland to France should be considered as a mitigation option for the risk to Ireland's energy security of supply. Such a piece of infrastructure would provide a route to market for approximately 15GW of indigenous offshore wind projects, provide a direct connection to an EU member state including EU energy market, which would complement existing gas (to be repurposed to hydrogen) interconnection with the UK (a non EU country and heavily import dependent country itself) while enhancing the resilience of Ireland's security of supply.
- Long term regular assessments of Ireland's energy security of supply are required to continuously ensure the energy security of supply needs are met for the future generations and citizens of Ireland and aligned with planning a sustainable renewables based energy system to achieve net zero emissions by 2050.

Commenting in general at the outset of our response and expanding on our key messages above, we agree with the introduction of the consultation document on a number of points, specifically the four points below;

1. Ireland's dependency on gas imports is increasing as our supply of indigenous gas declines;
 - This is clear, Ireland's import dependency is far too high and that dependency will further increase towards the end of this decade. what is unquestionable is the urgent need to transition away from our current dependence on fossil fuels, towards an electricity system, and indeed a wider energy system, based on clean renewable energy.
2. To reduce its import dependency, Ireland must increase the level of energy from a diverse number of renewable energy sources;
 - In increasing the level of renewables, offshore wind and in particular floating offshore wind must form a large proportion of the renewables mix in supplying Ireland's own domestic energy needs, however the opportunity for Ireland to become a net exporter of energy by exploiting our offshore wind resource has to form part of Ireland's plans to enhance its energy security. Realising this export opportunity, will naturally further enhance the resilience of Ireland's security of supply. When floating offshore wind is considered, the offshore wind opportunity off the coast of Ireland is potentially of the order of 75GW in size. While electrical interconnection will provide a way to export a portion of this energy, it is relatively limited e.g. Celtic Interconnector 700MW. Our view is that the route to market for the scale of the offshore wind opportunity is to produce and export green hydrogen to Europe.
 - To realise this export opportunity, a relatively low cost transport option and route to market is needed. When compared to other forms of transport, a subsea interconnecting hydrogen pipeline to mainland Europe (e.g. Cork to France) would not only provide such a relatively low cost transport option¹ and

¹ "Delivering hydrogen to the industrial sector is cheaper by pipeline for transmission distances below 1,500km" figure 29, IEA report "The Future of Hydrogen" https://iea.blob.core.windows.net/assets/9e3a3493-b9a6-4b7d-b499-7ca48e357561/The_Future_of_Hydrogen.pdf

route to market, it would also provide Ireland with an commercial opportunity to have a bi-directional interconnector to/from Europe to enhance Ireland's security of supply.

3. To support Ireland's decarbonisation and energy security agenda, interconnection is needed;
 - o We agree absolutely that interconnection is needed however this must include interconnection by pipeline to export energy in the form of molecules and not just interconnection to export/import electricity. Ireland is limited to two subsea pipeline interconnectors to the UK. We provide further detail in our response to illustrate that an interconnector to Europe similar in capacity to one of the existing subsea natural gas interconnectors between Dublin and Moffat in Scotland, would have the capacity to export green hydrogen produced from approximately 15GW of offshore wind in Ireland. In the context of the UK now being outside the EU, an interconnecting pipeline to mainland Europe would provide an alternative route to market, a direct physical connection to the EU energy market and mitigate the risk of exporting/importing via the UK, a non EU country and a heavily import dependent country itself.
4. The Russian invasion of Ukraine has led to significant impacts on energy prices and is increasingly impacting on Europe's (including Ireland) energy security;
 - o While the Russian invasion of Ukraine has brought turmoil to the lives of Ukrainians, the invasion has also disrupted European energy markets and security of supply and this major event has focused European nations including Ireland to take stock of its current security of supply situation. For Ireland, its dependency on importing energy has for the last decade and more been too high. Long term planning by governments to enhance Ireland's security of supply has been lacking over that period. Now is the opportunity to take stock of Ireland's energy dependency and recognise the need for consistent regular long term planning for the country's energy security of supply. Assessment of the country's energy security of supply should be carried out regularly so that this current review is not only a once off in the context of a rare global geopolitical major event but a benchmark to measure and manage the energy security of supply needs for the future generations and citizens of Ireland.

Consultation Responses

Consultation question 1: Are there any other security of supply risks that you can identify in addition to those set out in section 6?

It should be noted that the risks outlined in the consultation document are relatively short term when compared to the typical asset life of energy infrastructure/assets and so these relatively short term risks also present an opportunity to plan and deliver a sustainable energy system for Ireland for the long term i.e. to achieve the country's commitment of net zero emissions by 2050.

In planning and looking at the deployment required to improve the energy security of supply situation and to achieve a sustainable energy system, there is a risk of failure to meet 2030 renewable targets and by association, a risk to Ireland's energy security of supply.

A key risk to the development of renewable energy projects to 2030 is planning risk. The planning system needs to be effective and efficient and adequately resourced. Policy needs to keep up with the pace of development required to underpin and encourage investment in renewables e.g. hydrogen strategy response/decision, phase 2 offshore projects ruleset, offshore enduring regime ruleset, OREDP II, onshore wind energy development guidelines. In relation to offshore wind, it is essential that MARA is set up on time and in a position to accept Marine Area Consent applications in Q1 2023.

At a time when Ireland is facing both a climate and energy crisis, renewable energy applications need to move through the planning process as efficiently and expeditiously as possible. Sufficient expertise and resources are required for planning bodies if we are to meet our obligations under the Aarhus Convention, the Habitats Directive and EU law and emission reduction targets.

Increased allocation of resources to planning bodies (e.g. NPWS) and An Bord Pleanála (ABP) will help in clearing the backlog of appeal and SID applications currently with ABP for decision and is therefore even more necessary, particularly having regard to the impending 2030 targets for both onshore and offshore wind energy and to avoid the delays experienced to date in the planning process.

Consultation question 4: Do you have any additional mitigation options that you think should be considered?

Subsea Hydrogen Interconnector Pipeline to Europe

Yes, we are of the view that a subsea hydrogen interconnecting pipeline from Ireland (e.g. Cork) to France should be considered as a mitigation option and we set out our reasoning below.

Green hydrogen can improve Ireland's energy security in two main ways. Firstly, by displacing fossil fuel consumption in the identified priority end use applications. Any reduction in the need to import fuel is an incremental improvement in Ireland's energy security. This is compounded by the fact hydrogen acts as an integrator of indigenous wind ensuring hard-to-abate sectors can substitute fossil fuels for hydrogen produced by renewables. This self-sufficiency and maximisation of indigenous wind potential is extremely important given the current geopolitical and energy price driven inflationary environment.

Secondly, green hydrogen production with our abundant offshore wind resource can be stored and utilised to provide power system security in times of low renewable output. This zero-carbon dispatchable power generation is a requirement for power system security in a heavily renewables-based energy system.

While this consultation has a focus on feasibility of implementation of mitigation options to 2025 and 2030 timelines and includes a contribution by green hydrogen production and a 400MW CCGT fired on hydrogen in 2030, there is a need to look beyond 2030 to achieve net zero emissions by 2050. In planning for net zero emissions in 2050, indigenous renewables will be integral to achieving that target, which will naturally enhance Ireland's security of supply.

Coupled with planning for net zero emissions in 2050, there is an opportunity for Ireland to further develop offshore wind projects for green hydrogen production, which otherwise wouldn't have a grid connection route to market. This opportunity is enormous. When floating offshore wind is considered, the offshore wind opportunity is potentially of the order of 75GW in size and the route to market for that opportunity is to export green hydrogen.

Our view is that, as a first step, blending green hydrogen in the existing gas network up to 20% by volume, which can be done without significant investment, should be facilitated in advance of 2030 as a first stepping stone in transitioning to Ireland's net zero emissions target by 2050. Gas Networks Ireland have commenced and are progressing towards being in a position to facilitate blending of hydrogen in the existing gas network. This will underpin investment in hydrogen production to 2030 to realise the government's target of 2GW hydrogen production from offshore wind for the Irish market.

As a second stepping stone towards a net zero Ireland, per the European Hydrogen Backbone (EHB) vision, we support the transmission networks around Cork and Dublin clusters being transitioned to 100% green hydrogen however this should be accelerated to be achieved in a timescale towards 2035. In conjunction with this and in a similar timeframe, one of the natural gas interconnectors between Ireland and Scotland should also be repurposed to 100% hydrogen and form part of the EHB.

In addition to those two stepping stones, to facilitate the enormous export opportunity of green hydrogen, provide a route to market and in doing so enhancing Ireland's energy security of supply, we would support the EHB vision of an interconnector to the continent. The government/state should take a leading role in the development of this subsea green hydrogen interconnecting pipeline to mainland Europe e.g. France. Such a piece of infrastructure could potentially be categorised as a project of common interest between two EU states and avail of TEN-E EU funding. The planning and development of that pipeline should start immediately to be operational for 2035. While this is beyond the timeline considered in this consultation, the appraisal, planning and development process needs to be kicked off now to achieve that timeline and such a strategic asset can then be considered in Ireland's next energy security of supply review.

A hydrogen interconnecting pipeline would not only provide a route to market, reduce our carbon emissions and reduce our dependency on fossil fuels, it would enhance Ireland's security of supply particularly in the context of the risk posed by Brexit, providing an export option bypassing the UK, a heavily import dependent country itself.

A subsea pipeline of this scale and ambition will take time and will require the cooperation and commitment of the governments concerned as well as the EU. This

was the case for the Langeled pipeline in the North Sea which was facilitated by the UK/Norway Framework Agreement of 2005, the Nord Stream 1 pipeline which began with the German/Russian governments' joint declaration of 2005, and the West African Gas Pipeline which began development after the Heads of State Agreement of 1995. From international agreement to completion typically took 10 years, so a 2035 operational date for an interconnecting pipeline to France is achievable.

The theoretical maximum potential export capacity of one of the existing natural gas interconnectors between Ireland and Scotland is ~ 45TWh/year. When this interconnector is converted to equivalent 100% hydrogen capacity, the capacity of this pipeline transporting green hydrogen per annum would equate to green hydrogen produced from an installed capacity of offshore wind of approximately 15GW. A similar subsea pipeline interconnector installed between Ireland and France connecting to the EHB would provide a route to market for a further 15GW of offshore wind while providing Ireland with a direct connection to an EU member state. Collectively, the converted Ireland – UK interconnector and a new interconnector to France would provide potential routes to market for 30GW of offshore wind (aligned with the current Programme for Government ambition of 30GW of floating offshore wind), while enhancing Ireland's security of supply.

A hydrogen pipeline connecting Ireland's offshore wind resources with continental Europe is the most cost effective way to transport bulk volumes of green hydrogen and unlock Ireland's offshore wind resources. Based on figures in the EHB for medium offshore pipelines, a subsea hydrogen interconnector of 600km in length between Ireland and France would cost of the order of €2.75bn (transporting green hydrogen annually produced from approximately 15GW of offshore wind). The EHB states that transporting hydrogen over 1,000 km along the proposed onshore backbone would on average cost €0.11-0.21 per kg of hydrogen, making the EHB the most cost-effective option for large-scale, long-distance hydrogen transport. In the case where hydrogen is transported exclusively via subsea pipelines, the cost would be €0.17-0.32 per kg of hydrogen per 1,000 km transported².

The International Energy Agency has completed techno economic modelling, which highlights that over short distances (<1,500km), a compressed hydrogen pipeline is the most economic form of bulk hydrogen distribution³.

To put the cost of such a subsea interconnector into context, the Celtic interconnector with a capacity of 700MW is estimated to cost approximately €1bn. A subsea interconnecting hydrogen pipeline (providing an equivalent capacity to 15GW of offshore wind) would cost approximately €2.75bn (i.e. approximately 3 times the cost however over 20 times the capacity of an electrical interconnector) and deliver massive economic benefits to Ireland including contributing strongly to meeting Ireland's and the EU's climate goals and enhance Ireland's security of supply.

In summary, as an action from this energy security of supply review/consultation, we would encourage DECC to kick off a feasibility study immediately to analyse the cost benefit of an interconnecting subsea hydrogen pipeline to France. If a benefit is

² European Hydrogen Backbone <https://ehb.eu/files/downloads/ehb-report-220428-17h00-interactive-1.pdf>

³ IEA – The Future of Hydrogen, 2019, https://iea.blob.core.windows.net/assets/9e3a3493-b9a6-4b7d-b499-7ca48e357561/The_Future_of_Hydrogen.pdf

demonstrated, the government should lead the development of such a pipeline to be operational by 2035. Such a mitigation measure is consistent with the decarbonisation ambition of the climate action plan, would enhance Ireland's security of supply and while it would be challenging to be implemented by 2030, it could be feasible by 2035 if kicked off now.

Hydrogen Storage

Following on from our previous additional mitigation option suggestion above, another additional mitigation option that should be considered is hydrogen storage. Storage is a key enabler of hydrogen's ability to improve both security of supply and power system security. Given the well understood variability and intermittency of renewable production, storage is key to ensuring the decoupling of hydrogen production with demand. This decoupling provides the ability to maximise capturing renewable electricity oversupply and can ensure sufficient volumes of hydrogen can be provided for use in demand-side applications such as power generation. It is important that any identified storage facilities can deliver flexible hydrogen for short term applications (e.g., peaking plant in power generation) in addition to satisfying volume requirements for longer term seasonal storage of hydrogen. Current primary energy storage is primarily based on oil. Best practice is >90 days of primary energy storage based on annual energy consumption. Primary energy in net zero is wind and solar, and therefore large-scale storage of green hydrogen must be developed, with the feasibility of subsea storage explored fully. Such a storage facility could be operated with a mandated level of strategic storage held at all times so that in the event of a supply shock a level of gas supply would be available immediately for the purpose of mitigating the supply shock to the Irish energy system.

In summary, as an action from this energy security of supply review/consultation, we would encourage DECC to kick off a feasibility study to analyse the cost benefit of subsea hydrogen storage. If a benefit is demonstrated, the development of such a storage asset should be facilitated to be operational by 2035. Such a mitigation measure is consistent with the decarbonisation ambition of the climate action plan, would enhance Ireland's security of supply and while it would be challenging to be implemented by 2030, it could be feasible by 2035 if kicked off now and included in Ireland' next energy security of supply review.

Hybrid and private wire connections

One final additional mitigation option we would suggest, in terms of the potential for onshore wind/solar farms to produce hydrogen 'off grid' or use curtailed energy, is that any barriers preventing such projects under current rules should be amended e.g. hybrid grid connections, permit use of private wires, enable off grid solutions or shared grid connections, facilitate zero export autoproducers, develop electricity market arrangements to allow matching of electrolyser dispatch action with a reduction in curtailment.

Consultation question 5: Which gas supply mitigation options, if any, should be considered for implementation?

We support the inclusion of indigenous green hydrogen gas production in the 'Gas Mitigation Package' however under this option it is assumed that all hydrogen gas injections into the grid are developed by electrolysis from volumes of curtailed electricity generation. While in theory this would be a good use of curtailed energy, the analysis informing the consultation doesn't appear to consider the practicalities of utilising curtailed energy, which is dispersed around the electricity grid and which would present challenges and additional costs in terms of producing hydrogen at multiple distributed locations throughout the country, with associated transport costs to injection points or storage locations.

Our view is that natural gas is now a transition fuel to net zero and per our comments under consultation question 4 above, blending hydrogen into the natural gas network could be a stepping stone to kick starting a hydrogen economy in Ireland, converting the transmission system including interconnector to the UK to 100% hydrogen in parallel to developing an interconnecting subsea hydrogen pipeline to France.

We would also support the 'Onshore Energy Storage Project' gas supply mitigation option proposed provided such a storage facility is hydrogen ready.

Consultation question 6: Which electricity supply mitigation options, if any, should be considered for implementation?

Additional electricity interconnection

We would make the observation that in section 7.2 of the consultation, it states that the supporting analysis assumes three planned electricity interconnectors including 700MW Celtic interconnector and an additional 700MW electricity interconnector to France by 2030. Per Eirgrid's website⁴, the Celtic interconnector is due to be completed by 2026 and it states that Eirgrid have been working with their French counterpart since 2011 on the interconnector. This would imply 15 years from start to finish for an electricity interconnector. It's difficult to see how an additional 700MW interconnector assumed in the analysis could be installed by 2030.

Per the consultation document, when the planned interconnectors are commissioned, Ireland will exceed the EU's target for each member state to reach interconnection capacity of 15% (actual will be 18%). While additional electricity interconnection may improve that somewhat, to enable interconnection of multi GW scale, a subsea hydrogen pipeline would provide such scale. Please refer to our previous points on this above under our reply to consultation question 4.

Conversion of a gas fired power plant to hydrogen

The consultation document states "It is assumed that the hydrogen is produced from non-dispatchable generation, via electrolysis, that would otherwise be curtailed

⁴ <https://www.eirgridgroup.com/the-grid/projects/celtic-interconnector/the-project/>

throughout the year and that it is shared across the electricity and gas grids, providing a renewable source of gas.”

Similar to our comments on the ‘Gas Mitigation Package’ under our reply to consultation question 5 above, the analysis informing the consultation doesn’t appear to consider the practicalities of utilising curtailed energy, which is dispersed around the electricity grid, which would present challenges and additional costs in terms of producing green hydrogen at multiple distributed locations throughout the country with associated transport to a 400MW hydrogen gas turbine (H2GT) (located at Great Island per section 6.3.5 of the CEPA technical analysis report).

Aside from the challenge of utilising curtailed electricity and transporting distributed produced hydrogen, large volumes of hydrogen will be required to supply a 400MW H2GT (3TWh of hydrogen assumed from 4TWh of curtailed electricity in the CEPA analysis). Given the variability/seasonality of hydrogen produced predominantly from wind power, storage will be required for such a scenario. Refer to our comments above on hydrogen storage under our reply to consultation question 4.

Electricity mitigation package (DSR and batteries)

We would support implementation of this mitigation option, in particular battery storage but also long duration energy storage.

Consultation question 9: Do you support the policy measures proposed in section 8 of the consultation paper?

We support the proposal for an annual assessment for electricity and gas but this annual assessment must tie into the Climate Action Plan deliverables.

We support regular energy security reviews proposed however Department reviews of legislation and policy should align with the proposed frequency of technical analysis/reviews i.e. every two years, and this must tie into the Climate Action Plan deliverables.

Each such technical and Department review should be looking to 2050 to align with the country’s pathway to net zero emissions by 2050. Achieving net zero by 2050 will naturally align with enhancing Ireland’s security of supply as we increase our indigenous renewables generation capacity, produce our own green hydrogen for domestic demand but also capitalise on the opportunity to export green hydrogen to Europe.

Consultation question 10: What further tools and measures do you think would contribute the most to Ireland’s energy security of supply?

Policy and Resources

Their needs to be immediate and continued focus on the right policy measures to

support investment in the development of renewables and green hydrogen. Public bodies and agencies must be adequately resourced to support development of energy projects.

The consultation document looks to 2030 with a number of assumptions and assertions that various mitigation measures may be feasible. If the right policies are not in place and adequate resources in public bodies to support timely development of energy projects, timelines simply will not be achieved, which will further increase the risk to Ireland's energy security of supply.

Hydrogen Strategy

The DECC consultation on developing a Hydrogen Strategy for Ireland closed in early September. Government have committed to publishing the strategy by the end of 2022 and we would welcome the clarity that this policy will deliver. The strategy once finalised must be underpinned by tangible, deliverable targets that will enable green hydrogen to make a real impact on our energy system including storage and power generation.

Conclusion

We would again like to thank DECC for the opportunity to provide a submission on the *Review of the Security of Energy Supply of Ireland's Electricity and Natural Gas Systems Consultation*. We hope you take into account the suggestions made within our submission with a summary of our key messages below:

- Ireland urgently needs to transition away from our current dependence on fossil fuels, towards an electricity system, and indeed a wider energy system, based on clean renewable energy.
- A subsea green hydrogen pipeline interconnector from Ireland to France should be considered as a mitigation option for the risk to Ireland's energy security of supply. Such a piece of infrastructure would provide a route to market for approximately 15GW of indigenous offshore wind projects, provide a direct connection to an EU member state including EU energy market, which would complement existing gas (to be repurposed to hydrogen) interconnection with the UK (a non EU country and heavily import dependent country itself) while enhancing the resilience of Ireland's security of supply.
- Long term regular assessments of Ireland's energy security of supply are required to continuously ensure the energy security of supply needs are met for the future generations and citizens of Ireland and aligned with planning a sustainable renewables based energy system to achieve net zero emissions by 2050.

Yours Sincerely

