

Reply to:

**Public Consultation on the proposed amendments to the TEN-E Regulation**

Dear DECC,

As [REDACTED] of Dublin City University & as [REDACTED] I welcome the opportunity to feed information into this consultation to enable Government to set a clear direction for managing Ireland's resources, clarify objectives and priorities, and direct decision makers, users and stakeholders towards a more sustainable, environmentally and ecosystem focused, strategic, efficient and forward thinking use of our marine & wind resources.

In my position in the [REDACTED] Dublin City University, I am actively involved with energy-related education, research and development. The main aim of my research is to develop a better understanding of the technologies, strategies and economic models required to achieve Paris aligned national & global ambitions to mitigate the major effects of Global Climate Change. Focusing on clean, low-cost, sustainable energy for households, industry and for transport, interacting with renewable energy, hydrogen and storage technologies, I have ongoing projects with Irish & EU academic & industry partners and government bodies such as Enterprise Ireland & Sustainable Energy Authority of Ireland (SEAI). I am an advisor to the World Energy Council Hydrogen taskforce. I am a hydrogen expert to the United Nations Economic Commission for Europe taskforce on the role of hydrogen in attaining carbon neutrality in the UNECE region.

Hydrogen-Ireland is a not for profit association formed in 2019, on the back of a growing interest from industry, in Hydrogen, the technology, and its potential application in the energy, transport and industry sectors to assist with the transition towards a zero carbon economy. Our members are from across the economy in Ireland (north and south of the border) semi-state companies and organisations, SMEs, large corporate companies, large energy users, multinational companies, large energy producers, etc. Some members want to be updated on hydrogen, some want a solution for their energy problem, others want to be educated on new technologies so that they are ready for an energy transition where hydrogen is centre stage.

My role as [REDACTED] of Hydrogen-Ireland is to listen to the voice of our members and partners; to inform and share information with communities, industry, government & EU representatives; to support safe hydrogen technology development, demonstration and scale up on the island or Ireland; to achieve carbon emissions reductions; to support the creation of hydrogen jobs & IP; and allow Ireland become a leader in hydrogen in Europe.

I have commented on specific points in the following section and also have an introduction section on hydrogen for your information. I am available to be contacted to clarify any topic or answer any questions you may have.

Kind Regards,

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<https://www.gov.ie/en/consultation/41483-consultation-on-the-proposed-amendments-to-the-ten-e-regulation/>

The proposed amendments to the TEN-E Regulation are overwhelmingly welcomed, these include the following principals:

- to meet mandatory sustainability criteria and to follow the 'do no harm' principle
- ending support for oil and fossil fuel infrastructure
- a new focus on offshore electricity
- a new focus on hydrogen infrastructure including transport & certain types of electrolyzers
- integrating clean gases like renewable hydrogen into the existing networks
- continued attention to the modernisation of electricity grids and energy storage
- new provisions on support for projects connecting the EU with third countries (e.g.UK)
- increased stakeholder involvement throughout the process

Ireland, with a small population and with one of the biggest potential for offshore wind in Europe, has the potential to be totally energy secure using indigenous resources, backed up by interconnection to Europe. Continue with interconnection on a cost benefit basis, it will be needed to export surplus electricity as we approach >100% renewable integration.

Indigenous offshore wind energy can enable a vast renewable supply of energy (electricity and other energy carriers e.g. hydrogen) for the country and for export creating local jobs and new economies.

Hydrogen is a key sector for Ireland, and for the marine industry, enabling the energy transition to full decarbonisation, coupling major parts of energy sector to achieve 100% renewables. Hydrogen must be added to all development plans. Excess energy should be stored on the island via Power-to-Gas or Power-to-Chemicals or Power-to-X. European countries., such as Germany require huge amounts of Hydrogen for its industry, Ireland could even export hydrogen and be a supplier of energy to Germany: <https://www.frontier-economics.com/media/2642/frontier-int-ptx-roadmap-stc-12-10-18-final-report.pdf>

### **Cables or Pipes?**

With ever increasing renewable energy penetration, grid access and cable costs are getting more difficult and more costly. For example onshore, prime solar sites are many km's from a suitably large enough grid substations and the cost of reinforcing the cables/substation is many times the cost of the solar plant. The same issues arise with prime wind sites across Ireland, and of course offshore wind.

It is cheaper to pipe a fuel than lay a cable to supply energy to a customer. You can also supply more energy in a pipe than in a cable to supply energy to a customer. Not all offshore wind sites will or should be connected to land via cable. Some offshore wind sites will and should be developed to produce hydrogen or other energy carriers, and possibly for export.

### **In summary**

For Ireland, there are clearly identifiable pathways to transition the great majority of its energy requirement to proven indigenous zero- or negative-carbon energy sources (primarily wind, solar,



and sustainably cultivated indigenous bioenergy). This does require, the development of large scale (multi-TWh) energy storage facilities to buffer variability on at least an annual basis (this is also available on the island at Larne).

Such energy storage is technically feasible, using well proven conversion and storage technologies, through the use of hydrogen as the vector to produce gaseous and/or liquid "electrofuels": Power-to-Gas or Power-to-Chemicals or Power-to-X; hydrogen, ammonia, possibly synthetic hydrocarbons (with carbon cycling), all produced primarily from indigenous variable renewable energy sources.

Production of renewable hydrogen is a key enabler to deliver renewable gas and offers huge potential as a precursor vector in future sustainable energy systems, transport (synthetic CNG/H2 transportation), heating (methanation of CO2), and power generation displacing fossil fuel natural gas. Greening the natural gas grid by direct injection of H2 (in limited quantities at specific sites) is already a feasible option [ <http://www.certify.eu/> ].

#### **Also to Note:**

In a recent report on Ireland by the IEA some comments are note-able: [IEA, Ireland, 2019]

- "The Irish government should intensify research on hydrogen"
- "Emerging international research areas such as those relating to hydrogen also offer potential benefits and align well with the Irish resource endowment and its energy sector policies."
- "The efforts to decarbonise the Irish gas infrastructure by the admixture of biomethane could potentially be supported by the use of hydrogen."

Support for renewable hydrogen in planning is important. Strategic planning decisions support Irish businesses to develop knowledge, intellectual property and early hydrogen deployment projects across the country, overcoming economic and social barriers so that by 2030 Ireland is positioned to assist in achieving the targets set to achieve our energy system decarbonisation goals.

While the hydrogen or electro-fuel production is challenging, this is true of all decarbonisation pathways that might credibly be commensurate with meeting the Paris climate goals. Hydrogen however has the unique advantages of high confidence in the effectiveness of decarbonisation and relatively rapid achievement of very high national energy security; bringing very significant co-benefits in balance of payments and overall national social and economic resilience.

In Europe today there are many existing and planned planning 10MW - 100MW electrolysis projects producing hydrogen from wind or solar for many applications [ <https://www.frontier-economics.com/media/2642/frontier-int-ptx-roadmap-stc-12-10-18-final-report.pdf> , <http://europeanpowertogas.com/projects-in-europe/> ]

#### **Final Word:**

Ireland has the wind resources and the proposed amendments to the TEN-E Regulation should support Ireland to deploy and connect to Europe via green hydrogen energy carriers to support Jobs and sustainable economic growth.

## References:

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Preindustrial CH<sub>4</sub> indicates greater anthropogenic fossil CH<sub>4</sub> emissions, Nature, 2020 <https://www.nature.com/articles/s41586-020-1991-8>

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<https://www.scientificamerican.com/article/solar-and-wind-power-could-ignite-a-hydrogen-energy-comeback/>

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**Energy Policies of IEA Countries Ireland 2019 Review Hydrogen** <https://webstore.iea.org/energy-policies-of-iea-countries-ireland-2019-review>

**Review:**

<https://gasforclimate2050.eu/publications/>

<https://energyindustryreview.com/renewables/worlds-first-offshore-green-hydrogen-project/>

## Hydrogen projects in Ireland 2021:

Government bodies such as "Enterprise Ireland" & "SEAI" have supported some of small hydrogen projects in Dublin City University over the years. But recently a number of large EU funded projects have been successful on the Island. These include;

**NortherIreland Hydrogen Transport-** Aims to install 1 hydrogen fuelling station and provide 3 hydrogen buses. <https://ee.ricardo.com/htpgrants>

**GenComm** - Aims to address the energy sustainability challenges of North West Europe communities, by commercially validating renewable hydrogen technologies. <http://www.nweurope.eu/projects/project-search/gencomm-generating-energy-secure-communities/>

**SeaFuel** - Aims to use the renewable resources and hydrogen across the Atlantic Area to power local transport fleet and support the shift towards a low-carbon economy <http://www.seafuel.eu/>

**HUGE** - Aims to address the necessity for assessing the hydrogen renewable energy chain from production through storage, transport and on to the end-user in the Northern Periphery and Arctic region. <https://actionrenewables.co.uk/news-events/post.php?s=new-eu-project-huge-to-launch-next-month>

**HyLantic** - Aims to establish a network to advance renewable hydrogen generation, storage, utilisation and implementation in the Atlantic area.

<http://hylantic.com/>

Separately a number of industry community groupings have focused on Hydrogen, these include;

**Hydrogen Ireland Association** - Aiming to achieve the establishment of a hydrogen economy on the island, through management of renewable energy and its utilization in zero emissions transport and grid injected to assist the decarbonisation of electricity and heating. <http://hydrogenireland.org/>

<https://www.h2-view.com/story/hydrogen-ireland-association-hoping-to-create-hydrogen-economy-for-ireland/>

**Hydrogen Mobility Ireland** - Aiming to deploy the first hydrogen fuelling stations, hydrogen supply chain and hydrogen fuelled public busses and cars in Ireland by 2023. <https://www.rte.ie/news/business/2019/0606/1053809-new-group-addresses-hydrogen-transport-in-ireland/>

**Valentia** - Aims to address the energy sustainability and economic challenges of island communities, utilising renewable hydrogen. <https://www.irishexaminer.com/breakingnews/ireland/valentia-aims-to-lead-way-in-hydrogen-energy-use-919902.html>