

"Offshore Renewable Energy (ORE) Future Framework Policy Statement Consultation"

Dear Minister Ryan & the Department of the Environment, Climate and Communications Team,

I am [REDACTED], [REDACTED] Student at [REDACTED]. As a [REDACTED] student in [REDACTED] [REDACTED] I bring a multidisciplinary background to the discussion surrounding hydrogen implementation in Ireland. My studies have provided me with insights into the technical, economic, and regulatory aspects of renewable energy transitions, particularly focusing on hydrogen technologies.

Based on recent literature and the Irish National Hydrogen Strategy, I recommend:

- Scaling up renewable "green" hydrogen production to meet the 2 GW target by 2030, primarily from offshore wind.
- Removing barriers to early-stage hydrogen projects and investing in research and innovation initiatives across the hydrogen value chain.
- Strengthening international partnerships to leverage global resources and expertise in hydrogen development.
- Building strategic international partnerships in the field of renewable hydrogen development.
- Better understanding the skills required, skill gaps, and job creation opportunities in Ireland regarding renewable hydrogen.

These recommendations align with the Irish Government's commitment to establishing a sustainable renewable hydrogen industry in Ireland, integrating it with overall energy, economic, and climate goals. Few areas that can be related is given below.

Policy Support

The Irish Hydrogen Strategy recognizes how crucial it is to have clear rules and incentives to encourage making and using green hydrogen. These guidelines aren't just about encouraging investment and innovation; they're also about creating a market for hydrogen technologies. To deal with the uncertainty about how much hydrogen will be needed and how fast the industry will grow, the strategy says we need to predict how much demand there will be within Ireland and also look at opportunities to sell hydrogen to other European countries. This means figuring out which countries might want to buy hydrogen and then making policies and offering subsidies to encourage the development of hydrogen technologies here.

The strategy also talks about how Ireland has an advantage because we can make hydrogen from offshore wind power at a lower cost. But it says that to really make the most of this advantage, we need to think about our location. Being close to mainland Europe means we could easily sell hydrogen to countries like Germany, which has a big market for it. So, the strategy suggests that by using our location well, we can deal with challenges like competing on price and become a big player in the global hydrogen market.

Research and Development

Research and development (R&D) play a vital role in the Irish Hydrogen Strategy, driving innovation and technological progress within the hydrogen sector. Recognizing the need for continuous investment in R&D, the strategy aims to address challenges related to the cost, efficiency, and scalability of hydrogen technologies.

One key area of focus is improving electrolysis efficiency, a critical process in hydrogen production. Enhanced electrolysis efficiency is essential for reducing energy consumption and production costs. To achieve this, the strategy advocates for investment in research initiatives aimed at advancing electrolysis technologies, including proton exchange membrane (PEM) and solid oxide electrolysis cells (SOECs). By developing these technologies, Ireland can bolster its competitiveness in the global hydrogen market.

Moreover, the strategy underscores the significance of developing cost-effective storage solutions and optimizing distribution systems to ensure reliable and efficient hydrogen delivery. Investment in R&D efforts focused on storage technologies, such as compressed hydrogen storage and liquid organic hydrogen carriers (LOHCs), is highlighted. These initiatives aim to overcome challenges related to storage and transportation costs, thereby accelerating the adoption of hydrogen technologies across various sectors.

Through strategic investment in R&D, Ireland aims to drive innovation, address key challenges, and position itself as a leader in the global hydrogen market, contributing to sustainable economic growth and environmental sustainability.

Collaboration

Collaboration stands as a cornerstone in the Irish Hydrogen Strategy, recognizing its pivotal role in fostering progress within the hydrogen sector. The strategy underscores the significance of partnerships and knowledge sharing among governments, industry stakeholders, research institutes, and international organizations to tackle common challenges and capitalize on opportunities for innovation and growth. A key initiative outlined in the strategy involves promoting public-private partnerships (PPPs) to facilitate collaborative efforts on hydrogen projects and initiatives. By bringing together government agencies, industry players, and other stakeholders, PPPs can pool resources, share risks, and expedite advancements in the hydrogen sector.

Furthermore, the strategy highlights the importance of joint research ventures and technology transfer programs to translate research findings into practical applications. By investing in collaborative research initiatives and technology transfer activities, Ireland can bridge the gap between academia and industry, fostering innovation and unlocking new avenues for growth in the hydrogen sector. Through robust collaboration mechanisms such as PPPs and joint research ventures, Ireland aims to harness collective expertise, drive innovation, and position itself as a leading player in the global hydrogen economy, contributing to sustainable development and economic prosperity.

Public Awareness

Public awareness plays a pivotal role in the Irish Hydrogen Strategy, recognizing that education and engagement are essential in garnering support for hydrogen initiatives. The strategy emphasizes the necessity of comprehensive public awareness campaigns to enlighten citizens about the advantages of hydrogen as a clean and sustainable energy source.

A key objective of the strategy is to demystify hydrogen technologies and dispel misconceptions through various educational initiatives such as workshops, seminars, and community outreach programs. By offering accessible and accurate information about hydrogen technologies and their

potential benefits, Ireland aims to empower citizens to make well-informed decisions and endorse policy measures geared towards accelerating the adoption of hydrogen technologies. Moreover, the strategy underscores the importance of stakeholder engagement and media relations in heightening awareness about hydrogen. By involving key stakeholders such as government agencies, industry leaders, and community groups, Ireland seeks to cultivate trust, facilitate dialogue, and mobilize support for hydrogen initiatives across local, national, and international levels.

Through concerted efforts in public education, engagement, and media outreach, Ireland aims to foster widespread understanding and acceptance of hydrogen as a viable energy solution, thereby catalysing the transition towards a more sustainable and greener future.

Market Development

Market development is a key focus area of the Irish Hydrogen Strategy, recognizing the importance of creating a conducive business environment to stimulate investment, innovation, and adoption of hydrogen technologies. The strategy emphasizes the need for policy incentives, market mechanisms, and infrastructure investments to drive market demand and attract capital to the hydrogen sector. One of the initiatives outlined in the strategy is the provision of financial incentives, including grants, subsidies, and tax incentives, to stimulate investment in hydrogen projects. By providing financial support and regulatory certainty, Ireland can create a level playing field for hydrogen compared to conventional fuels and encourage private sector involvement in the sector. Additionally, the strategy emphasizes the importance of infrastructure investments to support the development of a robust hydrogen ecosystem. By investing in production facilities, storage tanks, distribution pipelines, refuelling stations, and end-user applications, Ireland can create new market opportunities, reduce barriers to entry, and accelerate the transition to a hydrogen-based economy. These detailed descriptions for each point should help provide a comprehensive understanding of the Irish Hydrogen Strategy and the proposed solutions to address key challenges and opportunities in the hydrogen sector. By implementing targeted policies and incentives, investing in research and development, fostering collaboration, raising public awareness, and supporting market development, Ireland can accelerate the transition to a sustainable hydrogen economy and achieve its climate and energy goals.

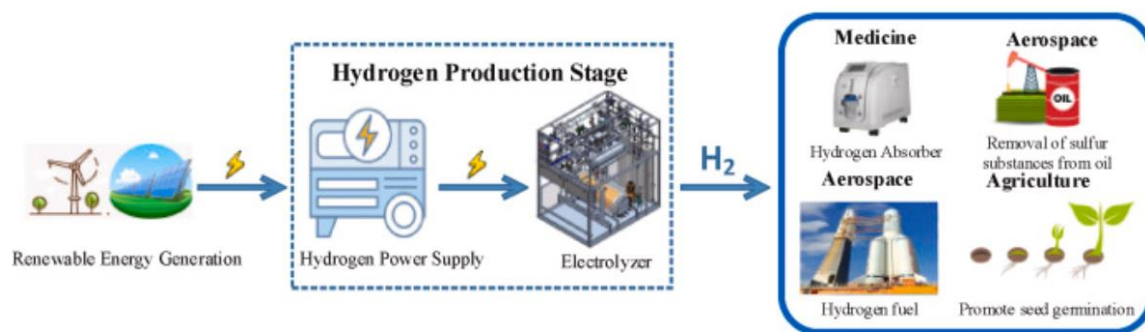
Supporting information

As per the section in WS3 in page 5 which discuss about the Irish exports which struggle to compete as the cost of hydrogen is marginally greater than other countries. Here to improve the cost-effectiveness of hydrogen production in Ireland, several strategic approaches can be considered. Firstly, Ireland's abundant wind resources, particularly in the west of the country, present a valuable opportunity. By harnessing these strong winds and connecting wind generators directly to electrolyzers, green hydrogen production can be maximized, taking advantage of renewable energy sources.

Addressing grid congestion issues is another essential step. By resolving these challenges, the efficiency of green hydrogen production can be enhanced, ensuring smoother operations and reducing associated costs. Moreover, Ireland's projected excess production capacity offers promising export opportunities for green hydrogen. Exploring these markets can not only drive down costs but also stimulate economic growth and competitiveness in the industry. Government support plays a pivotal role in incentivizing green hydrogen production. By implementing policies such as hydrogen purchase agreements and offering capital expenditure relief on electrolyser investments, the government can spur investment and innovation in the sector, ultimately reducing production costs. Additionally,

optimizing connections between offshore wind farms and electrolyzers aligns with the Irish government's plans to expand green hydrogen production capacity. This strategy can significantly increase output while capitalizing on Ireland's ambitious renewable energy goals. Policy support is crucial for establishing a thriving green hydrogen industry. Developing a comprehensive national hydrogen strategy and implementing supportive policies for supply, demand, and infrastructure can create a conducive environment for growth and innovation.

By implementing these strategies and leveraging Ireland's natural advantages, such as high wind speeds and strong government support, the country can work towards producing green hydrogen more efficiently and competitively, ultimately driving down production costs and contributing to a sustainable future.



Executive Summary

To accelerate hydrogen adoption in Ireland, I propose:

- Leveraging Ireland's abundant wind resources for renewable hydrogen production.
- Setting ambitious targets for green hydrogen production capacity.
- Providing financial incentives for hydrogen production, storage, and distribution projects.
- Evaluating opportunities for blending hydrogen into the existing gas grid.
- Assessing the feasibility of large-scale hydrogen storage options.
- Promoting collaboration among stakeholders, including governments, industry leaders, research institutes, and international partners.
- Increasing public awareness about the benefits of hydrogen as a clean energy source.
- Stimulating market demand for hydrogen-based products and services.

These recommendations emphasize the importance of collaboration, education, and innovation in facilitating hydrogen adoption in Ireland. They also highlight the need for strategic policy decisions and targeted funding mechanisms to support the development of a thriving hydrogen ecosystem.

BIBLIOGRAPHY

- [1] L. Tommasi, P. Lyons, and B. Norton, *Hydrogen in the Irish Energy Transition Opportunities and Challenges*. 2023. doi: 10.13140/RG.2.2.21424.74246.
- [2] “National Hydrogen Strategy.” Accessed: Feb. 25, 2024. [Online]. Available: <https://www.gov.ie/en/publication/624ab-national-hydrogen-strategy/>
- [3] J. O. Trá, “Revitalising Our Seas - the new report by Fair Seas,” FairSeas. Accessed: Feb. 25, 2024. [Online]. Available: <https://fairseas.ie/2022/06/08/revitalising-our-seas-identifying-areas-of-interest-for-mpa-designation-in-irish-water/>
- [4] “Green hydrogen: A guide to policy making”.
- [5] “Grey, blue, green – why are there so many colours of hydrogen?,” World Economic Forum. Accessed: Feb. 25, 2024. [Online]. Available: <https://www.weforum.org/agenda/2021/07/clean-energy-green-hydrogen/>
- [6] L. De Tommasi and P. Lyons, “Towards the Integration of Flexible Green Hydrogen Demand and Production in Ireland: Opportunities, Barriers, and Recommendations,” *Energies*, vol. 16, no. 1, Art. no. 1, Jan. 2023, doi: 10.3390/en16010352.
- [7] J. M. English and K. L. English, “Overview of hydrogen and geostorage potential in Ireland,” *First Break*, vol. 41, no. 4, pp. 41–49, Apr. 2023, doi: 10.3997/1365-2397.fb2023025.
- [8] L. De Tommasi and P. Lyons, “Towards the Integration of Flexible Green Hydrogen Demand and Production in Ireland: Opportunities, Barriers, and Recommendations,” *Energies*, vol. 16, no. 1, Art. no. 1, Jan. 2023, doi: 10.3390/en16010352.
- [9] L. Tommasi, P. Lyons, and B. Norton, *Hydrogen in the Irish Energy Transition Opportunities and Challenges*. 2023. doi: 10.13140/RG.2.2.21424.74246.
- [10] silicon, “Can hydrogen solve Ireland’s energy problems?,” Silicon Republic. Accessed: Feb. 25, 2024. [Online]. Available: <https://www.siliconrepublic.com/machines/hydrogen-energy-renewables-wind-gas-ireland>
- [11] “Hydrogen in the Irish Energy Transition - Opportunities and Challenges.” Accessed: Feb. 25, 2024. [Online]. Available: <https://www.tyndall.ie/news/hydrogen-in-the-irish-energy-transition-opportunities-and-challenges/>
- [12] 1001, “Ireland Renewable Energy Key Focus on Irish National Hydrogen Strategy.” Accessed: Feb. 25, 2024. [Online]. Available: <https://www.trade.gov/market-intelligence/ireland-renewable-energy-key-focus-irish-national-hydrogen-strategy>