

Engineers Ireland Submission on 'Offshore Wind – Phase Two Consultation'

For the attention of the Department of the Environment, Climate, and Communications
9 March 2022

1. Introduction

Ireland's continued prosperity and ability to compete in an open international economy is directly linked to our increased demand for energy. Ireland has a growing population, increased industrialisation, a thriving technology sector, and we are now a digital hub for Europe, holding 70% of Europe's data. Our heating and transport requirements are increasingly being met by electricity and this trend is set to continue. With all these additional demands, a robust and flexible energy infrastructure is vital to Ireland's future. In a carbon-constrained future, existing plans for carbon reduction, including the use of offshore wind, must be accelerated now, in order to achieve net-zero greenhouse gas emissions no later than 2050, and a reduction of 51% by 2030 compared to 2018 levels.

Key actions recommended:

- Ireland's energy security is key to the economic success of the nation. Developing offshore power can secure our energy needs but must be addressed now
- Ireland has the potential to become a net exporter of renewable energy, and to become a leader in the EU energy strategy, to ensure that secure EU based energy production is feasible in a carbon-constrained future. We must accelerate the route to market for innovative energy solutions with support from government policy around procurement, planning and execution.
- Hybrid grid connections provide a near term solution to adding additional capability to the grid using existing underused infrastructure. These must be endorsed by government and can be expanded to support additional energy sources such as onshore wind, green hydrogen, and solar.
- Government should develop a comprehensive hydrogen strategy, embracing hydrogen's potential to serve as a replacement for existing fossil fuels. The option of upgrading existing electricity generation infrastructure to operate on hydrogen and link in with hybrid schemes should be a key part of this strategy.
- Ireland has unique experience in combining power grids spread over different jurisdictional electricity markets, linking across the northern border. Our experience can support EU efforts to create an Internal Energy Market; this should be highlighted at a European level by all our representatives.
- As our energy requirements increase, we must plan for future decades; this means additional infrastructure will be needed. Considering innovative alternatives to traditional overhead lines may improve public opinion. Information campaigns are also necessary to heighten awareness of the need for additional infrastructure and to counter misinformation on health and environmental issues.
- Support innovative solutions in the development of floating offshore wind turbine platforms, to position Ireland to take a leading role in developing this technology
- Mandate future offshore power infrastructure developments to include a positive effect on biodiversity, creating protected waters and artificial reefs around offshore turbines

Ireland can address its own energy needs by using our substantial offshore wind potential. The use of hybrid connections, in particular, will allow new offshore wind sources to utilise existing infrastructure to get energy onto the grid quickly. There are also opportunities for innovation in this area, predominantly in the floating platform technology. We believe this technology is key to effectively managing our offshore assets, and Ireland can become a significant contributor and leader in this technology, if adopted early.

2. Ireland's power requirements

Ireland's and the European Union's prosperity and security hinges on a stable and abundant energy supply. No significant energy supply issues have been seen in Europe since the oil crisis in the seventies. Russia's recent invasion of Ukraine has already resulted in restrictions on the supply of gas and oil and highlighted the vulnerability of our existing energy supplies. The need for alternative energy supplies is apparent in the EU. Ireland, imports most of our energy needs as oil and gas leaving us as one of the EU's most insecure energy countries.

Ireland's energy needs have increased substantially in the last twenty years and will continue to grow in years to come. Predictions show an increase of energy needed from approximately 31TWh in 2019 up to 46TWh by 2030 [1].

Currently, renewables account for 13% [2] of Ireland's energy supply, with the remaining 87% being non-renewables (Figure 1), predominantly being traditional thermal generation plants, burning imported oil (45%) and gas (34%). While there is substantial wind generation capacity in Ireland, at times reaching 70% of required energy in favourable conditions, the energy is currently not stable and requires support from thermal generators.

Ireland is geographically well-positioned to utilise renewable wind energy. Ireland's offshore jurisdiction is approximately ten times bigger than our landmass, with strong regular winds from the Atlantic. Offshore, therefore, represents a substantial opportunity to meet a large part of our energy needs, and allows for the possibility of Ireland becoming a net exporter of energy.

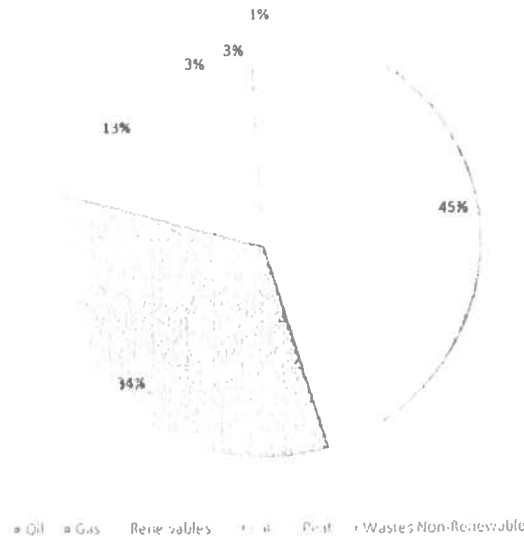


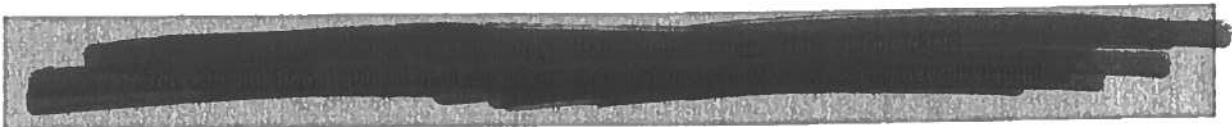
Figure 1 Irelands primary energy by fuel 2020 [2]

In only eight years, Ireland must significantly increase the use of renewables to reach our carbon budget goals of a 51% reduction by 2030 compared to 2018 levels. Creating an additional 5GW of offshore power generators will be a significant step towards this. It will take about five years to assemble and commission a new Gigawatt scale energy source from a standing start. This leaves only three years to arrange logistics, planning permission, set regulations, win over public opinion, survey site locations, etc. These actions cannot be delayed if are to achieve these goals. We are already in a race against time and Ireland must improve on its ability to deliver large scale infrastructure projects on time.

Engineers Ireland supports the creation of this additional 5GW offshore capacity. This work, alongside creating a new High Voltage DC (HVDC) interconnector to France, completing the North-South interconnector, and creating an additional East-West interconnector, will secure Ireland's electricity needs and facilitate us in becoming a net exporter in energy to other EU states. Wind Energy Ireland (WEI) has published a report [3] showing offshore could potentially provide 30GW of energy for export. We can export this excess power while providing a current peak load in Ireland of approximately 6GW.

Call to Action:

- Ireland's energy security is key to the economic success of the nation. Developing offshore power can secure our energy needs but must be addressed now
- Ireland has the potential to become a net exporter of renewable energy, and to become a leader in the EU energy strategy, to ensure that secure EU based energy production is feasible in a carbon-constrained future. We must accelerate the route to market for innovative energy solutions, with support from government policy around procurement, planning, and execution.



3. Hybrid grid connections to the grid

The Republic of Ireland and Northern Ireland co-operate closely on energy matters. The all-Ireland Single Electricity Market (SEM) is one of the first of its kind in Europe [4], combining two separate jurisdictional electricity markets. Lessons learned from this exercise can support the European Internal Energy Market (IEM), also known as the super grid.

Eirgrid's 'Shaping our Electricity Future' report [5] provides a valuable roadmap out to 2030. It also links to the duration of the Phase 2 delivery, to develop our offshore potential effectively. We must think in decades, out to 2050 and beyond. Our western seaboard has significant potential in this regard, but we risk creating a suboptimal network, if our horizons are limited. With the planning of additional gigawatt power sources, long term planning for supporting infrastructure is required, along with near term solutions, such as hybrid grid connections.

Hybrid grid connections are defined as single grid connections that facilitate the connection of both an existing thermal generation plant and a proposed offshore wind project. These hybrid grid connections are essential to accelerate new energy sources to the grid. Maximising our existing assets in the near term is preferable. These hybrid connections allow new offshore projects to utilise existing cables in Ireland and accelerate the reduction of the carbon budget of the grid. They will also facilitate the decommissioning of older thermal generation plants, as the connection can be shifted to a straight replacement over time.

Hybrid connections ensure near term energy security. If there is insufficient wind for the supply and demand, some thermal generation plants can meet the demand. With modern wind forecasting able to predict accurate wind levels three hours in advance, there is enough time to engage gas turbine plants from a cold start. This infrastructure is available now and would lower the project's costs, benefiting consumers.

While the definition of hybrid grid connections applies to thermal and offshore, it is also relevant for onshore wind and solar. Hybrid grid connections could ensure multiple energy sources can co-exist at a grid connection, ensuring maximum utilisation of our existing grid infrastructure, such as the existing 400 kV lines connecting power stations on the Shannon Estuary to Dublin.

In addition to this, the hybrid grid connection, using gas power thermal plants, can potentially be shifted to the production and burning of green hydrogen. This will involve transitioning through a blended hydrogen/gas model, to eventually a full hydrogen model in the future. This will facilitate the shift to a fully renewable energy supply as the green hydrogen technology develops to scale. The consultation refers to hydrogen, but it is difficult to comment further at this point, as Ireland has yet to provide an overarching hydrogen strategy. Putting a robust hydrogen strategy, embracing hydrogen's potential to serve as a replacement for existing fossil fuels, is critical for innovation to succeed.

Planning beyond the 2030 markets is essential. This will likely need additional overhead lines or underground alternatives. Public opinion can be a significant hurdle when proposing additional lines. Public education on the need for this infrastructure, and combating false information, is vital to the success of providing this infrastructure. A novel way to improve public opinion could be to create a design feature that positively impacts other areas of society. Iceland previously had a design proposed by London based architects for a collection of giants carrying cables. The Irish cultural landscape has potential for this or similar design, creating opportunities that may be more palatable to local communities.

Call to Action:

- Hybrid grid connections provide a near term solution to adding additional capability to the grid. These must be endorsed and can be expanded to support additional energy sources such as onshore wind, green hydrogen, and solar.
- Government should develop a comprehensive hydrogen strategy, embracing hydrogen's potential to serve as a replacement for existing fossil fuels. The option of upgrading existing electricity generation infrastructure to operate on hydrogen and link in with hybrid schemes should be a key part of this strategy.
- Ireland has unique experience in combining power grids spread over different jurisdictional electricity markets, linking across the northern border. Our experience can support EU efforts to create an Internal Energy Market; this should be highlighted at a European level by all our representatives.
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4. Floating offshore wind turbines

Hybrid connectors can kick start offshore wind turbine technology in Ireland, as it will allow us to get power onto the grid faster. While it is a relatively new technology, floating offshore technology is key to future offshore infrastructure and is supported by Engineers Ireland. There is potential for Ireland to become a frontrunner in the technology, innovation, development and execution of the floating platforms for these wind turbines. This is an opportunity for Ireland as an island nation to become a critical European leader in the design and manufacture of these platforms and lead offshore energy generation in the future.

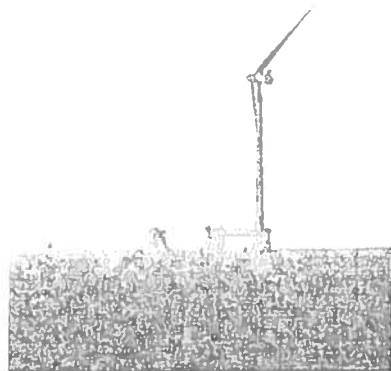


Figure 2 Floating Offshore wind turbine

Floating offshore platforms can extend innovation in renewable energy by simplifying installation reducing costs. This can be done by fitting out the floating platforms in a controlled coastal area before being deployed out to sea. The technology can also utilise additional renewables such as wave power, solar power, and green hydrogen production.



Ireland's offshore platforms could become a significant industry in Ireland with a global market interest.

Ireland has an incredible offshore wind resource. However, this alone is not enough for the industry to grow and prosper. The regulatory environment must be correct, and Engineers Ireland welcomes the recent Maritime Area Planning bill and the commitment by the Government to deliver 5 GW of offshore wind by 2030. However, it is essential to note that Ireland is a fledgling market in terms of offshore, competing globally in terms of talent and supply chain. If developers deem the market too risky or uncertain, they could take their capabilities elsewhere. On the other hand, if the early engagements are positive, it sets up Ireland to progress this industry successfully into the middle of the century, when we could have up to 30GW of installed wind in our jurisdiction.

Call to Action:

- Support innovative solutions in the development of floating offshore wind turbine platforms

5. Preferred option

Regardless of the preferred option, the critical element is the 2030 timeframe. Whichever option is selected, planning, approval and execution processes must be streamlined to ensure companies can deliver the required engineering solutions to reach our goals in time.

The focus for Phase 2 projects should be that they can be delivered by 2030, to meet Government timelines. There are considerable hurdles to achieving this; Option B with the Competitive MAC process should ensure that the best projects are led by entities that can deliver the projects successfully. Engineers Ireland supports the focus on the technical ability of developers being part of the potential pre-qualification process, as we look to train and upskill our members to meet this challenge.

Aside from the delivery focus, the value to the consumer should be paramount. As applied successfully in the Scotswind process in the UK, a cap of the MAC levy fees should be a means to achieve that, while also ensuring deadlines are reached. Active projects from phase one should retain their MACs for Phase Two while being subject to regular audits to ensure a secure route to market within the specified timeframe.

ORESS 2 must facilitate the engineering projects and not become a bottleneck for the projects. Depending on the levels of industrial interest for these projects, ORESS will need to be funded accordingly.

6. Biodiversity

As an island nation, Ireland needs to consider biodiversity in terms of land and sea. Engineers Ireland supports the OREDP II plan and its considerations on maritime activities and marine biodiversity assessment. Biodiversity support must be included in the planning permission for the offshore constructions. When done correctly, this can promote seeding areas with fish and plants and create artificial reefs.

Biodiversity in the sea must be protected in nature reserves like on land, over half of key biodiversity areas are not protected globally. Ireland is obligated to protect 10% of its coastal

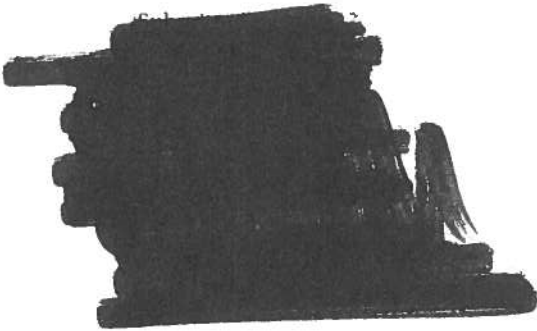
and marine areas, with an increase to 30% by 2030 – currently, it has just 1.32% protected waters. [6]. There is an alarming rise in dead zones in the global seas, where the oxygen levels have reached a level too low to support marine life. If the sea reaches a level, where it cannot support life, the results would be catastrophic globally. It is more difficult to engender public interest in marine biodiversity as people rarely see below the sea’s surface.

The utilisation of offshore energy infrastructure can help create markers and barriers on the surface, creating protected waters. These protected areas would protect fish stock and support coastal biodiversity. Biodiversity support measures can be included in the planning permission for offshore turbines. This can consist of seeding areas with fish and plants and creating artificial reefs.

Call to Action:

- Mandate future offshore power infrastructure developments to include a positive effect on biodiversity, creating protected waters and artificial reefs around offshore turbines

ENDS



References:

- [1] Eirgrid, "All-island Generation Capacity Statement," 2020.
- [2] SEAI, "Energy Use Overview," [Online]. Available: <https://www.seai.ie/data-and-insights/seai-statistics/key-statistics/energy-use-overview/>.
- [3] IWEA, "Building Offshore Wind," 2020.
- [4] Houses of the Oireachtas, "Ireland's energy transition - challenges and opportunities," 2018.
- [5] Eirgrid, "Shaping our Electricity Future," 2021.
- [6] Department of Culture, Heritage and the Gaeltacht, "Ireland 6th National Report to the Convention on Biological Diversity," 2019.

Background to Engineers Ireland

With over 25,000 members from every discipline of engineering, Engineers Ireland is the voice of the engineering profession in Ireland. Engineers Ireland was established in 1835 making us one of the oldest and largest professional bodies in the country. Members come from every discipline of engineering and range from engineering students to fellows of the profession.

Our responsibility is to

- Promote knowledge of engineering
- Establish and maintain standards of professional engineering and engineering education
- Provide opportunities for Continuing Professional Development (CPD)
- Maintain standards of professional ethics and conduct
- Ensure that professional titles are granted to qualified candidates
- Act as the authoritative voice of the engineering profession in Ireland

Our Vision Statement

Engineers Ireland: a community of creative professionals delivering sustainable solutions for society.

Our Mission Statement

Engineers Ireland is an institution that enables the engineering community to progress their professional development and make a sustainable impact on society, advocates for the profession, quality assures education and encourages the future generations of engineers.