

Engineers Ireland Submission on 'Electricity Interconnection Policy – Technical Consultation'

For the attention of the Department of the Environment, Climate and Communications
2 September 2022

1. Introduction

As we move towards our 2030 renewable goals, amidst a global recovery from the pandemic and rising inflation, the public will focus on creating new means of generating green energy in Ireland; however, the creation of energy infrastructure is equally as important. With the increasing demand for energy and the production of energy through wind and solar, the more important aspect of electrical infrastructure will become more apparent. The design of electrical grids has struggled to keep up with the rate of development in renewable energy.

Ireland's electrical infrastructure was initially developed to transmit power from hydro and peat-fired stations. Later additions in the 1950s of oil and gas-fired generation stations to support increasing rural connectivity. This organic expansion resulted in Ireland creating an extensive but low-level network except for a few 400kV lines like that connecting the Greater Dublin Area to Moneypoint in the Shannon Estuary. This leaves Ireland's electrical infrastructure in a precarious position with limited ability to divert power around the country as demand requires.

Ireland's peripheral location at the edge of Europe isolates it from the wider European grid. With the developing situation caused by Brexit, our existing connections with the UK suffer from uncertainties and put our electrical connection to the rest of the EU at risk. Ireland must expand its portfolio of energy sources and interconnectors with a focus on direct links to the EU in the GW range to ensure a robust electrical system will exist in Ireland and our future opportunity as a net exporter of green energy can be achieved.

Key solutions:

- In preparation for uncertainties created by Brexit and the rising cost of living, interconnectors to the continental EU should be counted as critical infrastructure and require full support from the Irish Government
- The Government aims to be a net exporter of green energy; this will require interconnectors to the EU of up to 5 GW by 2050
- The Government should prioritise connections to continental Europe to avoid the UK becoming a bottleneck
- There is limited social acceptance of investment in transmission lines. The Government must take direct ownership of this issue and provide public education on the need for increased electrical infrastructure
- Ireland must recognise the risk associated with only being connected to the UK; we must identify alternative energy connections as critical infrastructure and provide support.
- A fully regulated model is potentially the best model for the construction of new interconnectors as critical infrastructure
- Government must commit to completing existing infrastructure projects and support the public education and planning approval of this infrastructure.

2. To what extent would a commitment by Government on delivery of further interconnection capacity, beyond the proposed Celtic and Greenlink interconnectors, impact achievement of Ireland's 2030 and post-2030 energy objectives?

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 Europe¹, combining two separate jurisdictional electricity markets. However, Ireland currently only has two operational interconnectors, and both connect to the UK mainland through the East-West Interconnector and the Moyle Interconnector. Both are critical infrastructure to Ireland and provide significant energy inertia to Ireland's grid, particularly over the winter. With the uncertainty of Brexit and the rising cost of living, more interconnectors to the continental EU should be counted as critical infrastructure and require full support from the Irish Government. The greater our ability to transfer energy to and from Europe will support an increase in the use of renewable energy systems and enhance the security of our energy supplies towards 2030 and beyond.

Ireland has high ambitions for renewable electricity, with a target of 80% by 2030. Investment in national electrical infrastructure is essential for this ambition. Ireland has a high potential for innovation in energy management, floating offshore wind generation, and green hydrogen production. We have the potential to be a leader in green energy in Europe and become a net exporter of green energy to support the REPowerEU Plan².

Increased connectivity allows the opportunity to export renewable electricity while also providing greater network inertia (which renewable sources alone are generally poor at)-hence the requirement for the Moneypoint's Synchronous Condenser "flywheel" is a critical component of ESB's Green Atlantic@Moneypoint project.

- *In preparation for uncertainties created by Brexit and the rising cost of living, interconnectors to the continental EU should be counted as critical infrastructure and require full support from the Irish Government*

3. In the context of Ireland's increased climate and energy ambition, should Government establish future minimum interconnection targets with the capacity to be delivered by a specific point in time? If so, what should these targets be?

Ireland's target is to have 80% of electrical energy produced from renewable sources by 2030. To achieve this, 5 GW of offshore wind capacity is needed by the end of this decade. We must think in decades, out to 2050 and beyond, monitoring increases in population and demand. Our western seaboard has significant potential as a source of green energy, but we risk creating a suboptimal network due to limited infrastructure if our horizons are limited. With additional gigawatt power sources, long-term planning for the necessary supporting

¹[2019-01-02 ireland-s-energy-transition-challenges-and-opportunities_en.pdf \(oireachtas.ie\)](#)

² [REPowerEU: affordable, secure and sustainable energy for Europe | European Commission \(europa.eu\)](#)

infrastructure is required, along with near-term solutions, such as hybrid interconnectors. The capacity of future interconnectors should correlate with the growth in our overall grid and renewables capacity, which may often exceed our domestic demand and, therefore, will be available for export. The government should plan for interconnectors in the gigawatt range to the continental EU to potentially transmit the 5 GW of renewable energy generated by offshore turbines by 2050.

Specific time and capacity targets will be challenging to predict but must be planned from the viewpoint of contingency; it would be prudent to have additional capacity in our targets to allow for weather conditions such as calm and overcast days that would reduce the output from renewable electrical sources and challenging to predict specific failures within the distribution networks. Hybrid interconnections to existing thermal generators can compensate for this issue. However, hybrid systems like this are better placed on the west coast, connected to larger offshore wind farms; there are fewer opportunities on the East coast to connect to neighbouring countries through interconnectors and wind turbines. Potentially some wind installations in the Irish sea may be feasible.

The installation of more interconnectors to facilitate the exchange of clean electricity generated from offshore wind turbines will entail substantial civil engineering projects; the environmental impact and the effects they will have on marine biology within Irish shores must be carefully considered from conceptual stages considering the extent of the forecasted increased capacity. If planned correctly, this can provide artificial safe areas to support the development of ecosystems.

- *The Government aims to be a net exporter of green energy; this will require interconnectors to the EU of up to 5 GW by 2050*

4. Regarding the location of future interconnection, should priority be given to developing further interconnection with Great Britain or the EU IEM, or both?

Construction of new UK interlinks similar to the existing "East-West" Interconnector (500 MW) and the new Greenlink (under construction) are presumably more cost-effective than longer interconnectors with the continental EU grids via Brittany as proposed for the Celtic Interconnector. Ireland's grid is also highly integrated with the Northern Ireland (NI) grid. The rest of the UK is connected to NI via the Moyle (500 MW) interconnector, and electricity is traded on the Internal Energy Market (IEM). The UK is well connected with the EU with over 4GW interconnection capacity. This sets the UK as a bridge between two separate parts of the EU, connecting Ireland and the continental grid.

If priority is given to UK interconnectors, it limits Ireland's ability to connect to the rest of Europe since the UK transmission system would become a bottleneck. There is also the possibility that the UK, now outside the EU bloc, may seek to re-claim some of its costs by implementing tariffs on electricity and gas between the EU and Ireland³. The discussed changes to the sharing agreements under the single electricity market operator, from Daily Bids (for EU members) to Hourly bids for the UK, may introduce additional instability for effective management of the markets. For this reason, while technically challenging,

³ [The UK has an energy security problem but does not want to admit it | Financial Times \(ft.com\)](https://www.ft.com/content/2019/07/11/uk-energy-security-problem)

interconnectors of a similar level to the UK will be needed to continental Europe and should remain a part of the Government's strategy. Ireland can no longer solely rely on the UK's ability and political will to provide for Ireland's energy shortfall.

France sits at the centre of Europe's energy landscape with abundant nuclear power, providing cheap electricity generation. Ireland could become a significant importer of excess cheap electricity and an exporter of green wind energy when available. The combination of wind and nuclear through an interconnector to France could lower customer costs for electricity⁴. Priority should be given to increasing connections with France to allow this.

- *The Government should prioritise connections to continental Europe to avoid the UK becoming a bottleneck*

5. What are the primary benefits associated with increased interconnector capacity? For instance, would the primary benefit relate to enhanced security of electricity supply or de-risking future renewables development

Interconnectors will allow for better use of surplus electricity generation and will help alleviate problems with daily and seasonal demand peaks in Ireland and the greater EU. As noted above, they will also enhance the security of our energy supplies, ensuring access to higher energy inertia through connections to alternative power generation systems.

In addition, ESB's 1st July 2022 announcement permitting bidirectional energy flows to private installations will encourage private individuals to invest in their renewable installations, increasing Ireland's excess energy potential. However, we should be careful not to make the same mistake as Spain, where grants were not honoured to earlier installations by private individuals with the later introduction of larger international renewables companies. Such local private installations may be well suited to more remote rural areas where the energy losses from the transmission system could be significant. In addition, the future expansion of the electrical energy systems may be impacted by other aspects not currently discussed in the policy, which include:

1. Limitations to natural resources like elemental copper that are required for expansion of the electrical distribution system
2. International human resources for the specialists required for the design and installation of the associated interconnectors and onshore infrastructure
3. Availability of specialist equipment like floating cable laying barges and floating heavy lift cranes for subsea cables and equipment installation.

This increase in renewable installations and domestic infrastructure increases, such as Hybrid grid connections, are essential to accelerate new energy sources to the grid. Hybrid interconnections ensure near-term energy security by facilitating the connection of an existing thermal generation plant and offshore wind projects. If there is insufficient wind available to meet demand, some thermal generation plants can be energised to cover the

⁴ [Second French interconnector could bring down energy costs, says Irish think tank – The Irish Times](#)

shortfall. 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.

Ireland and Europe's increased capacity of low carbon renewable energy generation will be largely dependent on weather patterns across the continent, interconnections will be essential for the exchange of energy when Ireland's generation is high, and demand is low, and equally when generation is low, and demand is high.

6. To what extent will the development of future interconnection between Ireland and Great Britain be impacted by the removal of Great Britain from European Market Coupling?

The UK remains a net importer of electricity from the EU; the UK government will likely try to minimise the dependency on the EU as far as possible. If the UK were to significantly increase its export capacity by adding additional energy sources (perhaps through the significant development funding in fusion and fission technologies seen in recent years). In that case, they would likely seek more favourable tariffs when trading with the EU (including Ireland).

Reports in the UK press show that the UK may impose “Windfall taxes” on energy companies⁵ which have benefited from recent increased international prices since the Russian invasion of Ukraine. Suppose these “Windfall taxes” are viewed by existing companies (which operate in both UK and Ireland) as reducing their expected profits. In that case, they may reduce their planned investment or allocation of resources for future projects and divert their attention to other European or Global countries in a highly competitive market. Ireland must be prepared for this through interconnectors to Europe so decisions in Westminster do not adversely affect Ireland.

7. To what extent will clarity over the future energy relationship between the EU and UK be necessary in order to provide for future interconnection between Ireland and Great Britain?

The UK is well connected with the EU, with over 4GW interconnection capacity at present. Future energy relationships between the EU and UK must be carefully considered before planning for future interconnection between Ireland and the UK. The EU wants to achieve a target of 15% interconnection between member countries by 2030⁶. With the UK outside the bloc, the EU and Ireland will require an increase in interconnector capability to the continental EU to achieve this target. More interconnectors will provide a more diverse source of electricity generation, which means more competition in the market and potentially cheaper electricity for consumers. The extent of future connections with the UK will likely continue at a similar level to now, but Ireland will require alternative links to prevent the UK from becoming a bottleneck for Ireland's interconnectivity.

⁵ [What is a windfall tax and will it be extended to UK energy providers? | Energy industry | The Guardian](#)

⁶ [Electricity interconnection targets \(europa.eu\)](#)

To an extent, the level of interconnection is driven by individual EU member states as much as by the European Parliament. Ireland must recognise the risk associated with only being connected to the UK and denote alternative energy connections as critical infrastructure. This will likely result in additional overhead lines or underground alternatives when the cables make landfall. Public opinion can be a significant hurdle when proposing additional infrastructure like this. Public education on the need for this infrastructure and combating false information is vital to the success of providing new infrastructure.

- *Ireland must recognise the risk associated with only being connected to the UK, identify alternative energy connections as critical infrastructure, and provide support.*

8. Are the technical criteria employed by the CRU in assessing interconnector development applications appropriate?

The Commission for Regulation of Utilities (CRU) will require technical knowledge to assess aspects like specialist equipment, floating cable laying barges and floating heavy lift cranes that form part of the Interconnection proposals and must consider the environmental impact of these technologies.

One of the most significant challenges will be in the planning process. Public opinion can be a significant hurdle when proposing electrical infrastructure projects. Public education on the need for this infrastructure and combating false information is vital to the success of providing new infrastructure. Government must take direct ownership of this issue as it is a political and not a technical issue.

9. What of the above three regulatory models offers the most viable route for the development of future interconnection between Ireland and neighbouring countries?

Inter-connectors should only be privately financed if they can be expected to bring revenue into the country (i.e. by exporting significant amounts of electricity). This would require a substantial increase in Ireland's wind energy production and transmission infrastructure to become a viable option. If the primary purpose is to import energy, they become items of critical infrastructure and must be owned and operated by the Government. Ultimately, consumers will pay for any infrastructure upgrades (be it through taxation or higher energy bills). The fully regulated model is potentially the most relevant regulatory model, through a private company partially owned by the State to attract State finance from the country at the opposite end of the interconnector (UK, France, Spain etc.)

- *A fully regulated model is potentially the best model for the construction of new interconnectors as critical infrastructure*

10. Existing infrastructure

Ireland's energy sources must expand to meet our future demand, Ireland used 5.65 GW of peak energy in 2021, 20% higher than in 2014, and this demand will continue to increase. Optimising and completing existing infrastructure projects is essential, alongside committing to new projects. Additional international electrical interconnectors will not be fully utilised if the domestic grid is insufficient. High voltage projects, such as the 400 kV Kildare-Meath Grid Upgrade, the North-South (400 kV) Interconnector, and the cross Shannon cable project, are undoubtedly some of the most important infrastructure schemes on the island today.

The North-South interconnector is a prime example of the political challenges faced by these infrastructure projects. The interconnector was first proposed in 2013 with planning permission first submitted in 2016. The project was delayed because of public objections, often fuelled by misinformation and opportunistic political campaigning, and subject to judicial review. It now has an anticipated completion date of 2025⁷. Taking 12 years to deliver an essential element of national infrastructure process shows the political challenges in developing infrastructure in Ireland. Government must commit to completing existing infrastructure projects and support campaigns to educate and inform the public on the need for essential infrastructure and reassure them as to its safety.

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Special thanks to all members who provided input on this topic

⁷ [The Project \(eirgridgroup.com\)](http://TheProject(eirgridgroup.com))

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.