Energy for generations

Electricity Interconnection Policy Consultation

2 September 2022

ESB Generation and Trading

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1. EXECUTIVE SUMMARY

- New interconnectors should be subject to rigorous analysis, not just on the basis of a stand-alone project, but against alternative technologies that could achieve a similar result.
- Targets for the level of interconnection between Ireland and its neighbours should not be set without a holistic, inclusive and rigorous analysis of both the electrical system and the wider energy system.
- Priority should not be given any one jurisdiction for additional interconnection.
- There are a variety of theoretical benefits associated with increased interconnector capacity which would be limited by different structural characteristics of the adjoining jurisdictions. There are however some of the negative aspects of interconnectors.
- Interconnectors are not a panacea for security of supply.
- The legislative framework is adequate except possibly in the case of hybrid interconnectors.
- Broadly speaking the interconnectors are working efficiently since Brexit.
- The build out of interconnectors will be determined by how and if GB moves to locational marginal pricing.
- There is no "right" regulatory model for interconnectors and the model chosen should be one the best suited to the task that interconnector has to perform.
- Dual purpose hybrid interconnectors, if properly developed could help avoid the under-utilisation of interconnector capacity, achieve some economies of scale, and limit the overall environmental impact of offshore wind and interconnectors.
- Hybrid interconnectors may put some pressure on the legislative framework, but this all depends on what operating model is selected.

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2. INTRODUCTION

ESB Generation and Trading (ESB GT) welcomes the opportunity provided by DECC to respond to this important Electricity Interconnection Policy Consultation.

Electrical interconnectors are growing part of an integrated energy system and they provide some useful functions. This consultation is part of a wider set of industry consultations including those on renewables supports, marine planning, grid development and hydrogen. Hence, we believe that interconnectors, and indeed any other part of Ireland's energy infrastructure, should only be assessed in a holistic manner which delivers de-carbonisation, minimises costs to the final consumer, and ensures security of supply.

3. ISSUES FOR CONSULTATION

3.1 Ireland's increased energy ambition

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?

Further interconnection will likely have a role in the electricity system post 2030. Like all investments that will be underwritten by the consumer, new interconnectors should be subject to rigorous analysis, not just on the basis of a stand-alone project, but against alternative technologies that could achieve a similar result.

The die is essentially cast in respect of interconnectors impacting on the 2030 energy objectives. Greenlink and Celtic will be in operation in this decade. It is probably better to consider how the build-out of onshore and offshore transmission infrastructure will impact on the 2030 energy objectives. EirGrid's "Shaping Our Electricity Future" lacks ambition in respect of building sufficient onshore transmission infrastructure to facilitate the achievement of the Government's carbon targets. The connection of onshore wind over the coming years will play an important role in helping to adhere to the carbon budgets. The delivery of offshore wind will be vital to meeting the 2030 targets but cannot deliver the interim carbon reductions required to meet onshore wind targets. It is understood that this deficit may well be addressed in the next version of EirGrid's document.

In respect of targets in the following decade, the role of additional interconnectors, and indeed any other technology being considered for deployment, should only be analysed through the lens of whole system thinking. This issue is considered further under Question 1.2.

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

It is premature to be setting targets for interconnection. Targets for the level of interconnection between Ireland and its neighbours should not be set without a holistic, inclusive and rigorous analysis of both the electrical system and the wider energy system. Only by carrying out such an analysis can the inputs of all stakeholders be considered. Issues such as security of supply, the level of generation that needs to be physically located on the island of Ireland, the quantity of zero carbon fuels stored in Ireland, political risk factors, and the role of exporting renewables need to be taken into consideration. Once completed the analysis should guide the selection of appropriate levels of interconnection for 2040 and 2050.

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

The review recommended in the question above should take this topic into consideration with both Great Britain and the EU IEM as very likely candidates. An ideal candidate jurisdiction for the end point of one's interconnector would have a larger electrical system, a significantly different mixture of generation technologies, a high degree of non-correlated weather, a different time for peak demand, a robust and efficient energy market, and political and regulatory stability. Great Britain and the EU IEM fulfil several of these requirements. From a risk point of view, most of one's interconnector capacity should not be just with one jurisdiction and limited diversity does not support greater growth in interconnector numbers.

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?

Theoretical benefits associated with increased interconnector capacity (but would be limited by different structural characteristics of the adjoining jurisdictions) include:

a) Capacity, particularly if the capacity in neighbouring countries is quite different from that in your home country

b) Markets can maintain high levels of generation from intermittent renewables rather than curtailing generation when it is not required to meet domestic demand and increased flexibility, including interconnection, will be important to help integrate renewable energy

c) A decrease in emissions - meeting carbon emission targets for the power sector will be increasingly influenced by interconnector activity.

d) Security of supply, in certain cases

e) Interconnectors can cause electricity market prices either to fall (if importing and facilitating the use of cheaper generation from another market) or rise (if exporting and facilitating increasingly expensive generation to run within your own market)

Some of the negative aspects of interconnectors include:

a) Additional system services and inertia required in home country as interconnection generally displaces domestic thermal generation, which provides important benefits for managing system stability

b) Security of supply benefit is worth less to the importing market the larger that market: larger markets are more likely to have a diversity and scale of domestic generation resources to manage risks at home

c) Interconnectors may require additional upgrades within the existing transmission systems to accommodate changes in physical system flows.

d) Losses

e) Absence of back-up generation in home country due to being economically displaced by the interconnector

Even if there are price differences during a stress event, interconnector flows have not always historically acted rationally in response to price triggers, and they could potentially reduce security of supply if they displace domestic generation because they are less reliable. There is a common misconception that further interconnection would in all circumstances help security of supply, particularly during periods of sustained absence of wind in Northern Europe. Interconnectors do provide some help, but two factors need to be considered. If your neighbours are suffering from the same supply problems such as negligible renewable generation due to weather conditions, they may not be able to help you. Secondly, extra interconnectors do not provide a proportional increase in security of supply. The law of diminishing returns applies. It is a bit like installing more pipelines. The new pipelines do not in themselves conjure up more stuff to flow in them when you need it. As more and more countries de-carbonise their electricity systems, they will have less and less back-up (hopefully zero-carbon) thermal generation available. This poses an obvious question: is a 500 MW generating asset located in Ireland of better value to the Irish consumer from a security of supply point of view rather than an additional 500 MW interconnector, considering that each of these options would cost roughly the same and it be a cost incurred by the domestic customer?

3.2 National Legislation

Is the existing legislative framework contained in the 1999 Act appropriate to secure future development of interconnector capacity?

As EWIC has already been built and Greenlink and Celtic will be in operation in due course, it could be said that the legislative framework is adequate.

What amendments, if any, do you consider necessary to the 1999 Act?

None, except possibly in the case of hybrid interconnectors.

3.3 Brexit and future EU-UK Interconnection

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?

Broadly speaking the interconnectors are working efficiently since Brexit. Any interconnector will trade in the intra-day market until we return to Euphemia via the Multi Region Loose Volume Coupling mechanism that is still in negotiation between the EU and GB. This will allow arbitrage which works well to occur as today.

There may be issues if there is nodal pricing in GB. If this was to occur the location where an interconnector makes landfall will become important This question has yet to be debated.

The lack of joint order books on the two GB ex-ante markets could dilute / reduce the market revenue (congestion rent) available to the interconnectors. However, as these interconnectors are now typically funded via a Cap and Floor mechanism in GB, it may result in a greater top up via the Cap and Floor mechanism rather than relying on congestion rent.

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 build out of interconnectors will be determined by how and if GB moves to locational marginal pricing (LMP). One of the stated benefits of LMP is that it will send the correct signals to interconnectors to flow electricity as market needs. LMP should also sharpen the signals as to where to best site new interconnection.

The value may be eroded which may affect the investment case for a long-life interconnector asset as it may become a point-to-point trade. Restricting incomes and increasing exposures to smaller granular conditions can increase risks and thus costs. At present Interconnectors support a system wide requirement against a system wide price.

Interconnector investments can continue between governments and the reward model based on a RAB or Cap and Floor mechanism can continue, but the costs to consumers must also be taken into consideration, as must the share of the support any one jurisdiction is providing against any risk that the conditions change and the value is extracted by a different one to that paying.

3.4 The Role of the CRU

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

Like all investments that will be underwritten by the consumer, new interconnectors should be subject to rigorous analysis not just on the basis of a stand-alone project but against alternative technologies that could achieve a similar result.

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

The fully regulated model comes with full regulatory oversight and the absence of excessive rents and has traditionally been used for TSO-to-TSO interconnectors.

The merchant approach perhaps suits situations where the fully regulated model cannot be adopted. Risk is taken by the developer of the interconnector, and this can lead to a higher cost of capital.

Cap and floor is seen by many as providing a balance between the other two models. The customer is still liable when revenues are below the floor, but they do benefit when the revenues are above the cap. A higher floor on returns means lower risks for the developer which in turn should mean that consumers are entitled to capture more of the upside benefits via a lower cap to the revenues that the developer can keep.

So perhaps the there is no "right" model and the model chosen should be the one best suited to the task that interconnector has to perform.

3.5 Hybrid Interconnection

To what extent can dual purpose hybrid interconnectors contribute to Ireland's post 2030 climate and energy objectives?

Offshore wind farms are currently located relatively close to the coast. However, it is likely that newer offshore wind farms could well be located farther away from the coast. The long and expensive connection would remain unused if there is no wind. Combining such an offshore wind connection with an interconnector may well have some benefits. If the offshore wind park is also connected to another market, the cables can be fully used to exchange electricity between the two markets. Hence the overall cost of connecting offshore wind could well be reduced, an important cost factor in offshore wind energy, if the costs of the network are shared across different jurisdictions.

Dual purpose hybrid interconnectors, if properly developed could help avoid the under-utilisation of interconnector capacity, achieve some economies of scale, and limit the overall environmental impact of offshore wind and interconnectors.

Existing 'point to point' interconnectors run directly from one location in one country to another, while individual wind farms have to connect one-by-one to the shore. A multi-purpose interconnector (MPI) will let clusters of wind farms connect directly with the interconnector itself, acting as a green energy hub. Hybrid interconnectors can be the building blocks of meshed offshore grids, but clear policy, regulation and market signals are needed.

A dual-purpose hybrid interconnector (DHI) lends itself to cross-border projects and, therefore, it could be appropriate to develop interconnection with both the UK and the EU IEM. This is especially true given the probable location of significant offshore wind capacity off the South-East coast of Ireland. It will be important to ensure compatibility with the regimes of neighbouring countries – both within the EU and outside and it makes sense for the UK to continue with market arrangements that are compatible with those of the EU.

There are significant environmental benefits to a reduction in the amount of cable manufactured and laid along the seabed. With the proliferation of offshore wind farms, it is desirable to try to limit the impact to coastal ecosystems and biodiversity. Therefore, a co-ordinated approach, combining and rationalising transmission assets and connections, will be important to minimise the impact of such large-scale development.

What is the appropriate policy and regulatory framework to provide for development and operation of dual-purpose hybrid interconnectors?

The policy and regulatory frameworks need to address the following:

- The treatment of the windfarm and the interconnector.
- In which bidding zone will the offshore wind farm operate, wind farm dispatches to both markets, to one market only, or is the wind farm in its own bidding zone?
- Does the offshore wind farm get preferential access, and in which direction?
- What is the status of the addition capacity on the interconnector?
- How does one deal with renewables support schemes, possibly in more than one jurisdiction?

It would be sensible to develop policy and regulatory frameworks in a coherent and holistic manner and to avoid any piecemeal development thereby allowing a consistent approach to meshed offshore grids whenever they materialise.

In terms of Asset Classification, the cable capacity and offshore wind farm load factor can be used to assess whether the DHI should be classified as an interconnector or not. To the extent that the cable is sized to match the capacity of the offshore wind farm, and the average load factor is below 50%, there is an argument that interconnection is the primary use of the DHI asset, as the average capacity available for cross-border trade would exceed 50%. To the extent that the classification of an asset changes from the activity for which the licence was granted, each instance should be considered on a case-by-case basis, to avoid penalising early adopters while still applying the appropriate licencing regime

In terms of Market Design, further clarity on the market arrangements applicable to DHIs is needed. Two possible solutions have been considered:

I) The Home Model (HM) - here the offshore wind farm is considered part of its home market and generation is priced on the same basis as electricity in its home bidding zone; and

II) The Offshore Bidding Zone Model (OBZM) - here a separate bidding zone is introduced for the offshore wind farm(s) and the electricity price is set at the level of the connected zone where transmission capacity is available. The offshore windfarm would receive the same price as the zone exporting electricity to the home market, if the home market is importing, rather than the price in the home market. This is different to the Home Market model where the offshore wind farm receives the higher home market price.

The advantages of the OBZM have been considered by the European Commission and ENTSO-E, particularly in addressing compatibility with EU electricity trading rules and the 70% capacity requirement, as capacity sent to either connected market would be considered as cross-zonal capacity. Whilst the development of an OZBM may have advantages, there are concerns as to offshore wind revenues, how quickly the regime could be readied for DHIs, and if there are any new procedures that require development.

Both the HM and OBZM can co-exist and should not be seen as mutually exclusive, however, it should be recognised that compatibility is essential. In the UK, BEIS has confirmed its commitment to the Trade and Co-operation Agreement which governs cross-border electricity trading between the EU and UK. The EU Commission, BEIS, relevant regulatory bodies and industry participants should co-operate closely to explore mutually beneficial solutions in this area.

What if any amendments to national legislation may be necessary to provide for the above? Should hybrid interconnectors be considered as new electricity market infrastructure, separate from conventional point to point interconnectors?

However, the advent of hybrid interconnectors may put some pressure on the legislative framework, but this all depends on what operating model is selected.

There is some uncertainty regarding how a DHI would be classified under the current regime. In GB, Ofgem discusses two approaches:

I) An Offshore Transmission Owner (OFTO)-led model, which combines a radial connection between the UK grid and an offshore wind farm, with a further connection between that offshore wind farm and the grid or offshore wind farm of a nearby country; and

II) An Interconnector-led model, in which a point-to-point cross border interconnector also includes a direct connection to an offshore wind farm (which can use that connection to access both markets).

The Licencing Regime for DHIs needs to be considered. The standard interconnector and OFTO licence conditions are not suitable for DHIs in their current form and require modifications to address a number of matters, including priority access, payment arrangements, flexibility, outage planning, and revenue.

Ofgem outlines some guidance regarding asset classification, which suggests using the cable capacity and offshore wind farm load factor to assess whether the MPIDHI should be classified

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as an interconnector or not. To the extent that the cable is sized to match the capacity of the offshore wind farm and the average load factor is below 50%, Ofgem suggests that there is a strong argument that interconnection is the primary use of the MPIDHI asset, as the average capacity available for cross-border trade would exceed 50%. To the extent that the classification of an asset changes from the activity for which the licence was granted, Ofgem will consider each occurrence on a case-by-case basis – to avoid penalising early adopters whilst upholding duties to enforce the licencing regime

What are the principal barriers in existing EU electricity market rules, most notably the Electricity Market Directive and Electricity Market Regulation, to development and operation of hybrid interconnectors?

EC unbundling restrictions will need to be addressed.

At the EU level, there is no specific legal or regulatory framework addressing the development of DHIs. However, both the European Commission and the European Network of Transmission System Operators for Electricity (ENTSO-E) have highlighted those dual-purpose projects, such as transmission of power from offshore wind and cross-border interconnectors, can facilitate the evolution of offshore transmission infrastructure. They are also an essential first step towards the eventual construction of more complex 'meshed' grid structures, which could allow clusters of offshore wind farms to be connected to offshore hubs that connect to each other and then to various onshore terminals.

The ownership of DHIs also needs to be addressed. Both within the EU and the UK, ownership unbundling requirements operate to prevent ownership or control of connected transmission and generation assets by the same entities. As such, within the current regime, the offshore wind farm component of the DHI could not be owned or controlled by the same entity as the interconnector/OFTO component, and each would be required to hold its own licence.