ASSESSMENT CRITERIA FOR ELECTRICITY INTERCONNECTION APPLICATIONS

Consultation CRU/18/131
Introduction

SSE welcomes the opportunity to respond to CRU’s proposed criteria for assessment of interconnector applications (CRU/18/131). Given the large level of renewable generation installed and being proposed for Ireland, we welcome the CRU’s consideration of the assessment criteria for interconnectors.

We note that this consultation is published alongside other documents relating to interconnection policy and approach. Namely, a consultation on Greenlink’s CBA application and the recently published government policy on interconnection1. Furthermore, this consultation is set against the macro-environment of higher EU renewables targets (clean energy package)2, the recent government announcement on the new Renewable Energy Support Scheme (RESS), Brexit3, gas scenario and ramping up of DS3 revenues. Finally, we also note the expectation that Celtic’s interconnector application will also be forthcoming shortly.

In developing our analysis, we have considered the PESTLE analysis mechanism and based our response around the key parameters. A PESTLE analysis consists of an assessment of the macro-environment of a project. As part of this, we comment on some of the primary aspects that the CRU should consider in its assessment.

As an island on the periphery of Europe, the impetus for interconnection may be greater in Ireland to allow us to access other EU energy markets. However, interconnectors must also be understood in the context of what they deliver, which is transmission infrastructure that connects two markets. This is distinct from installed generation, which facilitates Ireland in terms of ensuring domestic security of supply. Being a small market and at the end of Europe, Ireland could become a captive market with limited opportunity to compete equally, given the specific limits to the Irish system, (which remain unresolved).

Executive summary

We would like to take this opportunity to outline some considerations for CRU to reflect on, in relation to the proposed assessment criteria for future interconnectors. Our response outlines these, using a PESTLE approach:

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By assessing each of the factors above, the CRU can ensure that a robust and holistic CBA will be conducted, which will ensure that all aspects which will impact the feasibility of further interconnection,

1 https://www.cru.ie/document_group/greenlink-electricity-interconnector/
are robustly tested. Our central view is that the medium-term aspiration should be domestic system optimisation (including existing interconnection), to provide a suitable balance between external connectivity and all-island generation sustainability, to meet a variety of future scenarios.

**SSE response**

In CRU’s consultation, their public impact statement refers to three key potential benefits from interconnection, namely:

- security of supply,
- renewable energy integration and,
- lower prices.

We also note that CRU’s proposed assessment criteria are based on ENTSO-e’s planned revised version of CBA guidelines, as below.

![Diagram of Project Assessment](source: ENTSO-E)

We use headings from both parts of the consultation, to structure our response to this consultation. We have therefore provided comments under the following headings:

- Renewable energy (RES) integration
- Market issues
- Security of supply
- Proposed assessment criteria

**Renewable energy (RES) integration**

CRU’s (and other’s) policy papers on interconnection, assumes that interconnection will facilitate higher levels of intermittent renewable generation on the system. This in turn may facilitate further levels of renewable integration in Ireland. Theoretically, this is the benefit of interconnection. However, this view is simplistic when taking into consideration the network capabilities of the Irish electricity system.

SSE is of the view that network and locational issues should be resolved in the medium term, to facilitate existing (and new) renewables generation, before new interconnection is considered. This is because, the business case of new interconnectors is handicapped at the outset, because of system issues. Essentially, interconnectors cannot realise their full potential benefits, due to the fact that the system is currently not capable of facilitating the levels of renewables associated with the CBA, for new
interconnectors. If these system issues were resolved, this could significantly change the investment case for new interconnectors. Furthermore, new interconnection should not itself be seen as a single solution to ensure greater renewables penetration, or to address inherent locational and network issues that limit renewables penetration at the moment. Rather, network issues and locational constraints require to be resolved anyway, for a host of related reasons.

Finally, persistent system constraints guarantee that future interconnection will be constrained to some level at the outset, and this will affect the projected revenues for the project. With an interconnector constrained, customers (and domestic generation), will be paying the full MEC cost per MW installed capacity, despite the fact that full MW deliverability will unlikely be realised. We do not think that this is a reasonable cost for customers to bear, nor that it will bring benefits in excess of the costs. This money could be reasonably spent on network upgrades/re-sizing of the network to ensure optimised renewables integration on the domestic system in the first instance, before considering future interconnection in the longer term.

Network issues

The Irish network is not fit for purpose and is lacking the infrastructure to meet the rapid pace of renewable penetration. Leaving aside the question of what capacity is required to meet security of supply, the current network cannot meet the high levels of intermittent generation, although it should be noted that inroads are being made through the DS3 programme. For instance, Galway Wind Park, with an installed capacity of 169 MW was, upon completion, immediately constrained. This indicates the requirement for reinforcements to facilitate renewable generation.

We appreciate that the function of the TSO is to balance generation flows across the country. However, we consider that the inadequacy of the network infrastructure increases the focus of this function, and provides the impression that the only resolution is to move the excess, often intermittent generation to another jurisdiction, via interconnection. We acknowledge that there is a concerted focus in parallel, on delivering specific investment projects to improve the overall network infrastructure and renewables integration, however these should be largely delivered, and benefits being realised in terms of greater system optimisation, ahead of new interconnection.

Increase in demand

Excess intermittent generation is the current situation driving an impetus for interconnection, but this may not always be assured, (given for instance, the design of the CRM and focus on efficient generation). There is a significant increase in demand (data centres) anticipated, “as much as 36% by 2030”, up from “less than 2% of Ireland’s (current) total electricity demand”. Demand from data centres is anticipated to “account for over 75% of new demand growth”.

We note that CRU acknowledges that Greenlink’s projected benefits only begin to be realised by the time of these demand forecasts (if it is built and operational to plan). Data centres have a relatively short build time, whereas interconnectors have a significantly longer lead time. This suggests that the increased demand will arise well before the delivery of interconnectors. In contrast, new build peaker plants or even CCGTs (as the proposed Best New Entrant (BNE) in the CRM T-4 auctions), have a lead time that ensures that they can deliver the necessary generation, as demand increases. Therefore, we are of the view that the focus of the TSO should be on network reinforcement (e.g. resolving network

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4 For example, EirGrid’s Future Energy Scenarios under a “steady evolution” forecasts 5,200 MW of installed renewable generation by 2030
5 https://issuu.com/designtactics/docs/eirgrid_-_ireland_s_grid_development?e=1919908/43298204
http://www.eirgridgroup.com/how-the-grid-works/ridp/
6 Tomorrow’s Energy Scenarios, published by EirGrid
7 Tomorrow’s Energy Scenarios, published by EirGrid
constraints), which will facilitate current and future generation on the island and complement those demand signals provided by the capacity market, (i.e. via the BNE). This would ensure that the short to medium term demand increases are met with equal increases in supply. It is imperative that interconnection, whilst it has its benefits, does not cannibalise the investment climate for much needed new generation to replace the plant closures expected in the next number of years.

Furthermore, it is unclear what actual final capacity requirements\(^8\) will really be in the future, with or without resolved network constraints. Therefore, there is a question is to whether new and existing generation will produce a sufficient surplus (above anticipated plant closures and increase in demand), to make it likely that there will be regular scenarios of excess capacity to be exported; (i.e. the scenario where the interconnector can make money for the Irish system, by exporting domestic generation, and allowing additional generation to bid into the market). In a small market, such as Ireland’s, it is important that interconnectors do not provide a signal to exit (or enter) to new generators on the island.

We would consider that these factors signal the need for network reinforcements as the primary investment requirement ahead of additional costs to consumers, of additional interconnection. The added benefit of improved network infrastructure to transport generation to where it is needed, could be preparing the system for increased renewables, (given the new RESS announcement), and realising renewables’ ability to meet increased targets under the Clean Energy Package. Thereby, improving RES integration, outside the significant investment for new interconnection.

**Location issues**

As we have suggested, transmission network reinforcement is the first line in ensuring RES and market integration at optimal levels, and therefore should be the initial point to addressing higher levels of renewable generation on the network. As an aside, both Greenlink and Celtic, as the two potential interconnectors to the Irish system, are both intended to sit in the South East of Ireland. As per transmission development plans, there are significant network issues that currently prevent generation from getting to location constrained areas, i.e. Greater Dublin and Northern Ireland.

We intuitively consider that both interconnectors siting in a proximate location to each other, will have an impact in potentially creating an area of locational constraint, given the size of these assets, the capacity of the existing transmission infrastructure, and the generation assets already located within this region\(^9\). We note that there does not appear to have been any mention of this, in the limited CBA published by Greenlink, where we understand, the scenarios included both Celtic and Greenlink operating in Ireland. Locational constraints should be resolved in Dublin and Northern Ireland (particularly given the forecast increases in demand volumes), to get the generation to where it needs to be, rather than signalling that it should be maximised as exports, in the South East.

Furthermore, TSO’s guidelines to maintain system integrity and security\(^10\), have resulted in EWIC and Moyle being de-rated, which limits import volumes\(^11\). It is therefore unclear how any additional interconnection would be able operate at more favourable import volumes and be able to export excess capacity with greater success, than the existing interconnection on the island. Therefore, the investment case for new interconnection becomes unrealistic, if it is does not consider these likelihods. In fact, it seems likely that the level of network constraint (65%), may increase in line with the increase in

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\(^10\) “To ensure the secure, stable operation of the power system, it is necessary (for Eirgrid) to limit the level of nonsynchronous generation of the system to 65%. The System Non-Synchronous Penetration (SNSP) is a measure of the non-synchronous generation on the system at an instant in time i.e. the nonsynchronous generation and net interconnector imports as a percentage of the demand and net interconnector exports (where “Demand” includes pump storage consumption when in pumping mode).”

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interconnection added to the system, which would have an impact on the intended benefits of interconnection, in terms of security of supply.

**Market issues**

**Participating in the CRM**

Interconnectors are defined as being able to bid into the capacity market (CRM), under the I-SEM model. The transitional approach to dealing with this is not ideal, as it excludes interconnectors from some of the performance requirements another capacity provider would have to face. An interconnector is a transmission asset rather than a capacity provider and will rely on surplus system margin from generation or demand response, to cover its contribution to any Reliability Standard.

A large transmission asset bidding into the capacity market, with limited exposure to underlying wholesale markets or specific penalties that incentivise performance, could create distortions that could undermine the achievement of the all-island Reliability Standard. In operation, if prices in other jurisdictions are sufficiently favourable, the interconnector will flow during periods of system stress in Ireland, even if that exacerbates the shortfall within the all-island zone. Moving to the enduring hybrid approach (where cross border capacity is required to back and perform against the Reliability Standard), should be a SEM Committee priority, to facilitate interconnectors and an assumption for the assessment of future interconnector projects.

Finally, with reference to the recent SEMC consultations relating to CRM parameters (SEM-18-028), Moyle and EWIC are proposed to have their de-rating factors adjusted, to reduce the impact of scarcity in GB, on the Irish system. This is still suboptimal, as if interconnectors were forced to back their contribution to the I-SEM Reliability Standard to manage the real exposure to penalties other providers face, they would be required to hedge this with a true capacity provider or de-rate their contribution further. Under the current energy, capacity and services arrangements, the real costs of additional non-synchronous penetration created by future interconnection aren’t being fully captured. Without these being addressed, the rationale for additional interconnection is unclear.

**Impact to the BNE**

In May 2018, the SEMC outlined its proposal for a change in reference technology for the BNE\(^{12}\), to a CCGT gas-fired plant. The investment signal of a new CCGT being built, is presumably predicated on an anticipated need for this thermal generation, (given wind intermittency and planned closures of certain plant). The BNE, coupled with the minimum and ceiling indicators in the market (i.e. the ECPC and APC), provides an indication as to the likely investment case for entering the market as a new generator.

However, large transmission assets like interconnectors could displace the CCGT, thereby adding additional risk to both energy and capacity revenue. We recommend that a holistic approach reflecting on the balance of market, locational and network signals needs to be applied to Ireland, in the first instance. Currently, the variance of these signals against the drive for new interconnection, do not present a consistent or certain picture for any would-be investor, in new generation. We consider that there is a need for this new generation, given the anticipated factors relating to demand and plant closures, over and above new interconnection, if it risks this new generation being built.

**Affects to prices**

Interconnectors effectively remove transmission constraints between connected bidding zones, leading to price harmonisation between the coupled markets. However, in reality, price harmonisation is unlikely

to be achieved as interconnector revenue is achieved predominantly from partially, but not fully, relieving restrictions on flows between zones. Fully resolving the constraint, removes any interconnector income from the locational spreads between market and undermines the original investment case. There is an ‘optimum’ level of interconnection that varies between zones, that will be determined by the capex required for the infrastructure versus the value available from the constraint. In addition, the infrastructure itself is exposed to the effectiveness of coupling between the markets – decoupling whether through technological limitations (EUPHEMIA scalability) or regulatory limitations (Brexit), will reduce the congestion rent available for capture.

We agree that the risks of Brexit could signal the need to have additional interconnection, should there be a resulting market decoupling. However, Celtic would not be ready in time for this eventuality, and Greenlink is not providing this security, (given it is connecting to GB).

Security of Supply

Policy

There is a balance to be struck, between striving for sustainable levels of market sufficiency (particularly given current risks around Brexit), and external interconnection for diversity of supply, (given the size of our market, EU aspirations for market cohesion, and the fact that Ireland will likely continue to have economic links with GB post-Brexit, which may have its own impact on the system).

There is an assumption that more and more interconnection is necessary for security of supply, without end. Security of supply policy should not only consider outward and external measures to ensure that the lights remain on. Measures at a domestic level, through system design, market function and additional services, serve to provide a sustainable market and reduce dependence on imports. External measures for security of supply, remain outside the complete and autonomous control of domestic decision-makers and market operators. There is a tipping point beyond which, external measures for security of supply, will surpass balancing domestic measures, and will expose the Irish market without much recourse by domestic agencies. Being small and remote, this could result in a captive market and increased dependence on imports, to the detriment of domestic generation.

The drive for increased electricity interconnection now, is to meet the aspirations of a single energy market across the EU. The original target for this was 10% interconnection, as a percentage of installed capacity, by 2020\(^\text{13}\). The revised non-binding target, as of 2017 is 15%\(^\text{14}\), out to 2030. The current nameplate capacity of existing interconnectors, is 950MW. Total capacity requirements under the CRM is 7,800MW. Therefore, our current levels of interconnection, if completely optimised, lies at c.12%\(^\text{15}\). We would conclude that we are almost meeting our EU targets without the need for additional interconnection. In fact, with optimised existing interconnection, we could have been exceeding the 2014 target of 10%, long before it was revised in 2017\(^\text{16}\). The public interest for new interconnection, we think is undermined by this fact, and implies a need to resolve issues to existing interconnection, in the first instance.

Gas twinning-security of supply

An original aim for external security of supply measures, was to ensure the continued flows of gas, given that Ireland is dependent on the gas interconnectors for gas supplies, in the longer term.

\(^{15}\) This does not take account of the effects of Brexit on the proportion of interconnection that would be attributed to our total interconnection target, as an EU member state.
\(^{16}\) [https://ec.europa.eu/energy/en/topics/infrastructure/projects-common-interest/electricity-interconnection-targets]
To reinforce security of gas supplies, the CRU approved Gas Networks Ireland’s proposal to twin the remaining onshore section of the interconnectors in South West Scotland; known as South West Scotland Onshore System (SWSOS). This project is on track and due for completion in 2018\(^\text{17}\). The twinning project must be seen in the context of IC2\(^\text{18}\), which is largely used for security of supply purposes. All energy customers must pay for such security of supply, and the cost of the twinning project alone is c. €100m.

This project is intended to ensure security of gas flows to meet gas demand requirements in the longer term. The largest consumption of gas on the island is to fuel electricity generation, such as with the intended new BNE; a gas-fired CCGT. Gas fired generation is the dominant form of generation in the market in terms of price setting. Therefore, the SWSOS project will supply continued significant thermal generation, given the likely continued dominance of gas-fired generation in the future. However, should electricity interconnection be brought onto the system in the South East, displacing the new BNE CCGT, this sends a market signal against investment in new thermal generation. This in turn reduces the requirement for such security of supply measures. However, as these costs are now sunk capex costs, customers will continue to pay for these, regardless. This indicates that from the perspective of the energy regulator, it is imperative that security of supply (and its associated costs), are not only seen through the lens of electricity, but rather from a total energy customer cost, as this is a more accurate reflection in terms of a robust CBA.

**Domestic security of supply**

We consider that the CRU should take a holistic approach with regard to security of supply. There is a tipping point where external security of supply can lead to market exposure, given the proliferation of interconnectors across various jurisdictions. This is because, unlike the mainland of Europe, Ireland is a small, remote market and is not subject to the same permeable physical borders and subsequent cost and benefit sharing across various countries, except with Northern Ireland, which is already realised through the Single Electricity Market (SEM).

In addition, there are certain domestic market features that provide a significant amount of security of supply, that should not be undermined by a drive for increased interconnection, especially where it has been demonstrated that we may already broadly align with EU targets for interconnection. Specifically, the new Capacity Remuneration Market is designed to ensure security of electricity supply, by ensuring that sufficient and efficient generation is available all-island to meet demand. Furthermore, mechanisms such as DS3 ancillary services also aim to integrate further intermittent renewables on the system, using domestic generation, at lower cost impact to customers.

In summary, if the aim of further interconnection is to enhance security of supply, then this must be understood and analysed in the context of the steps taken across gas infrastructure, the CRM market design and the DS3 work stream, which all aim to enhance security of supply and further facilitate renewable integration. All of this should also be borne in mind in terms of holistic consideration and development of CBAs on further interconnection.

**Proposed assessment criteria**

CRU has proposed a set of criteria against which to assess interconnector project applications. We welcome this step, and the implication to apply a consistent, transparent and replicable approach to reviewing these applications. SSE plc have commented in the past to Ofgem’s assessments of interconnectors, primarily in relation to the accuracy or completeness of the CBA’s for these projects.


\(^{18}\) Second Interconnector Pipeline (IC2) pipeline system, operated by IBEC, runs from Gormanston, Co Meath to Beattock, Southwest Scotland. with a length of 195 km in the Irish Sea offshore Ireland.
We are encouraged by CRU’s intent therefore, to independently review Greenlink’s CBA, particularly because of the specific areas that CRU has noted, needed further detail from Greenlink.

The proposed assessment criteria, based on the CBA guidelines set by ENTSO-e, are realistic and detailed. However, the CRU needs to be cognisant of the requirement to ensure that internal network investment, as already identified, is also included in any assessment criteria.

We have comments about certain criteria, as outlined below:

- CO₂ variation
- Losses variation
- Generation cost savings
- Socio-economic benefits

We recommend that the first three, should have further clarity provided against them. Particularly in relation to modelling losses and CO₂ avoidance or abatement measures. These are notoriously difficult to quantify and the assumptions around these can also vary widely. In relation to generation cost savings (i.e. fuel costs savings), we would again consider that modelling this may prove difficult. We would suggest that a high-level methodology, or specific key assumptions associated with modelling these, should be indicated by regulators, to ensure consistency, transparency and replicability. Again, we reiterate that many of the issues that a CBA is attempting to capture, would be resolved were network reinforcement and constraints resolved.

Finally, we would recommend that social and economic benefits are modelled together, (i.e. not only separately detailed), to provide a thorough assessment as to the full public interest of a potential project. It would also intuitively be important for the CBA to model the magnitude of socio-economic benefits within each jurisdiction of the project.

Summary

In summary, we have provided some Ireland-specific comments for the CRU’s consideration, when developing assessment criteria for interconnector applications. We have also indicated some specific thoughts in relation to proposed criteria, as based on ENTSO-e’s revised CBA guidelines.

A holistic approach, along the lines of a PESTLE analysis, indicates the large degree of interrelated and impacted areas of the domestic system and market, that should be considered in relation to the balance of benefits provided under CBAs for future interconnection. We are of the view that many of the purported benefits of interconnectors such as optimal RES integration, can be achieved through network reinforcement that will be required in any case, regardless of whether interconnection arises or not. Furthermore, ensuring that network reinforcement is prioritised in the medium term will also ensure that market entry signals for necessary new generation are not diluted unnecessarily. This is important in the context of the upcoming T-4 auctions. Finally, we are of the opinion that the drive for security of supply is a considered balance between domestic market sufficiency, proportionate dependence on imports, and external market interconnection with access to other markets.