Policy for Electricity Interconnectors

Assessment Criteria for Electricity Interconnection Applications
Executive Summary

This decision paper contains a final set of high level criteria for the assessment of applications the Commission for Regulation of Utilities (CRU) has received, or will receive, from the developers of the electricity interconnection projects. In finalising our approach, we have carefully considered all the responses to our July consultation paper (CRU/18/131) and further specified our criteria where required or clarified our assessment process.

We also draw on our previous policy papers on interconnectors and are cognisant of the Government’s policy as set out in the National Policy Statement on Electricity Interconnection issued on 6 July 2018. We also have regard to the European rules and policies promoting further electricity interconnection, in particular in relation to projects of common interest.

An electricity interconnector is essentially an electrical line or cable connecting the electricity transmission systems of two countries allowing them to exchange electrical power. Under EU law, new electricity interconnection projects which contribute to completing the EU internal energy market can become “projects of common interest” (PCIs), and as such, benefit from streamlined permitting procedures, funding opportunities and various regulatory mechanisms put in place in order to facilitate their implementation.

The CRU has a number of competences in relation to assessing electricity interconnection projects and deciding on their regulatory treatment, and will assess them on a case-by-case basis. Developers of electricity interconnection projects (project promoters) can apply to the CRU on the basis of the Irish national law. If their projects are PCIs, they have a choice to apply directly under the provisions of the EU law or under the Irish national law. Accordingly, the CRU’s approach in considering such applications may differ to some extent, depending on which process is chosen by the developer and the underlying legal basis for that assessment. Notwithstanding differences in process necessitated by this case-by-case approach, we have developed a set of high level assessment criteria that we are going to apply to each electricity interconnection application we may receive. In other words, we will use the same assessment criteria in a consistent manner, however our determination will be made on a case-by-case basis. This is to ensure consistency and fairness in our evaluation regardless of which process is chosen. This also provides high level guidance for project developers as to the nature of assessment they can expect from
the CRU, and the type of information we might request from them in order to aid our decision making process.

The CRU will assess electricity interconnection applications on the basis of a set of technical, economic and regulatory criteria. In particular, we will assess the impact of each project both in terms of its socio-economic benefits as well as in terms of costs under a range of different scenarios and sensitivities. However, we note that economic considerations are only one piece of information used in the decision-making process and will be complemented with information on qualitative, equity and distributional impacts as well as strategic issues. Accordingly, we will assess projects on a case-by-case basis and take a fair and balanced decision in the round against the criteria. For the avoidance of doubt, project promoters are not required to meet all the assessment criteria outlined in this decision and failure to supply certain information will not necessarily mean that the application will be rejected or denied.

In carrying out our evaluation, we will have due regard for the long term interest of final consumers. In particular, when deciding on a project's financial structure and the level of public funding, if any, we will ensure that the impact on national tariffs does not represent a disproportionate burden for the Irish consumer.

Our assessment approach and the criteria, as amended following the consultation, are set out in section 4. We group those criteria under three broad categories:

- Criteria for a technical assessment of the project
- Criteria for an economic assessment of the project
- Criteria for developing a regulatory model for the project

Application documents submitted by project promoters, including an analysis of project's costs and benefits will be assessed by the CRU by means of an independent economic and technical appraisal in an objective and impartial manner. We may also conduct our own cost-benefit analysis and any further studies, as required. We recommend that project promoters engage with us in advance of submitting their applications to determine the scope of their application and supporting studies at the early stages of the process. In accordance with the CRU’s best practice, we also intend to publish and separately consult on each electricity interconnection application.
Public Impact Statement

Electricity interconnectors are physical links which allow the transfer of electricity across borders. New interconnectors should be built only to the extent that they benefit the public at large. That is, as long as the benefits of adding interconnection capacity outweigh or equal the costs. Therefore, the CRU’s assessment of each electricity interconnection application will balance potential benefits of a new interconnector to the Irish consumers against its costs.

Generally, new electricity interconnectors can offer multiple potential benefits:

- lowering costs for consumers if power can be generated cheaper abroad (lower prices);
- reducing emissions by facilitating the integration of renewable power into the energy system (renewable energy integration); and
- providing an additional layer of security (security of supply).

In relation to lower prices, interconnectors can transport power in both directions, i.e. import and export. This allows them to utilise differences in the power systems, and electricity prices, between countries. Electricity between interconnected markets flows from the lower-priced market to the higher-priced one. For instance, at times of high electricity price in Ireland, interconnectors can allow cheaper electricity from another country to be imported into Ireland, thereby raising the supply of electricity and lowering its price. Conversely, if Ireland was the lower-priced market, export of its (cheaper) electricity to a higher-priced market would increase the price in Ireland and bring the price down for the consumers abroad. In summary, a new interconnector tends to increase prices in the lower-priced market and decrease prices in the higher-priced market. As prices converge, consumers in the higher-priced market will benefit from lower prices, while the lower-priced market consumers will have to pay a higher price. Therefore, whether a new interconnector lowers electricity prices for Irish consumers would depend on whether it connects to a country where electricity prices are typically lower than in Ireland.

Regarding renewable energy, on very windy or sunny days there can be more renewable power available than the system can accept. When this happens, renewable generators are dispatched down or “curtailed off”, that is, blocked from supply, and a large volume of renewable energy goes unused. This is because, at present, renewable energy cannot
displace conventional power plants below the minimum level needed for certain grid stability services. Additional interconnection could reduce this effect and allow more renewable energy onto the system (as it can safely be exported).

Finally, regarding **security of supply**, interconnectors allow physical imports of electricity to meet domestic demand. As such, a new interconnector would give Ireland yet another potential import route for electricity, diversifying Ireland’s energy supply. This diversification can have various dimensions. First, a new interconnector can provide geographic diversification if it links Ireland with a new country or supplies power to a new (different) point on the Irish electricity system. A new interconnector can also provide economic diversification, as it supplies electricity according to the price dynamics between the two interconnected countries. Finally, a new interconnector also provides technological diversification in that it links markets with different technology choices or having different natural resources determining their energy mix. Each of these dimensions enables security of supply risks to be spread and reduced.

Building a new interconnector can be costly for the Irish consumers, depending on the way it is regulated and funded. Interconnectors derive their revenues from sales of interconnection capacity to users who wish to move electricity between markets with different prices (congestion revenues). There are various approaches to regulate interconnectors and determine who bears the risk of the interconnector being able to earn congestion revenues. In a merchant model, which is exceptional in Europe, the interconnector is fully reliant on its congestion revenues and bears all the risks of not being able to recover its investment. In a fully regulated model, which is most common in Europe, investment costs are recovered through network tariffs. In this model, it is the end consumer that pays the investment costs in full and receives all the revenues from sales of interconnection capacity. Interconnectors can also be partly regulated, and therefore partly funded by the tariffs. For instance, in a so-called cap and floor model, an interconnector’s sales revenues that are below the floor are topped up by network tariffs and its sales revenues above the cap are returned to the end consumer.

Hence, regulated and partially regulated interconnectors can have a positive or negative impact on network tariffs, and ultimately on end consumers, depending on their performance. If interconnectors underperform financially, then this can translate into a cost to electricity consumers by increasing network tariffs. In contrast, if electricity
interconnectors over-perform financially they can reduce electricity network tariffs. Therefore, the risk of underperformance and its potential cost to Irish consumers must be balanced against the potential benefits that a new interconnector may bring.
# Table of Contents

**Glossary of Terms** .................................................................................................................. 8

1 **Introduction** .............................................................................................................................. 1

   1.1 Commission for Regulation of Utilities .............................................................................. 1

   1.2 Background ......................................................................................................................... 1

       1.2.1 Electricity interconnectors ......................................................................................... 1

       1.2.2 Electricity interconnection projects of common interest (PCIs) ................................ 1

   1.3 Purpose of this paper ............................................................................................................ 2

2 **Legal and policy context** ......................................................................................................... 4

   2.1 Legal basis for electricity interconnection applications ...................................................... 4

       2.1.1 Electricity Regulation Act 1999, Section 2A ................................................................ 4

       2.1.2 TEN-E Regulation, Article 12 .................................................................................... 4

   2.2 EU policy on electricity interconnection ............................................................................... 5

       2.2.1 ACER’s CBCA Recommendation 5/2015 .................................................................. 6

       2.2.2 ENTSO-E’s TYNDP .................................................................................................... 6

       2.2.3 ENTSO-E’s CBA Guideline ........................................................................................ 6

   2.3 Government’s policy on electricity interconnection .............................................................. 8

   2.4 CRU’s policy to date ............................................................................................................... 8

3 **Responses to CRU/18/131** ...................................................................................................... 10

   3.1 Holistic approach and policy interactions .......................................................................... 11

   3.2 Alternatives to electricity interconnection .......................................................................... 11

   3.3 Optimal level of interconnection, EU targets and treatment of competing projects .......... 13

   3.4 Regulatory treatment ........................................................................................................... 14

   3.5 Weighting factors and additional criteria ............................................................................ 14

   3.6 Modelling approach ............................................................................................................. 18

   3.7 CRU process in assessing applications .............................................................................. 18

4 **Assessment approach and criteria** ......................................................................................... 21

   4.1 Technical criteria .................................................................................................................. 23
4.2 Economic criteria ............................................................................................................24
4.3 Regulatory criteria ..........................................................................................................27

5 Summary ..........................................................................................................................28
## Glossary of Terms

<table>
<thead>
<tr>
<th>Term or Acronym</th>
<th>Definition or Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACER</td>
<td>Agency for the Cooperation of Energy Regulators</td>
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<tr>
<td>CBA</td>
<td>cost benefit analysis</td>
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<td>CBCA</td>
<td>cross-border cost allocation</td>
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<tr>
<td>CEF</td>
<td>Connecting Europe Facility</td>
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<tr>
<td>CER</td>
<td>Commission for Energy Regulation (now, Commission for Regulation of Utilities)</td>
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<tr>
<td>CRU</td>
<td>Commission for Regulation of Utilities</td>
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<tr>
<td>DCCAE</td>
<td>Department of Communications, Climate Action and the Environment</td>
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<td>ENTSO-E</td>
<td>European Network of Transmission System Operators for Electricity</td>
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<td>ESB</td>
<td>Electricity Supply Board</td>
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<tr>
<td>GTC</td>
<td>grid transfer capability</td>
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<tr>
<td>HVDC</td>
<td>high voltage direct current</td>
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<tr>
<td>IRR</td>
<td>internal rate of return</td>
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<tr>
<td>I-SEM</td>
<td>Integrated Single Electricity Market</td>
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<tr>
<td>LNG</td>
<td>liquefied natural gas</td>
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<tr>
<td>NPV</td>
<td>net present value</td>
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<tr>
<td>NRA</td>
<td>national regulatory authority (i.e. CRU in Ireland)</td>
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<td>OFGEM</td>
<td>Office of Gas and Electricity Markets (NRA for Great Britain)</td>
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<tr>
<td>PCI</td>
<td>project of common interest</td>
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<tr>
<td>RES</td>
<td>renewable energy sources</td>
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<tr>
<td>SEW</td>
<td>socio-economic welfare</td>
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<tr>
<td>SNSP</td>
<td>system non-synchronous penetration</td>
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<tr>
<td>SONI</td>
<td>System Operator for Northern Ireland</td>
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<tr>
<td>TEN-E</td>
<td>trans-European networks for energy</td>
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<tr>
<td>TSO</td>
<td>transmission system operator</td>
</tr>
<tr>
<td>TYNDP</td>
<td>ten-year network development plan</td>
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1 Introduction

1.1 Commission for Regulation of Utilities

The Commission for Regulation of Utilities (CRU) is Ireland’s independent energy and water regulator. The CRU was established in 1999 and has a wide range of economic, customer protection and energy safety responsibilities. The CRU’s mission is to regulate water, energy and energy safety in the public interest.

Further information on the CRU’s role and relevant legislation can be found on the CRU’s website at www.cru.ie.

1.2 Background

1.2.1 Electricity interconnectors

An electricity interconnector is essentially an electrical line or cable connecting the electricity transmission systems of two countries allowing them to exchange electrical power. Interconnectors may run across a land border as overhead lines or underground cables, or connect two land areas separated by water, by way of a submarine cable.

For the purpose of EU law, Regulation 714/2009 defines an interconnector as transmission line which crosses or spans a border between Member States and which connects the national transmission systems of the Member States.

1.2.2 Electricity interconnection projects of common interest (PCIs)

Projects of common interest (PCIs) are key infrastructure projects, especially cross-border projects, which link the energy systems of EU countries. These projects concern electricity transmission, gas transmission and storage, and smart grids, and are considered key in terms of enhancing the resilience and efficiency of EU energy

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networks, improving security of supply and facilitating the development of EU renewable energy sector.

Every two years, the European Commission draws up a new list of PCIs. The first list was published in 2013 and the second in 2015. The third list of PCIs, adopted in November 2017, contains 173 projects, of which 8 projects are located on or involve the island of Ireland.²

To become a PCI, a project must have a significant impact on energy markets and market integration in at least two EU countries, boost competition on energy markets and help the EU’s energy security by diversifying sources, and contribute to the EU’s climate and energy goals by integrating renewables.

A PCI is afforded a number of benefits under EU Regulation 347/2013 which aims at ensuring timely development of the trans-European energy infrastructure (TEN-E Regulation).³ These benefits include timely implementation through streamlined planning and permit granting processes, improved regulatory conditions, increased public participation via consultations, and increased visibility to investors. PCIs also have the right to apply for funding from the Connecting Europe Facility (CEF).

1.3 Purpose of this paper

This decision paper contains a final set of high level criteria for the assessment of applications the CRU has received, or will receive, from the developers of the electricity interconnection projects.

The CRU has a number of competences in relation to assessing electricity interconnection projects and deciding on their regulatory treatment, and will assess them on a case-by-case basis. Developers of electricity interconnectors (project promoters) can apply to the CRU on the basis of the Irish national law. If their projects are PCIs, they have a choice to apply directly under the provisions of the EU law or under the Irish national law. Accordingly, the CRU’s approach in considering

² More information on PCIs is available on the European Commission’s website. See also the current list of PCIs per country.
such applications may differ to some extent, depending on which process is chosen by the developer and the underlying legal basis for that assessment. Notwithstanding differences in process necessitated by this case-by-case approach, we have developed a set of high level assessment criteria that we are going to apply to each electricity interconnection application we may receive. In other words, we will use the same assessment criteria in a consistent manner, however our determination will be made on a case-by-case basis. This is to ensure consistency and fairness in our evaluation regardless of which process is chosen. This also provides high level guidance for project developers as to the nature of assessment they can expect from the CRU, and the type of information we might request from them in order to aid our decision-making process.

In July 2018, we have consulted on our proposed approach and assessment criteria (CRU/18/131). We received nine responses which are published alongside this decision paper. Having carefully considered and taken into account all views received, we set out an overview of the feedback in section 3 of this decision paper and responded to the comments directly. We also amended our list of criteria where appropriate.

The final, approved list of criteria and our assessment approach is provided in section 4 of this decision paper.
2 Legal and policy context

2.1 Legal basis for electricity interconnection applications

The CRU has a number of competences in relation to electricity interconnectors. An overview of those competences under the Irish and the European law is provided in our information paper (CRU/18/056). Here we only discuss two provisions which directly relate to project assessment and determining its regulatory treatment.

2.1.1 Electricity Regulation Act 1999, Section 2A

Section 2A of the Electricity Regulation Act 1999, as amended (1999 Act) states that an interconnector owned by a person other than the Board (i.e. ESB) may, where the CRU determines that it is in the public interest, be considered to be part of the transmission system for the purposes of calculating and imposing charges for the use of the transmission system.

If the CRU determines that it is in the public interest to consider an electricity interconnection project to be part of the transmission system as per section 2A, it will then subsequently consider its regulatory treatment.

2.1.2 TEN-E Regulation, Article 12

The TEN-E Regulation aims to facilitate implementation of PCIs. The Regulation explains (at recital 35) that the costs of developing and operating a PCI project should in general be fully borne by the infrastructure users, i.e. recovered by the tariffs paid by those users. This principle is particularly important where a PCI project, despite its overall benefits for EU as a whole, might not go ahead because the countries hosting the project might not (or not fully) benefit from it, and therefore might not be willing to pay for the investment. In such cases, Article 12 of the Regulation provides for a mechanism allowing for projects’ costs to be shared

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4 See note 3.
5 Before the TEN-E Regulation, the common cross-border cost allocation practice was that each country pays for the asset on its territory.
among countries in a way that corresponds to their expected benefits from the investment, i.e. cross-border cost allocation (CBCA).

As set out in Article 12, a PCI project may apply to the relevant national regulatory authorities (NRAs) for energy for a coordinated CBCA approach, and the NRAs have then six months to make decisions in that regard. Applying for a CBCA is at the project promoter’s discretion, and only for projects that would not materialise otherwise. The requirements for requesting a CBCA and the key elements of a CBCA decision process are defined by the TEN-E Regulation. In the past, the CRU, in coordination with OFGEM and the Utility Regulator in Northern Ireland, made two decisions on cross-border cost allocation for gas projects, Gaslink Twinning (CER/14/137) and Shannon LNG (CER/14/138).

Based on the successful outcome of the CBCA decision, the CRU will consider the project’s regulatory treatment with respect to any costs allocated to Ireland.

## 2.2 EU policy on electricity interconnection

When assessing electricity interconnection applications the CRU takes into consideration the European guidance and best practices for such assessments. Accordingly, our criteria are aligned with the relevant recommendations and methodologies issued by the Agency for Cooperation of Energy Regulators (ACER) and the European Network of Transmission System Operators for Energy (ENTSO-E) in relation to electricity interconnection projects. Three key documents relevant to the CRU’s assessment are briefly discussed below.

<table>
<thead>
<tr>
<th>ACER</th>
<th>Recommendation 5/2015 on good practices for the treatment of the investment requests including cross border cost allocation requests for electricity and gas projects of common interest</th>
<th>December 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTSO-E</td>
<td>Ten Year Network Development Plan (TYNDP) (Scenarios)</td>
<td>December 2016 (TYNDP 2018 in consultation)</td>
</tr>
<tr>
<td>ENTSO-E</td>
<td>Guideline for Cost Benefit Analysis (CBA) of Grid Development Projects</td>
<td>February 2015 (CBA 2.0 submitted for EC approval)</td>
</tr>
</tbody>
</table>
2.2.1 ACER’s CBCA Recommendation 5/2015

ACER shares best practices with NRAs and PCI project promoters in order to facilitate CBCA processes and to ensure a consistent approach in deciding on the allocation of cost across borders. ACER Recommendation of 2015 provides guidance to project promoters on the submission of an investment request to the relevant NRAs requesting CBCA under Article 12 of the TEN-E Regulation. It also formulates the main principles that NRAs should follow when assessing such requests and deciding on the allocation of costs.

2.2.2 ENTSO-E’s TYNDP

The European Commission selects PCI projects from a list of projects included in ENTSO-E’s pan-European network development plan for the next ten years (TYNDP). The principal aim of the plan is to provide a consistent view of the pan-European electricity infrastructure, signal potential gaps in future investment and capture the wider dynamics of the European electricity market. ENTSO-E use a number of scenarios to represent future developments of the power system. ACER recommends that project promoters use TYNDP scenarios in their CBAs submitted to NRAs, while noting that additional robust scenarios can also be provided.7

ENTSO-E update their plan every two years. The previous edition, the TYNDP 2016, was published in December 2016. The 2018 edition is currently in the consultation process.8

2.2.3 ENTSO-E’s CBA Guideline

TEN-E Regulation also required ENTSO-E to establish a methodology for evaluating the benefits and costs (CBA) of all the projects included in their TYNDP from a pan-European perspective. The main objective of this CBA methodology is to provide a common and uniform basis for the assessment of key infrastructure projects with regard to their value to the European society. The first CBA methodology was

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6 Available on ACER’s website.
7 ACER’s CBCA Recommendation, Annex I.1.
8 See TYNDP website for updates.
adopted in 2015. Since then, ENTSO-E have worked on a new, updated version of this methodology (CBA 2.0) and submitted it for European Commission’s approval in March 2018.\footnote{See note 8.}

Each project included in the TYNDP (and therefore each PCI project) is assessed using the above pan-European CBA methodology which stems from EU policies on market integration, security of supply and sustainability. As such, the benefit of each project is assessed against a number of indicators grouped into three separate categories: costs, benefits and residual impacts. This is illustrated below, and our assessment criteria broadly follow this structure.\footnote{See section 4 for details.}

\begin{figure}
\centering
\includegraphics[width=\linewidth]{diagram}
\caption{Diagram showing the structure of the CBA methodology.}
\end{figure}

ACER recommends that project-specific CBAs are consistent with the ENTSO-E’s CBA methodology.
2.3 Government’s policy on electricity interconnection

When assessing electricity interconnectors, the CRU is mindful of the Government’s policy on electricity interconnection. This is set out in the most recent National Policy Statement on Electricity Interconnection published by the Department of Communications, Climate Action and Environment (DCCAE) on 6 July 2018.11 This Policy Statement builds on DCCAE’s initial consultation12 which set out to identify an appropriate evidence base in the evaluation of electricity interconnection projects. These initial proposals and stakeholders’ responses to DCCAE’s consultation in that matter13 have also informed the CRU in developing the criteria set out in this decision paper.

Relevant Government’s policy documents:

- **Jul 2012** Government Policy Statement on the Strategic Importance of Transmission and Other Energy Infrastructure
- **Dec 2015** Ireland’s Transition to a Low Carbon Energy Future 2015-2030 (Energy White Paper)
- **Jan 2018** Draft National Policy on Electricity Interconnection in Ireland: Public Consultation
- **Jul 2018** National Policy Statement on Electricity Interconnection

2.4 CRU’s policy to date

Since late 2015, the CRU has published six documents which outline our process in developing a regulatory framework for assessing electricity interconnectors, in particular those with a PCI status. These documents are listed below, and this decision paper should be read in conjunction with them. In particular, we draw on the stakeholders’ feedback to our July consultation paper (CRU/18/131) which is discussed next, in section 3, in more detail.

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11 DCCAE, National Policy Statement on Electricity Interconnection, 6 July 2018, available [here](#).
12 DCCAE, Draft National Policy on Electricity Interconnection in Ireland: Public Consultation, available [here](#).
13 All responses are published on DCCAE’s consultation website.
<table>
<thead>
<tr>
<th>Reference</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>CER/15/269</td>
<td>PCI Incentive Methodology in accordance with Article 13(6) of EU Regulation 347/201</td>
<td>information paper</td>
</tr>
<tr>
<td>CER/15/284</td>
<td>Review of Connection and Grid Access Policy: Initial Thinking &amp; Proposed Transitional Arrangements</td>
<td>consultation paper</td>
</tr>
<tr>
<td>CER/16/239</td>
<td>Policy for Electricity Interconnectors – Consultation Process and Call for Initial Comments</td>
<td>information paper</td>
</tr>
<tr>
<td>CRU/17/300</td>
<td>Grid Connections for Electricity Interconnectors with PCI status</td>
<td>direction to EirGrid</td>
</tr>
<tr>
<td>CRU/18/056</td>
<td>Electricity Interconnectors</td>
<td>information paper</td>
</tr>
<tr>
<td>CRU/18/131</td>
<td>Policy for Electricity Interconnectors – Assessment Criteria for Electricity Interconnection Applications</td>
<td>consultation paper</td>
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</table>
3 Responses to CRU/18/131

In July 2018, we opened a consultation on our proposed approach and assessment criteria for electricity interconnection applications (CRU/18/131). We received nine responses from the following parties:

Bord Gáis Energy
SSE
ESB Generation and Trading
Aughinish Alumina
Greenlink Interconnector
Electricity Association of Ireland
EirGrid
Gas Networks Ireland
ERVIA

There was a broad support for the assessment criteria proposed by the CRU. The respondents in general recognised the need for a clear and transparent approach based on an independently verified appraisal, and called for consistency in its application across all electricity interconnection projects, and its alignment with assessment approaches developed in other EU Member States.

Grouping the comments into major categories results in the following areas of concern, presented below, along with a CRU response to the comment/concern.
3.1 Holistic approach and policy interactions

Five respondents noted that the CRU should take a holistic approach in assessing electricity interconnection projects. Comments indicated that the CRU’s assessment should cover all potential impacts and knock-on effects of further interconnection, as well as consider interactions with other regulatory policies, such as DS3,14 capacity market, grid connections and gas infrastructure. This, according to the respondents, would eliminate situations in which different policies undermine each other by sending out inconsistent investment signals.

CRU comment
The CRU is mindful of the impact a new electricity interconnector might have on the Irish system. While our assessment approach broadly draws on ENTSO-E’s CBA Guideline and uses TYNDP scenarios, we have tailored it to capture the specifics of the Irish system, such as the size of the market and its generation mix as it evolves over time in line with our policy objectives. This allows us to examine all direct and indirect impacts of further electricity interconnection and ensure that it would not thwart our other policies or impose an unnecessary burden on the Irish consumers.

3.2 Alternatives to electricity interconnection

A number of respondents perceived electricity interconnection as one of the (many) ways to meet the national and EU energy policy objectives, and that further interconnection should be considered only if it provides the best value for consumers when compared to alternative solutions. According to the respondents, these policy objectives, in particular in terms of RES integration and security of supply, can also be achieved by:

- Reinforcing the existing system and eliminating local network constraints, such as Dublin constraint.
- Optimising the existing interconnectors.
- Building new generation.

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14 Delivering a secure, sustainable (electricity) system. The DS3 programme aims to ensure the secure and safe operation of the electricity system with increasing amounts of variable non-synchronous generation, such as wind and solar.
Balancing the market through ancillary services.

- Improving system design and market function.
- Reinforcing or building new gas interconnectors.
- Investing in energy storage.
- Investing in LNG infrastructure.
- Investing in power to gas technology.
- Installing electrical heating systems in large industry.

One respondent noted that it would be inappropriate for project promoters to look into potential alternative solutions, and that instead, such an assessment should be carried out by the CRU.

**CRU comment**

The CRU notes the respondents’ comments in relation to potential alternative ways to meet the national and EU energy policy objectives, such as RES integration and security of supply. In particular, the respondents point at investments in alternative technologies and system optimisation. Regarding investments, we note that in a free market economy, a vast majority of investment decisions should be driven by market forces. The Government may seek to incentivise investments in particular technologies to achieve its national and EU policy objectives. The CRU’s role is to ensure a well-functioning and efficient energy market for the benefit of Irish consumers, rather than determining or promoting certain investment decisions. In relation to system optimisation, it is the role of EirGrid and SONI as the certified independent transmission system operators in the SEM market to operate and maintain the system, including the two existing interconnectors, and to further develop the system as specified in their respective licences. The role of the CRU and the Utility Regulator in Northern Ireland is to ensure the TSOs comply with their licence obligations.

In view of the above, the CRU also agrees with the respondents that it is not appropriate for the project promoter to examine alternative solutions to achieve national and EU energy policy objectives. Point 4.2.3 (7) of our proposed criteria (potential alternatives to electricity interconnection) has been deleted accordingly.
3.3 Optimal level of interconnection, EU targets and treatment of competing projects

Several respondents discussed the optimal level of interconnection, and whether, given a range of alternatives, there is really a need to build further interconnection. The same question was posed in the context of the EU target for each country to have interconnection of at least 15% of its installed generation capacity by 2030. One respondent was of the view that Ireland’s current interconnection level, ignoring Brexit, is already at 12% and this undermines the case for further interconnection. Respondents noted that Brexit will bring this level back to zero which makes a strong case for Ireland’s derogation from the EU target altogether.

It was noted in the comments that any new interconnector would reduce revenues of already existing interconnectors and also undermine the business case of potential competing projects (cannibalisation). Respondents therefore suggested that in the case of competing projects, only those should be selected which bring the highest benefit to consumers or constitute the most cost-effective solution to achieve the desired policy outcomes. In that regard, one respondent saw merit in a combined assessment of multiple projects if they are coming forward in the same period of time, such as Ofgem’s “window” approach, as opposed to the assessment on a case-by-case basis as proposed by the CRU.

CRU comment

EU interconnection targets are a matter of the Government’s policy and it would not be appropriate for the CRU to comment on these. However, we note the respondents’ comments on an optimal level of interconnection and suggestions to assess competing projects together. While we see merit in a combined assessment of multiple projects, for practical reasons we cannot follow this approach. This is due to potential differences in application process chosen by the project promoters and a time span between project promoters’ applications.

While we assess applications on a case-by-case basis, we examine impacts on the existing and/or potential electricity interconnectors as part of our assessment (see
point 4.2.3 (3) of the criteria), and project promoters are requested to model such impacts in their CBAs.

### 3.4 Regulatory treatment

Respondents identified a range of different regulatory models that could be considered for an interconnector and noted a potential distortion of competition due to special regulatory treatment of interconnectors. Two respondents considered a merchant model superior to a regulated one, as it would provide for a greater level playing field between interconnectors and domestic generation.

One respondent suggested that any regulatory model should include performance criteria to ascertain whether the project delivers stated benefits, and clawback options for failing to deliver them. Another respondent saw risk of double-counting revenues from energy and system services markets in calculating cap and floor payments.

**CRU comment**

The CRU notes the above comments and will consider an appropriate regulatory treatment in the context of each individual interconnection application, and separately consult in that matter.

### 3.5 Weighting factors and additional criteria

One respondent asks whether the CRU is going to apply a weighting to each of the assessment criteria. Some other respondents suggested that such weighting should be applied, and consistently used for all interconnection projects. One respondent noted that economic criteria should be given a higher weighting (than technical and regulatory criteria). Other respondents suggested applying medium to high weighting to security of supply benefits and diversity of supply benefits.

Furthermore, the respondents felt that a number of impacts (positive or negative) or risks are not, or not sufficiently, captured by the assessment criteria proposed by the CRU. These are listed below, in no particular order:
**System-related impacts:**

- Network reinforcement costs
- Increase or reduction in network constraint
- Balancing needs, procurement of ancillary services, wider works’ costs for frequency and voltage support
- Project’s location when assessing black start capability
- Project’s ability to provide reactive power versus procuring the service from other sources (quantitative analysis)
- Project’s ability to provide fast frequency reserve given a relatively low inertia of the Irish system
- Potential technical issues experienced by generators located near the interconnector’s connection points resulting from sub-synchronous resonance

**Security of supply impacts:**

- Impact on gas security of supply (existing gas fired generation and investments in gas infrastructure)
- Risks resulting from simultaneous occurrence of low RES output and high system demand periods in interconnected markets
- Reliability of interconnectors during stress events, including financial impacts of outages, repairs, insurance and loss of benefits to customers
- De-rating factor and impacts on de-rating factors of existing interconnectors

**RES integration and sustainability-related impacts:**

- RES targets and offshore wind development when assessing project’s rationale and its impacts on RES curtailment
- Assessment whether (non-synchronous) HVDC technology can safely help increase the allowable wind output during high SNSP periods
- CO₂ variations, in particular assessing the risk of potential carbon leakage due to differences in carbon prices between the interconnected countries
- Differences in RES support schemes between the interconnected countries
- Impact on grid connections for RES and DS3

**Market-related impacts:**

- Impacts on competition in capacity markets given different regulatory treatment, such as cap and floor
- Impacts on interconnector’s market revenues due to differences in capacity market designs in the interconnected countries

**Other impacts:**

- Risks associated with investment failure and its cost
• Potential stimulation of investment in the digital economy in Ireland (data centres)
• Compatibility of a given project with EU legislation, such as unbundling requirements mandated by the Electricity Directive 2009/72/EC, Article 9

CRU comment

We assert that our approach is based on a holistic assessment against all of the criteria listed in section 4, and that our decision will depend on the specifics of each application. In other words, the application will be viewed in the round against the criteria, meeting or failure to meet an individual criterion will not necessarily mean that the application succeeds or fails. As such, applying weighting to our criteria is not workable, and might result in discriminatory outcomes.

We also note that most of the impacts listed above are already captured in our assessment. The table below provides references to the relevant assessment criteria which cover those impacts. Where required, we have specified our criteria to reflect this, or added additional criteria.

<table>
<thead>
<tr>
<th>Network reinforcement costs</th>
<th>4.1 (11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact on network constraint</td>
<td>4.2.2 (4)</td>
</tr>
<tr>
<td>Balancing needs, procurement of ancillary services, wider works costs for frequency and voltage support</td>
<td>4.1 (12)</td>
</tr>
<tr>
<td>Project’s location when assessing black start capability</td>
<td>4.2.2 (10, 11)</td>
</tr>
<tr>
<td>Project’s ability to provide reactive power</td>
<td>4.2.2 (10)</td>
</tr>
<tr>
<td>Project’s ability to provide fast frequency reserve</td>
<td>4.2.2 (10)</td>
</tr>
<tr>
<td>Potential technical issues experienced by generators located near the interconnector’s connection points resulting from sub-synchronous resonance</td>
<td>4.1 (13)</td>
</tr>
<tr>
<td>Impact on gas security of supply (existing gas fired generation and investments in gas infrastructure)</td>
<td>4.2.3 (2, 3)</td>
</tr>
<tr>
<td>Risks resulting from simultaneous occurrence of low RES output and high system demand periods in interconnected markets</td>
<td>4.2.2 (2,11)</td>
</tr>
<tr>
<td>Reliability of interconnectors during stress events</td>
<td>4.1 (2)</td>
</tr>
<tr>
<td>Cost of repairs and outages</td>
<td>4.2.1 (2,7)</td>
</tr>
<tr>
<td>De-rating factor and impacts on de-rating factors of existing interconnectors</td>
<td>4.2.2 (2) 4.2.3 (3)</td>
</tr>
<tr>
<td>RES targets and offshore wind development when assessing project’s rationale and its impacts on RES curtailment</td>
<td>4.2.2 (1) 4.2.2 (8)</td>
</tr>
</tbody>
</table>
Assessment whether (non-synchronous) HVDC technology can safely help increase the allowable wind output during high SNSP periods

<table>
<thead>
<tr>
<th>Issue</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂ variations, in particular assessing the risk of potential carbon leakage due to differences in carbon prices between the interconnected countries</td>
<td>4.2.2 (5)</td>
</tr>
<tr>
<td>Impact on grid connections for RES and DS3</td>
<td>4.2.3 (2, 3)</td>
</tr>
<tr>
<td>Impacts on competition in capacity markets given different regulatory treatment, such as cap and floor</td>
<td>4.2.3 (2, 3) 4.3 (7)</td>
</tr>
<tr>
<td>Impacts on interconnector’s market revenues due to differences in capacity market designs in the interconnected countries</td>
<td>4.2.2 (2)</td>
</tr>
<tr>
<td>Risks associated with investment failure and its cost</td>
<td>4.2.1 (7) 4.2.2 (11)</td>
</tr>
<tr>
<td>Potential stimulation of investment in the digital economy in Ireland (data centres)</td>
<td>4.2.3 (6)</td>
</tr>
<tr>
<td>Compatibility of a given project with EU legislation, such as unbundling requirements mandated by the Electricity Directive 2009/72/EC, Article 9</td>
<td>4.3 (11) added</td>
</tr>
</tbody>
</table>

The two issues below are outside the scope of our assessment, for the following reasons:

- Differences in RES support schemes between the interconnected countries.

We note that differences in RES support schemes between the interconnected countries will not be considered as part of the analysis. The existing support schemes are a matter of Government policy, and outside the scope of the project’s CBA assessment.

- Quantitative analysis of project’s ability to provide reactive power versus procuring the service from other sources.

We do not consider it would appropriate for a project promoter to carry out this type of analysis. EirGrid as a licenced TSO is responsible for system balancing and cost-efficient procurement of such services from the most suitable service providers which are available on the market.
3.6 Modelling approach

One respondent noted that project’s benefits should be considered across a range of scenarios which include the different potential evolutions of the system, and referred to EirGrid’s Tomorrow Energy Scenarios.

Another respondent noted that social and economic benefits should be modelled together (and not only separately detailed) so they provide a full assessment of public interest, and the magnitude of socio-economic welfare (SEW) benefits should be modelled for each country.

One of the comments indicated that variations in CO₂, losses as well as generation cost savings (fuel cost savings) need to be further specified as they are difficult to quantify and may have different assumptions. Assessing these impacts would benefit from a high-level methodology and/or key assumptions which would be applied consistently to all projects.

CRU comment

As explained in section 2.2, we draw on the European guidance in assessing interconnection applications, and this recommends using TYNDP scenarios in the CBA of interconnection projects. EirGrid’s Tomorrow Energy Scenarios are national in scope and therefore are not best suited to assess benefits and impacts of cross-border infrastructure. In any case, there is a broad consistency between the two scenario sets as TYNDP scenarios are developed by TSOs, and build on national investment plans.

Different modelling approaches and assumptions used in a project’s CBA are project-specific issues and go beyond the scope of this decision paper. The CRU is going to consult separately on each individual interconnection project, including its CBA.

3.7 CRU process in assessing applications

One respondent commented on the CRU’s application process and suggested setting minimum eligibility thresholds to accept an application in order to ensure that only sufficiently mature projects come forward. The respondent noted that materials submitted to the CRU should be complete and of sufficiently high quality in order to

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15 For a definition, see note 16.
allow for an independent assessment, and that the onus should be on project promoters to meet the standard required.

The same respondent welcomed the approach to publicly consult on each interconnection application, and raised a question whether the CRU is going to consult also at a later assessment stage of a given project, or will the rest of the process be of bilateral nature. For comparison, the respondent referred to Ofgem’s three-stage assessment (Initial Project Assessment, Final Project Assessment, and Post Construction Review). It was also suggested that project promoter’s reporting obligations should be clarified.

**CRU comment**

In developing our policy for electricity interconnectors, we draw on the EU guidelines. Pursuant to Article 12 of the TEN-E Regulation, only “sufficiently mature” projects can apply for a CBCA decision. By analogy, we consider that only “sufficiently mature” projects can apply to the CRU for a determination under section 2A of the 1999 Act. ACER’s CBCA Recommendation explains that a “sufficiently mature” project is a project exhibiting sufficient certainty about the costs and reasonable foresight of the benefits assessed by the CBA, and good knowledge about the factors affecting expected costs and benefits and their ranges. In addition, permitting procedures need to have started in all hosting countries and commissioning to be achieved indicatively within 60 months. We will take the above criteria into account when assessing the eligibility of electricity interconnection applications, and PCI applications will be prioritised.

As for the question about the later stages of our assessment and their nature, these are determined by the process which is chosen by the developer and its underlying legal basis. In any case, in accordance with our best practice, we are independent and transparent in our assessment, and public consultation remains an integral part of our decision-making process.
3.8 Other comments

One respondent noted that some of the information requested by the CRU under the technical criteria are too detailed and may not be available at the time of submitting the application. This relates to (a) tender and supplier selection specifications and (b) demonstration how the technical specifications meet grid requirements.

With respect to impacts on the functioning of the wholesale energy market, one respondent noted that assessing impacts per technology type goes too far and may interfere with the CRU’s statutory duty to promote competition.

CRU comment

As we note in section 3.5, we are going to carry out a holistic assessment against all of the criteria and our decision will depend on the specific case. In other words, the application will be viewed in the round against the criteria, and failure to provide certain information or meet certain criteria will not necessarily mean that the application will be rejected or negatively assessed. We have amended section 4 to clarify this.

As for considering wider impacts on energy market participants, including different technologies, we are mindful of our statutory duty to promote competition in the energy market. However, market competition is not a goal in itself, but ultimately is to benefit consumers by keeping prices at a reasonable and stable level. A new interconnector might have substantial impact on electricity and gas prices, depending on which generation technologies it is going to displace, and therefore significant impacts on Irish consumers. It is necessary for the CRU to examine and fully understand those potential impacts in order to make an informed and balanced decision.

In relation to respondents’ comments on specific interconnection projects, we note that these are beyond the scope of this consultation, and therefore are not addressed here. We will separately consult on each application and will consider project-specific comments as part of those consultations.

Finally, we note the respondents’ concerns in relation to Brexit, and reaffirm our position as outlined in CRU/18/131 (see section 3.8).
4 Assessment approach and criteria

Following review and consideration of the responses summarised in section 3, and keeping in mind the relevant rules and guidelines outlined in section 2, the CRU has decided to assess electricity interconnection applications on the basis of a set of technical, economic and regulatory criteria. In particular, we will assess the impact of each project both in terms of its socio-economic benefits as well as in terms of costs under a range of different scenarios and sensitivities. However, we note that economic considerations are only one piece of information used in the decision-making process and will be complemented with information on qualitative, equity and distributional impacts as well as strategic issues. Accordingly, we will assess projects on a case-by-case basis and take a fair and balanced decision in the round against the criteria. For the avoidance of doubt, project promoters are not required to meet all the assessment criteria listed in this section, and failure to supply certain information will not necessarily mean that the application will be rejected or denied.

In carrying out our evaluation, we will have due regard for the long term interest of final consumers. In particular, when deciding on a project’s financial structure and the level of public funding, if any, we will ensure that the impact on national tariffs does not represent a disproportionate burden for the Irish consumer.

We group our assessment criteria under three broad categories:

- Criteria for a technical assessment of the project
- Criteria for an economic assessment of the project
- Criteria for developing a regulatory model for the project

We also note that the lists provided below, in sections 4.1 – 4.3, are non-exhaustive and we reserve the right to add additional criteria or carry out additional assessments as required. Finally, some of the criteria listed below may not apply to each and every application we receive (e.g. consideration of a CBCA request).

Application documents submitted by project promoters, including CBA and other relevant studies will be assessed by the CRU by means of an independent economic and technical appraisal in a manner that is objective and impartial. We may also
conduct our own cost benefit analysis and any further studies if deemed appropriate or necessary. In order to aid this process, the CRU expects that project promoters will supplement their CBA with transparent information on costs and benefits considered in the modelling, methodology and resulting, modelling assumptions, data sources and limitations of their assessments. Where benefits or costs are unable to be quantified or monetised, they can be described qualitatively.

It is recommended that project promoters engage with the CRU in advance of submitting their applications in order to determine the scope of their application and supporting studies at the early stages of the process.

In accordance with the CRU’s best practice, we also intend to publish and separately consult on each electricity interconnection application.
### 4.1 Technical criteria

**Criteria for a technical assessment of the project**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Choice of technology and its rationale, including economic cost comparisons of technologies used for the project.</td>
</tr>
<tr>
<td>2.</td>
<td>Technical specification of the interconnector, including capacity, ramp rates and losses under various operating scenarios, including calculation of interconnector reliability and availability.</td>
</tr>
<tr>
<td>3.</td>
<td>Demonstration of how the technical specifications meet the grid code requirements of the relevant jurisdictions.</td>
</tr>
<tr>
<td>4.</td>
<td>Tender and supplier selection specifications (if available). Tendering and procurement process.</td>
</tr>
<tr>
<td>5.</td>
<td>Project’s costs and assumptions underpinning these.</td>
</tr>
<tr>
<td>6.</td>
<td>Planned route including project’s connection locations; rationale behind project’s location.</td>
</tr>
<tr>
<td>7.</td>
<td>Implementation timeline and project’s current development stage.</td>
</tr>
<tr>
<td>8.</td>
<td>Risk factors that could affect project’s implementation at any stage and the risk mitigation measures envisaged to reduce their impact.</td>
</tr>
<tr>
<td>9.</td>
<td>Project’s current stage in the permitting process in the two countries at each end of the interconnector (hosting countries).</td>
</tr>
<tr>
<td>10.</td>
<td>Project’s grid connection in each hosting country and its firmness.</td>
</tr>
<tr>
<td>11.</td>
<td>Transmission deep reinforcement works required to connect the project to the Irish system and their impact on use of system charges.</td>
</tr>
<tr>
<td>12.</td>
<td>Change in balancing needs of the system and potential frequency and voltage support works required to connect the project, and their impact on use of system charges.</td>
</tr>
<tr>
<td>13.</td>
<td>Potential technical issues experienced by the existing interconnectors and/or generators as a result of connecting the project, e.g. impact on generators located near the project’s connection points.</td>
</tr>
</tbody>
</table>
4.2 Economic criteria

<table>
<thead>
<tr>
<th>Criteria for an economic assessment of the project</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4.2.1 Costs</strong></td>
</tr>
<tr>
<td>Costs are total project expenditure (reported as pre-tax values). Where costs or risks are unable to be quantified or monetised, they can be described qualitatively.</td>
</tr>
</tbody>
</table>

1. Capital expenditures, e.g. construction costs, financial costs, connection costs as well as expected costs for temporary solutions which are necessary to realise the project.

2. Operation and maintenance costs (including costs of devices that have to be replaced within the project’s life-cycle).

3. Environmental costs, e.g. costs avoided, mitigated or compensated under existing legal provisions.

4. Consenting costs, e.g. costs of planning procedures.

5. Decommissioning costs.

6. Technical justifications of cost estimates.

7. Main risk factors, whether technical or economic, that could affect the project’s estimated costs, and the mitigation measures envisaged to reduce their impact.
Criteria for an economic assessment of the project

4.2.2 Benefits

Benefits can be fully or partially accounted for in the calculation of socio-economic welfare (SEW) or calculated separately. Benefits and risks that cannot be monetised and quantified can be described qualitatively.

1. Rationale behind the need for the project, such as price arbitrage opportunities, expected evolution of the generation mixes in each hosting country, e.g. development of wind energy in Ireland.

2. Interconnector’s expected usage and revenues, e.g. flows, usage rate, de-rating factor, availability, trading volumes and congestion rents.

3. SEW benefits assessed for each group of beneficiaries in the hosting countries, e.g. consumers, producers, other energy market stakeholders if applicable.

4. Change in grid transfer capability (GTC) between the interconnected systems and within each of them, reflecting reduced congestion. Impact on network constraints.

5. Variation in CO₂ emissions resulting from the project, including the potential risk of carbon leakage.

6. Variation in thermal losses in the transmission system resulting from the project.

7. Generation cost savings resulting from the project, e.g. reduced fuel costs.

8. Avoided curtailment of RES generation (primarily wind and solar) resulting from the project (RES integration).

9. Security of supply and capacity benefits of the project. Counterfactual situation will take into account the specific reserve requirements of a small system such as the SEM.

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16 Socio-economic welfare (SEW) analysis is a commonly used tool to capture the overall benefit, in monetary terms, to society from a given interconnection project. The SEW analysis is usually done on a national basis, for the two countries at each end of the proposed interconnector, and reflects the lower cost of electricity resulting from the addition of a new interconnector. Estimating SEW benefits involves assessing impacts on consumer and producer costs as a result of changes in power flows between the connected markets and changes in generation dispatch.

17 For instance, RES integration benefits (4.2.2, point 8) can be quantified and monetised in SEW since estimated generation cost savings or changes in total surplus tend to reflect avoided renewable curtailment. See also ENTSO-E’s CBA Guideline (section 2.2.3).

18 Socio-economic welfare (see note 16).

19 GTC reflects the ability of the grid to transport electricity across a boundary. A boundary is a bottleneck in the power system (not necessarily a border between states).

20 Security of supply means system adequacy as well as system stability. System adequacy is the ability of a power system to provide an adequate supply of electricity to meet demand, and taking into account the variability of climatic effects on demand and RES production. System stability is the ability of a power system to return to its normal or stable conditions after being disturbed.
10. Ancillary services benefits resulting from the project.

11. Main risk factors that could affect the project’s rationale and estimated benefits, and the mitigation measures envisaged to reduce their impact, e.g. impact of Brexit on the project’s rationale and benefits.

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**Criteria for an economic assessment of the project**

**4.2.3 Other impacts and considerations**

Other impacts are additional (positive or negative) externalities of the project, where not quantified and monetised in the SEW calculation. Impacts that cannot be monetised and quantified can be described qualitatively.

1. Impact on the electricity system’s technical requirements in Ireland (e.g. if the project constitutes the largest single in-feed).

2. Wider impact on the functioning of the wholesale energy markets in each hosting country, e.g. impacts on competition, prices of wholesale products in I-SEM, capacity payments, generation costs and revenues per technology type.

3. Wider impact on other energy market participants, distributional impacts, e.g. impact on gas networks, gas tariffs and their knock-on impacts on gas consumers and/or I-SEM prices, impacts on other existing and/or potential electricity interconnectors.

4. Environmental impacts (after potential mitigation measures).

5. Social impacts, e.g. impact on local population.

6. Any other relevant impacts, e.g. relating to innovation, solidarity, market integration.
### 4.3 Regulatory criteria

<table>
<thead>
<tr>
<th>Criteria for developing project’s regulatory model</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Project’s forecasted costs and revenues over the project’s technical lifetime.</td>
</tr>
<tr>
<td>2. Project’s net present value (NPV) and internal rate of return (IRR).</td>
</tr>
<tr>
<td>3. Intended method and sources of financing the project, e.g. corporate or project finance, and the project’s current stage of raising finance. Main risk factors that could affect project’s financing.</td>
</tr>
<tr>
<td>4. Status of the project as per the most recent TYNDP list.</td>
</tr>
<tr>
<td>5. Status of the project as per the most recent PCI list.</td>
</tr>
<tr>
<td>6. Project promoters’ intention to (or not to) apply for grants (such as CEF) and the project’s eligibility to such funding, according to project promoter. If applicable, current stage of application for grants.</td>
</tr>
<tr>
<td>7. Project promoter’s proposed regulatory model in each country in light of expected sources of revenue, e.g. congestion rents, capacity mechanism.</td>
</tr>
<tr>
<td>8. Expected impacts of the proposed model on regulated prices (network tariffs) in Ireland.</td>
</tr>
<tr>
<td>9. If applicable, project promoter’s request for cross border cost allocation (CBCA).</td>
</tr>
<tr>
<td>10. If applicable, information on non-hosting countries’ TSOs consultations and their results (as required by TEN-E Regulation(^ {21} )).</td>
</tr>
<tr>
<td>11. If applicable (for TSO projects), project governance ensuring appropriate ring-fencing of the project from the TSO’s licenced activity and compliance with condition 17 of the TSO licence (duty of non-discrimination).</td>
</tr>
</tbody>
</table>

\(^ {21} \) Discussed in section 2.1.2.
5 Summary

The CRU has decided to assess electricity interconnection applications on a case-by-case basis against a set of high level assessment criteria set out in section 4 of this decision paper.