Consultation on
Low Carbon Inertia Service (LCIS) Competitive Procurement

22 June 2022

Disclaimer

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Glossary of Terms

‘Connection Offer’ means the offer letter issued to a Service Provider for a Connection Agreement;

‘Connection Point’ means the point where the LCIS Provider is joined to the Transmission System (110 kV or above);

‘ECP’ means Enduring Connection Policy in Ireland (Enduring Connection Policy (eirgridgroup.com));

‘LCIS’ means the Low Carbon Inertia Service, including provision of Synchronous Inertia, Reactive Power support and Short-Circuit contribution, to be procured and delivered as part of this proposed procurement exercise;

‘LCIS Providers’ means the units delivering the LCIS;

‘MEC’ means Maximum Export Capacity. In respect to a connection point, this refers to the maximum amount of electricity which is permitted to flow into the Transmission or Distribution System;

‘MVA.s’ means mega Volt-Ampere second (unit for inertia)

‘RES’ means Renewable Energy Sources;

‘Scalar’ means a multiplier which adjusts the payment of a System Service to reflect the delivery of a service;

‘SNSP’ means System Non-Synchronous Penetration. It is a real-time measure of the percentage of generation that comes from non-synchronous sources, such as wind and HVDC interconnector imports, relative to the system demand.

Executive Summary

In the SEM-21-021 Decision on the System Services Future Arrangements, the SEM Committee (SEMC) requested that the TSOs carry out an evaluation and bring forward proposals for a fixed term procurement in relation to Low Carbon Inertia Services (LCIS).

The motivation for this request is to support the integration of technologies which can facilitate a reduction in the quantity of carbon-intensive conventional generation required to run at any given time on the Ireland and Northern Ireland power system. This reduction will facilitate the further integration of renewable generation and contribute towards achieving our 2030 Renewable Energy Source (RES) targets.

As part of our Shaping Our Electricity Future Roadmap, the development and execution of a plan to procure LCIS has been identified as a key action.

An industry webinar was held in December 2021 to present this plan[1] which involved conducting technical studies to identify our needs and our plans to publish this consultation paper covering the volumes to be procured (based on studies conducted), the technical requirements as well as aspects of the commercial and procurement arrangements.

This consultation paper presents our requirements for LCIS as well as options and proposals for a range of design elements underpinning the LCIS procurement process that is expected to commence in 2023. Key proposals set out in this consultation paper are:

- A LCIS procurement exercise aimed at awarding contracts for up to 10,000 MVA.s of inertia to meet system requirements in 2026. This would be followed by a later and separate procurement process to address requirements for 2030. The decision to undertake these procurement processes will be subject to decisions and approvals by the regulatory authorities.

- LCIS units providing a single service comprising synchronous inertia, short circuit contribution and reactive power capability;

- A range of criteria to evaluate tenderers, including (but not limited to) the technical capability of proposed LCIS units and the development status of LCIS projects (e.g. planning permission);

- Tenderers ranked based on the cost per MVA.s per hour (inclusive of energy running costs) for the LCIS service being procured;

- Payment for the LCIS service based on availability and application of scalars to incentivise performance, locational characteristics and service delivery;

[1] https://www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-SONI-Plan-for-procurement-of-LCIS-Webinar.pdf

https://www.soni.ltd.uk/media/documents/EirGrid-SONI-Plan-for-procurement-of-LCIS-Webinar.pdf

- A 6 year contract, starting before the 1st of January 2026 with performance bonds related to achievement of delivery milestones.

These proposals are based on our consideration of the appropriate balance of system requirements, delivery timeframes, performance incentives and contractual arrangements to drive investment in LCIS for the overall benefit of the power system and consumers in Ireland and Northern Ireland.

In this consultation, we are seeking stakeholders' views on these proposals. SONI and EirGrid welcome feedback on the questions posed within this paper, which will be used to inform a recommendation paper that will be submitted to the SEM Committee for its consideration.

Note that proceeding with the resulting procurement process is subject to approval of funding arrangements by the Regulatory Authorities.

Responses to the questions set out in this paper should be submitted through either the EirGrid or SONI consultation portal **before 5 August 2022**.

Table of Contents

1. Introduction and Background

1.1 EirGrid and SONI

EirGrid and SONI are the Transmission System Operators (TSOs) in Ireland and Northern Ireland. It is our job to manage the electricity supply and the flow of power from generators to consumers. Electricity is generated from gas, coal and renewable sources (such as wind, solar and hydro power) at sites across the island. Our high voltage transmission network then transports electricity to high demand centres, such as cities, towns and industrial sites.

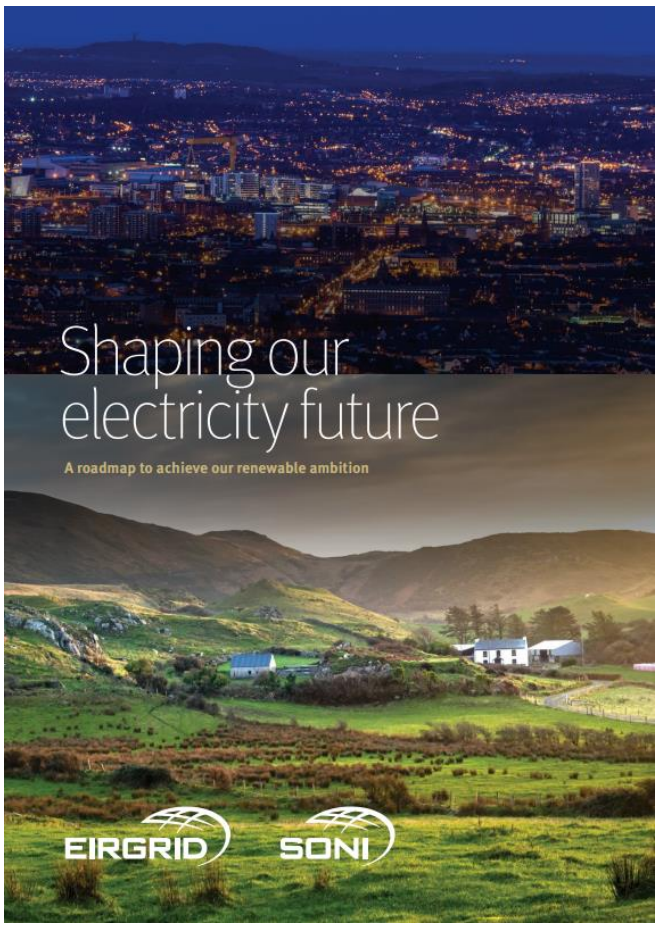
We have a responsibility to enable increased levels of renewable sources to generate on the power system while continuing to ensure that the system operates securely and efficiently.

1.2 Shaping Our Electricity Future

In November 2021 we published the inaugural Shaping Our Electricity Future Roadmap[2] following consultation with stakeholders across society, government, industry, market participants and electricity consumers.

This Shaping Our Electricity Future Roadmap provides an outline of the key developments from a networks, engagement, operations and market perspective needed to support a secure transition to at least 70% renewables on the electricity grid (RES-E) by 2030 – an important step on the journey to 80% RES-E and to net zero by 2050. Inherent in this is a secure transition to 2030 whereby we continue to operate, develop and maintain a safe, secure, reliable, economical and efficient electricity transmission system.

A key action identified in this roadmap was the development of a process to procure Low Carbon Inertia Services (LCIS) that would support these RES-E objectives.



[2] https://www.eirgridgroup.com/site-files/library/EirGrid/Shaping_Our_Electricity_Future_Roadmap.pdf

https://www.soni.ltd.uk/media/documents/Shaping_Our_Electricity_Future_Roadmap.pdf

1.3 SEM Committee Request

In the SEM-21-021 Decision[3] on the System Services Future Arrangements, the SEM Committee requested that the TSOs carry out an evaluation and bring forward proposals for a fixed term procurement in relation to LCIS.

The motivation for this request is to support the integration of technologies which can facilitate a reduction in the quantity of carbon intensive conventional generation required to run at any given time on the all-island power system.

As outlined in its decision paper, the SEM Committee decided to set a process for LCIS procurement similar to the one used previously in 2018, in which 110 MW of high availability reserve services was procured for a six year period (SEM-18-049[4]). As part of this LCIS procurement process, "*the TSOs' will publish the detailed proposal for public consultation which should cover the following:*

- *the proposed start and end dates of the contract;*
- *the details relating to the Performance Bond;*
- *detailed technical definitions of the services;*
- *the minimum and maximum volume to be procured in the auction;*
- *the treatment and application of scalars; and*
- *any other proposals that the TSOs consider appropriate.*

Following this public consultation the TSOs shall submit a Recommendation Paper to the SEM Committee. The SEM Committee, following a review of the consultation responses and TSOs Recommendations Paper, will then publish a Decision paper setting out the arrangements for that Fixed Contract procurement."

1.4 Procurement plan

In line with the SEM Committee Request, EirGrid and SONI developed a project plan which will ultimately provide fixed term contracts for LCIS (including inertia, reactive power and short circuit contribution capability). The targeted date for completion of the procurement process and contract award is September 2023.

The overall procurement plan is provided in Table 1.

[3] https://www.semcommittee.com/sites/semc/files/media-files/SEM-21-021%20System%20Services%20Future%20Arrangements%20-%20Decision%20Paper%201.pdf

[4] https://www.semcommittee.com/sites/semc/files/media-files/SEM-18-049%20DS3%20System%20Services%20Fixed%20Contracts%20Procurement%20Arrangements.pdf

Description	Start Date	Finish Date
Detailed plan for the implementation of the project to be presented to the Industry (Complete – webinar held on 15 Dec. 2021)	**Q4 2021**	**Q4 2021**
Studies to identify the technical and locational requirements considering inertia, reactive power and short circuit level (Complete)	**Q3 2021**	**May-22**
Consultation, Recommendation and SEMC Decision on the procurement and requirements	**Jun-22**	**Oct-22**
Consultation, Recommendation and SEMC Decision on the contractual arrangements	**Nov-22**	**Mar-23**
Complete Procurement Process and award Contracts	**Mar-23**	**Sep-23**

Table 1: Overall procurement process plan

1.5 Purpose of this Consultation Paper

The purpose of this consultation paper is to set out the proposed principles, approach, rules and requirements to be used to run the procurement competition.

Questions are provided for which we request responses by **5 August 2022**.

As set out in Table 1, a consultation on the contractual arrangements for this procurement exercise will follow, intended to be launched in November 2022.

1.6 Structure of the Consultation Paper

The remainder of this consultation paper is structured as follows:

Section 2 provides an overview of the proposals which are contained within the rest of the consultation paper.

Section 3 sets out our system needs and the volume that we propose to procure, as well as the definition of the service which is being procured and the requirements for potential providers.

Section 4 proposes the start date, end date and duration of the contract as well as the payment mechanism based on availability, the performance bond and details of the application of scalars.

Section 5 describes our proposal regarding the evaluation process for this procurement exercise, including the prerequisites and the mechanism by which tenders would be assessed.

Section 6 references the funding arrangements.

Section 7 provides an overview of next steps and details the consultation questions.

Appendix A: List of Transmission Stations within the LCIS Incentivised Zones

2. Overview of Proposals

2.1 General principles

For the procurement of LCIS, it is intended to contract for a single service comprising the provision of Synchronous Inertia, Reactive Power and Short-Circuit Contribution as described further in Section 3.2.1. Contracted providers would be required to provide this service with tenderers submitting a bid in €/MVA.s per hour or £/MVA.s per hour. As outlined in Section 3.1.4, a total volume of Inertia up to 10,000 MVA.s is proposed to be procured to meet our requirements for 2026. Note that through the minimum technical requirements, Reactive Power and Short Circuit contribution are requirements under the LCIS service definition. We expect that a further, separate, procurement process will take place at a later stage to meet our LCIS requirements for 2030[5].

The terms and conditions of the awarded LCIS contracts will differ from the DS3 System Services Regulated Arrangements contracts and will require further development and consultation. The proposed procurement process and associated contractual arrangements are intended to be suitable both for potential service providers already progressing connections as well as for aspiring new service providers yet to be connected. We therefore propose to allow time for a build phase before service provision commences.

We propose that contracts of a guaranteed term of a maximum of 6 years' duration would be awarded to successful tenderers. Contracts will be awarded based on pre-qualification criteria (which are further explored in this consultation paper) and price, both considered within the arrangements put in place for this procurement process.

LCIS providers will not be able to simultaneously hold a DS3 System Services Regulated Arrangements Contract and a LCIS Fixed Term Contract. Contract award is intended to take place in September 2023 with a proposed start date between the 1st of October 2024 and 1st of January 2026.

2.2 Overview of Proposals

The following table provides an overview of the proposals and options which are contained within this consultation paper. The proposals and options are explored in more detail in the subsequent sections.

[5] Following the outcome of Phase 1 procurement we will assess further if additional procurement phase will be needed to cover the period between 2026 and 2030.

Section	Requirement	TSOs' Proposal
3.1.3	Phased approach	Phased approach with the procurement of inertia up to 10,000 MVA.s in Phase 1 to meet our requirements for 2026. Phase 2 (and further phases if required) will be subject to a later, separate consultation and procurement process (subject to RA decision) to meet our requirements for 2030.
3.1.4	Volume and location	Up to 4000 MVA.s in Northern Ireland and 6000 MVA.s in Ireland shall be procured in Phase 1. Three zones have been defined in which the placement of LCIS shall be incentivised.
3.2.1	LCIS definition	LCIS comprises the provision of Synchronous Inertia, Reactive Power support and Short-Circuit contribution.
3.2.2	Technical requirements	A range of requirements is defined for the inertia constant, short-circuit contribution and steady state reactive power capability.
3.2.3	Grid Code compliance	Grid Code requirements for LCIS providers will be largely based on synchronous generator requirements such as frequency and voltage operating ranges and fault ride-through requirements. A separate Grid Code Implementation Note is under development.
3.2.4	Inertia capability requirements	Minimum inertia capability contracted is 900 MVA.s and maximum contracted is 2000 MVA.s for an individual unit at the connection point. Additionally, no more than 2000 MVA.s at a single transmission station will be contracted.
3.2.5	Connection requirements	A LCIS provider can be connected directly or share an existing connection provided they can meet the technical requirements set out in Section 3.2.
4.1	Contract start date and duration	Contract start date between the 1st of October 2024 and 1st of January 2026. Maximum duration for the contract is 6 years.
4.2	Performance Bond and Milestones	A performance bond of 500€/MVA.s or equivalent in £ will be required. Indicative performance milestones are provided and will be further detailed in the consultation on the contractual arrangements.
4.3.1	Availability	Payment based on 97% annual availability requirement, exclusive of 15 days of planned outages allowed annually following notification to the TSOs.
4.3.2	Application of scalars	Performance scalar will apply to incentivise the delivery of LCIS and a product scalar will apply for LCIS providers with better reactive power and short

Section	Requirement	TSOs' Proposal
		circuit contribution capability. A locational scalar will also apply to incentivise the delivery of LCIS in the three zones defined in Section 3.1.4.
4.4	Transmission Network availability	LCIS Providers who are fully or partially unavailable for service provision due to transmission system limitations will be deemed available for service up to the level of provision allowed by the transmission system.
4.5	Network Charges and Licensing	The Transmission Use of System Charges[6] applicable to a LCIS provider will be progressed independently of this procurement.
5.1	Overall procurement process	Tenderers will need to go through a pre-qualification stage. Tenderers that make it through the pre-qualification stage will then receive a Request for Proposal and successful tenderers will be selected based on the cost per MVA.s / h.
5.2	Grid connection / Planning permission requirements	Planning permission is required.
5.3	Connection Offer for successful projects in Ireland	Subject to CRU Direction, a Connection Offer would be issued outside of the Enduring Connection Policy (ECP) process for projects successful in the procurement process.
5.4	Bid format	Bidding a MVA.s per hour price only for the LCIS with application of a product scalar to incentivise the provision of reactive power capability and short-circuit contribution, and a locational scalar to incentivise the delivery of LCIS in the three zones defined in Section 3.1.4.
5.5	Cost of Energy	Cost of imported energy will be factored in the evaluation. It will be converted to MVA.s per hour cost and added to the bid received.
5.6	Price Determination	Pay-as-bid pricing will be used.
6	Funding Arrangements	Subject to approval by the Regulatory Authorities

Table 2: Overview of Proposals

[6] https://www.eirgridgroup.com/site-files/library/EirGrid/Statement-of-Charges-2021_22-_final_draft-v.1.0.pdf

https://www.soni.ltd.uk/media/documents/FINAL-TUoS-Statement-of-Charges-2021-22.pdf

3. Technical aspects

3.1 System needs and Volume

3.1.1 Context

Our operational policy includes several system constraints to ensure that we operate the All-Island power system in a stable and secure manner. As set out in the System Operations Programme published in our Shaping Our Electricity Roadmap, these system constraints will need to evolve to accommodate more RES on the system, especially those related to:

- the minimum number of large units required to be on (currently 8) and;
- the inertia floor (currently 23,000 MVA.s).

Without mitigation measures being put in place, the reduction of the minimum number of large units would lead to the following issues (among others):

- a reduction in inertia and an increase in Rate of Change of Frequency (RoCoF);
- a reduction of fault level (system strength) and short circuit ratio likely to cause protection failures and further instabilities/oscillations;
- a reduction of reactive power support leading to low voltage propagation during system faults and likely to cause reactive power control issues and long post-fault voltage settling times.

The studies carried out as part of this LCIS initiative have demonstrated a clear need and benefit of procuring LCIS to mitigate the issues listed above. By LCIS, we mean devices capable of providing Synchronous Inertia, Reactive Power and Short Circuit Capability provided today by conventional thermal units that will be gradually displaced in real time operations to accommodate more RES. See Section 3.2 for the definition of the service and provider requirements.

3.1.2 Technical Studies overview

The studies carried out focused on the year 2026. The following key assumptions (non-exhaustive) have been considered:

Item	Assumptions
Study year	2026
Minimum number of large thermal generating units	5 (IE: 3 + NI: 2)
All-island wind capacity	7396 MW (IE: 5815 + NI: 1581)
All-island solar PV	1042 MW (IE: 753 + NI: 289)
All-island peak demand	8.01 GW (IE: 6.26 + NI: 1.73)
LCIS devices	None in the base case

Item	Assumptions
Other Notable Developments	Greenlink HVDC Interconnector (500 MW) Celtic HVDC Interconnector (700 MW) Second North-South 400kV 'tie-line' Three new STATCOMs (in South and South-West of Ireland) ~1 GW new dispatchable generation ~2 GW retired dispatchable generation ~1.3 GW of Battery Energy Storage Systems (BESS) ~1 GW of large electricity users

Table 3: Studies assumptions

The studies have been performed as follow:

Stages	Tasks
Stage 1: Preparation of steady state and dynamic cases	• Steady state and dynamic base case model for 2026 network was prepared. • Plexos model was used to obtain valid economical schedules. • Filtering of 8760 schedules to selection of 21 representative points to cover various boundary operational conditions. • Base case model was populated with the economical schedules for the representative 21 operating points. Minimal adjustments were applied for initialisation purposes.
Stage 2: Identification of issues requiring additional inertia (primary concern), fault level contribution (system strength) and reactive power support	• Voltage stability analysis (contingency analysis + transfer scenarios) and time domain simulation (1106 contingencies + Critical Clearing Time) were carried out for each of the representative 21 operating points to identify the most critical contingencies. • Short circuit analysis carried out to reveal weak areas in the network. • For the representative 21 operating points, using the most critical contingencies (21 Trips and 18 faults), further time domain simulation (transient analysis) was carried out to reveal sensitivity to late delivery of the Second North-South 400kV 'tie-line' and the loss of Inverter Based Renewables (on top of the contingency) in weak areas in the network. • Low system strength locations and RoCoF issues identified.

Stages	Tasks
<u>Stage 3:</u> Sizing and placement of LCIS to solve these issues	• The most onerous snapshots were selected for sizing and placement of LCIS • 21 representative candidate locations across the network were identified based on N-1-1 short circuit analysis and post-contingency RoCoF values. • Algorithm for placement was developed: - Take 1 LCIS and connect to the 21 representative candidate locations, each at a time, and carry out time domain simulation for the most critical contingencies (21 Trips and 18 faults) + severe wind trips. Compare the total effective RoCoF improvements (i.e. improved threshold breaches) achieved for each of the representative locations. Choose the location for 1 LCIS according to the total improvements achieved. - Repeat the process by investigating the next LCIS for the remaining representative locations and stop when the total improvements are marginal. • Sensitivity analysis was performed with various sizes of LCIS using the placement algorithm. • The representative chosen locations for LCIS were concluded. • Sensitivity analysis was performed in the proximity of the representative chosen LCIS locations to draw suitable locational zones for LCIS.

Table 4: Studies methodology

The studies determined the following requirements to meet system needs in 2026:

Total system needs: Up to 10,000 MVA.s of inertia;

Location: Up to 4000 MVA.s in Northern Ireland and up to 6000 MVA.s in Ireland, as well as definition of three incentivised zones where LCIS brings most benefits;

Individual LCIS unit capability: Between 900 MVA.s and 2000 MVA.s.

Delivery of this capability will also be a significant step in contributing to the longer-term requirements.

An overview of the studies will be provided at the industry information session that will be held shortly after the publication of this consultation paper (see Section 7.3 for details).

3.1.3 Phased approach

As outlined in the previous section, our studies focused on requirements for the year 2026.

Beyond 2026 we expect further integration of RES and evolution of our operational constraints. For example, we are aiming to further reduce the minimum number of conventional thermal units that are required to run across the island from the five assumed in the 2026 study, to four or less by 2030. This will further reduce inertia, fault level and reactive power capability so we expect to require additional LCIS to meet our requirements by 2030.

We therefore expect to undertake a second phase of LCIS procurement (and further phases if required). For this second phase, the volume and timeline will be subject to the outcome of the first phase (e.g. the location and characteristics of the LCIS units awarded contracts) and analysis of system needs beyond 2026. The capability of non-synchronous technology to provide LCIS shall also be considered in this second phase.

Note also that the SEM Committee Decision SEM-22-012[7] on the High Level Design of the Future Arrangements introduced the concept of a Layered Procurement Framework with longer-term contracts of up to 12 months. Consideration of this new Layered Procurement Framework will be needed for any future LCIS procurement.

Table 5 provides timelines for this phased approach (Phase 2 timelines are indicative).

		Award Contract	Delivery
Phase 1	Up to 10,000 MVA.s	Q3 2023	1st January 2026
Phase 2	Volume and technology subject to outcome of Phase 1, analysis of system needs and technology capability (subject to decision by the regulatory authorities)	TBC	2028-2030

Table 5: Phased approach plan for procurement of LCIS

TSOs' Proposal:

LCIS will be procured in a phased approach. Up to 10,000 MVA.s will be procured in Phase 1 to meet our requirements for 2026. Phase 2 (and further phases if required) will be subject to a later, separate consultation and procurement process (subject to RA decisions) to meet our requirements for 2030.

[7] https://www.semcommittee.com/sites/semc/files/media-files/System%20Services%20Future%20Arrangements%20High%20Level%20Design%20Decision%20Paper.pdf

3.1.4 Volume and locations for Phase 1

As outlined in Section 3.1.2. on the outcome of the studies, we have a requirement of 4000 MVA.s in Northern Ireland and of 6000 MVA.s in Ireland for 2026. Based on the analysis conducted, we have also defined incentivised zones where the location of LCIS brings most benefits as shown in Figure 1.

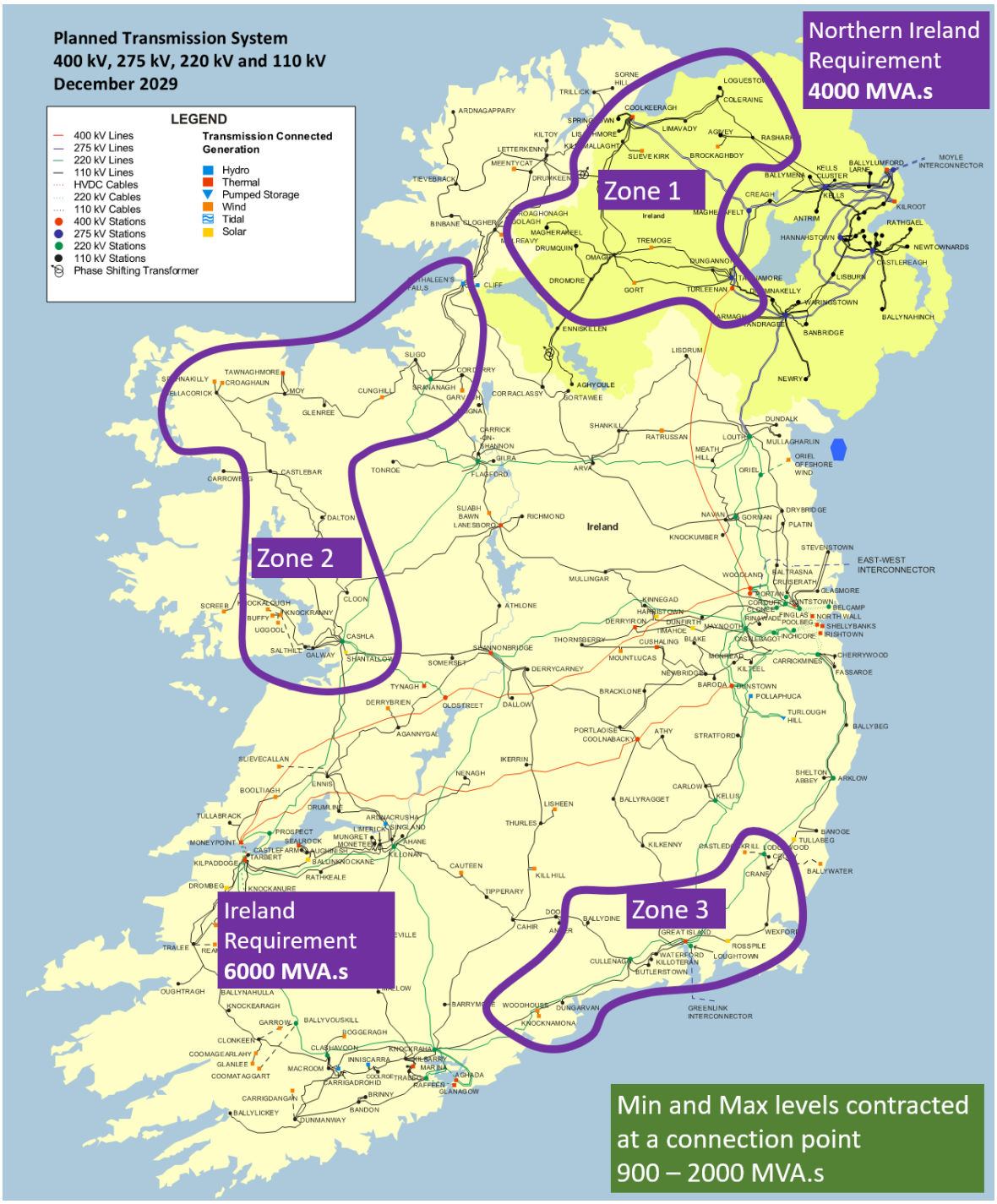


Figure 1: Zones incentivised and requirements (in MVA.s) for placement of LCIS

To incentivise LCIS Providers to connect in these zones, a locational scalar will apply to the bid received.

Appendix A lists the transmission stations in each of the zones and Section 4.3.2 provides further information on the application of the proposed locational scalar.

As outlined in Section 3.2.4, we also propose a minimum and maximum contracted capability at a connection point between 900 and 2000 MVA.s.

Caveats:

- The transmission stations listed in Appendix A have been identified as the most suitable locations for LCIS for solving the technical issues identified in the studies focusing on inertia, system strength and reactive power issues. However, this list of transmission stations has not been evaluated from a connection feasibility perspective;
- Note that the planned transmission network for 2026 has been considered in our studies; Figure 1 shows a map for December 2029 which has only been used in this document for illustrative purposes.

TSOs' Proposal:

A volume of inertia up to 4000 MVA.s in Northern Ireland and 6000 MVA.s in Ireland shall be procured in Phase 1. Three zones have been defined in which the placement of LCIS shall be incentivised.

Question 1: Do you have any comments on the proposed phased procurement approach?

Question 2: Do you have any comments on the volume to be procured and the definition of incentivised zones?

3.2 Product definition and service provider requirements

3.2.1 LCIS Service

To mitigate the displacement of the conventional units and solve the issues identified in the studies, we propose to procure a Low Carbon Inertia Service (LCIS) which includes the provision of:

- Synchronous Inertia;
- Reactive Power support;
- Short-Circuit contribution.

By Low Carbon, we mean providers with a Zero MW Maximum Export Capacity (MEC).

By Synchronous Inertia, we mean the instantaneous physical response of synchronous machines having directly coupled rotating mass, which acts to overcome the imbalance of

supply and demand by changing the rotational speed (and the electrical frequency as well), providing kinetic energy.

By Reactive Power support, we mean both dynamic reactive power and steady state reactive power. For steady state reactive power support, the TSOs, at any time, can instruct the Service Provider, by the issuance of a Dispatch Instruction, to provide Reactive Power (Leading) or Reactive Power (Lagging). The unit will be required to operate under the control of an Automatic Voltage Regulator.

By Short-Circuit contribution, we mean the amount of current that the service provider injects on to the transmission system during a fault.

To provide the required LCIS, potential LCIS units will need to meet the technical requirements as indicated in Section 3.2.2. They will also need to be Grid Code compliant as set out in Section 3.2.3.

TSOs' Proposal:

LCIS Providers will need to provide synchronous inertia, reactive power support and short-circuit contribution to meet the specified requirements.

3.2.2 Technical requirements to provide LCIS

To provide the required LCIS, we propose the following range of technical requirements to be met by LCIS providers:

Technical Requirement at the connection point	Range	Comment
Inertia constant H (MVA.s/MVA)	less than 20s	This range reflects our system needs as well as our understanding of the technology capability of LCIS devices.
Short Circuit (or fault) Contribution (MVA)	≥3 p.u.*	Typical fault contribution for conventional generators is between 4 p.u. and 5 p.u.
Reactive Power (MVAr) * per unit of rating in MVA	Lagging ≥0.8 p.u.* Leading ≤-0.5 p.u.* Automatic Voltage Regulator (AVR) required	This range reflects our system needs as well as our understanding of the technology capability of LCIS devices. The requirements specified here are with reference to the Connection Point. Requirements will ultimately be specified in the Grid Codes at the LCIS unit terminals and Connection Point.

Table 6: Technical requirements at the connection point

TSOs' Proposal:

LCIS providers will need to meet the minimum technical requirements with respect to the inertia constant, short circuit contribution and reactive power, as set out in Table 4.

3.2.3 Grid Code compliance

LCIS providers will need to be Grid Code compliant. However, as an LCIS provider has an MEC of 0 MW, a number of new or modified Grid Code requirements will need to be developed to account for specific features of LCIS providers.

In advance of completion of these Grid Code modifications, we are developing a Grid Code Implementation Note to provide stakeholders with guidance on synchronous LCIS requirements. The requirements will largely be based on synchronous generator requirements such as frequency and voltage operating ranges and fault ride-through requirements. We are planning to publish the Grid Code Implementation Note for consultation in Q3 2022.

Further details will also be provided in the consultation on the contractual arrangements.

TSOs' Proposal:

LCIS providers will need to be Grid Code compliant. In advance of completion of the Grid Code modifications, a Grid Code Implementation Note is being progressed to provide stakeholders with guidance on synchronous LCIS requirements.

3.2.4 Inertia capability requirements

We propose setting minimum and maximum inertia contracted limits on LCIS providers to balance technical requirements that meet system needs, economies of scale and the vendor capability of LCIS devices.

The technical studies demonstrated that it is better to have multiple smaller units rather one big unit to solve some of the issues which the procurement is designed to address. The reason for this is that multiple, smaller devices can better support system strength in weaker parts of the network. Multiple, smaller units would however drive the need for more transmission connections and potentially a higher per unit cost.

Larger units might offer a lower per unit cost and require fewer transmission connections to meet the overall inertia requirement. However, having inertia requirements met by a smaller number of large units could increase availability.

Therefore, balancing these considerations, we propose the following:

Minimum inertia capability contracted at the Connection Point: 900 MVA.s

Maximum inertia capability contracted at the Connection Point: 2000 MVA.s

Maximum inertia capability contracted at a single Transmission Station: 2000 MVA.s

Note that larger units (i.e. with inertia greater than 2000 MVA.s) may participate in this procurement but would only be offered a contract for up to 2000 MVA.s if successful. In this case, the inertia constant parameter described in Section 3.2.3 would be calculated based on the rating of the LCIS device and the contracted value (capped at 2000 MVA.s).

TSOs' Proposal:

The LCIS inertia capability contracted should be no lower than 900 MVA.s and no higher than 2000 MVA.s at the Connection Point. Additionally, no more than 2000 MVA.s will be contracted at a single Transmission Station.

3.2.5 Connection requirements

Each LCIS provider should have a Connection Point at transmission voltage level (110 kV or above).

A LCIS provider can be connected directly to the transmission system or share a connection provided the technical requirements set out in Section 3.2 are met at the Connection Point.

TSOs' Proposal:

The LCIS provider shall connect directly to the transmission system or share a connection provided they can meet the technical requirements set out in Section 3.2.

Question 3: Do you have any comments on the LCIS Provider requirements?

4. Commercial aspects

4.1 Contract Start Date and duration

As outlined in the Section 1.4 on the procurement plan, the targeted date for the procurement outcome (i.e. award of contract(s)) is September 2023.

We consider that 24-months is a reasonable timeframe in which to deliver a LCIS device and go-live. Therefore, we suggest that the targeted go-live date should be at latest the 1st of January 2026. This date also aligns with the study year used to identify our needs.

For any projects that are ready to go-live and begin contract fulfilment earlier than 1st January 2026, the contract start date can be on, or after, 1st October 2024. The start date is set in this way to:

- ensure that funding can be included in our tariffs;
- allow us to implement the performance scalars foreseen in Section 4.3.2 in the settlement system.

In terms of duration, we propose that all contracts will have a maximum term of 6 years. The end date of these contracts will be set for 6 years from the go-live date of each individual LCIS provider meeting the latest targeted go-live of the 1st of January 2026. The proposal of 6 years seeks to provide a balance between providing investment certainty and allowing us to procure services which remain useful to the power system.

For projects that do not meet the latest targeted go-live date of the 1st January 2026, we propose to shorten the duration of the contract by defining the end of the contract to be at the latest the 31st of December 2031.

TSOs' Proposal:

Contract go-live date shall be between the 1st of October 2024 and the 1st of January 2026. Contracts will have a maximum term of 6 years and end no later than 31st December 2031.

Question 4: Do you have any comments on the start dates and duration of the contracts?

4.2 Performance Bond and Milestones

It is proposed that performance bonds will be used in this procurement process. A Letter of Credit from a qualified bank, a deposit to the Company or a Parent Company Guarantee will also form acceptable methods of bonding. Note that alternative arrangements might be considered for LCIS providers who are already operational.

This consultation defines a performance bond as “a financial security provided by the potential bidder to the procuring party which may be called up by the procuring party:

- in whole, where a successful applicant abandons a development,
- in whole, where a successful applicant substantially fails to meet Performance Milestones or the Go-Live Date, or
- in part, where a successful applicant fails to meet Performance Milestones by the due dates.”

Based on the Implementation Plan provided by the tenderer at the tender stage, Performance Milestones dates will be provided by the TSO in the Contract. The proposed milestones for which further details will be provided on the consultation on the contractual arrangements are:

- Substantial Financial Completion;
- Commencement of Construction Works;
- Substantial Completion;
- System Service Compliance.

The contract shall include the obligations to provide Implementation Progress Reports to the TSO for each of the Performance Milestones, no later than 1 week following the relevant Milestone Deadline.

Additional Reporting Milestones shall be also considered in the consultation on the contractual arrangements to be held later in 2022.

It is envisaged that performance bonding requirements as outlined above will be put in place to reduce the risk of project non-delivery. We propose that a €500 Per MVA.s Bond will be required (or equivalent in £).

Further details including detail for each Performance and Additional Reporting Milestone will be consulted on in the contractual arrangements’ consultation.

TSOs’ Proposal:

Successful Tenderers will be required to submit a performance bond on the date of execution of the contract, chargeable in the event of non-delivery. The performance bond will be €500 per MVA.s or equivalent in £ of the LCIS provider’s unit.

Question 5: Do you have any comments on the Performance Bond and Milestones?

4.3 Payment

4.3.1 Availability Requirements

The dispatch of the units providing LCIS is difficult to forecast and while it’s likely to be used at high levels of SNSP when the number of conventional units on the system will be low, it can also bring benefits (e.g. voltage support) during other types of system conditions. For these

reasons, it is imperative that we can dispatch the LCIS provider when needed to maximise the benefits for consumers.

In addition, it's our understanding that LCIS providers likely to meet the requirements set out in this procurement can have a very high availability.

Therefore, as for the Volume Capped Procurement for Reserves in 2018, we propose paying for the service based on availability and requiring a 97% availability on an annual basis excluding the planned period of maintenance for which 15 days would be allowed. This approach allows:

- 3% of unplanned outage over the year without affecting remuneration;
- 15 days of planned outage annually for which the service providers will notify the TSOs ahead of time to allow them to manage this unavailability.

Payment	Comment
Based on availability	• Not dependent on operating hours which gives greater revenue certainty to project developers.
97% availability required	• High availability required as the unit can be used in various system conditions (dispatch difficult to forecast) • Below 97% of availability, revenue reduced by the application of a performance scalar
3% of unplanned outage over the year	• 11 days of unplanned outages allowed without reducing the remuneration
+15 days of planned outage allowed annually	• Service providers to notify the TSOs ahead of time to allow them to manage this unavailability.
Cost of energy imported covered by the energy market	• A market modification is being progressed. Further details will be provided in a separate planned Guidance Note which will address how LCIS providers will be treated from connection through to settlement.

Below 97% of availability over the year, the revenue would be reduced in steps by the application of a performance scalar (the period of planned maintenance would be excluded from the calculation of this scalar).

Further proposals are included in the next section on the application of scalars.

TSOs' Proposal:

The LCIS annual availability requirement will be 97%. This obligation will exclude planned periods of maintenance (with further information to be included within the contracts consultation to be held later in 2022).

Question 6: Do you have any comments on the proposed payment mechanism based on availability?

4.3.2 Application of Scalars

4.3.2.1 Existing scalars

The design of System Services has included the concept of 'Scalars' which could be applied to increase or decrease payments depending on a number of variables.

For the Steady State Reactive Power (SSRP) and Synchronous Inertial Response (SIR) services currently paid by the TSOs under the existing DS3 System Services Regulated Arrangements, the following scalars apply:

Existing Scalars	SSRP	SIR	Comment
Performance	Not implemented		Option to develop one for SSRP but not implemented yet. Value set at 1.
Product	x		Value set at 2 for units with an AVR which provides a more responsive service. No AVR, value set at 1.
Wattless	x		Value set at 2 when service provided at 0 MW output level to incentivise some technologies to provide the service. Otherwise, value is set at 1.
Locational	x	x	Value is at least 1 and above in location where there are scarcities.
Temporal	x	x	Values are set in the DS3 System Services Protocol document and incentivise the units to provide the service according to the level of SNSP

Given the different nature of this procurement and the service to be delivered (e.g. very high availability) in comparison to the Regulated Arrangements (for which the scalars were developed), we reviewed the application of these scalars for the LCIS procurement.

4.3.2.2 Performance Scalar

In the context of this procurement, proposing a payment based on availability, the performance scalar shall be used to incentivise the LCIS provider to reliably provide its services.

Table 7 summarises the performance categories that we are considering.

Performance Category	Performance Metric	Description
Availability	Availability (to synchronise)	To incentivise a high level of declared availability to synchronise the unit and provide services.
	Reactive Power Availability	To incentivise the availability of reactive power capability in line with the contracted capability.
Dispatch	Following Reactive Power dispatch instruction	To incentivise the unit responding to reactive power dispatch instructions from the TSO within the required timeframe.
	Synchronising within specified time	To ensure the unit synchronises within a specified number of minutes of the instructed time.
Operating Performance	Remaining Synchronised	To incentivise the unit to reliably deliver its services in steady state and during system frequency/voltage events – i.e. that it does not trip.

Table 7: Performance categories under consideration

Availability Performance

For the Availability Performance, as for the Volume Capped Procurement for Reserves in 2018, we propose that the revenue is reduced in steps for a reduction in availability to synchronise the unit. In order to provide us with confidence that the successful tenderer will provide LCIS when required, the payment would reduce below 97% and reduce to zero if availability to synchronise fell below 60% as described in Table 8.

However, it's also possible that a unit can synchronise and therefore provide inertia and short circuit contribution but cannot provide full reactive power capability. The application of a Performance scalar for reactive power would also reduce the remuneration in this case.

We propose that the Availability Performance to Synchronise and the Availability Performance for Reactive Power will be calculated each calendar month on a rolling 12 months basis. The overall Availability Performance would be then calculated by multiplying the Availability Performance to Synchronise by the Availability Performance to provide Reactive Power.

Further details will be provided in the contractual arrangements.

Availability	Performance to Synchronise	Performance for Reactive Power
<10%	0%	0%

Availability	Performance to Synchronise	Performance for Reactive Power
≥10% <20%	0%	*10%*
≥20% <30%	0%	*20%*
≥30% <40%	0%	*30%*
≥40% <50%	0%	*40%*
≥50% <60%	0%	50%
≥60% <70%	*25%*	*60%*
≥70% <80%	*50%*	*65%*
≥80% <90%	*70%*	*70%*
≥90% <95%	*85%*	*85%*
≥95% <97%	*95%*	*95%*
≥97%	*100%*	*100%*

Table 8: Performance Availability scalar

Dispatch and Operating Performance

Arrangements for incentivising Dispatch and Operating Performance are likely to be event based and may be implemented by scalars or event charges. Further details will be provided in the contractual arrangements.

TSOs' Proposal:

Three performance categories shall be considered i) Availability Performance ii) Dispatch Performance iii) Operating Performance. For the availability performance, the revenue is reduced in steps for reductions in availability.

4.3.2.3 Product Scalar

'Product Scalars' are typically used in order to incentivise service delivery with characteristics of increased benefit. For example, in the DS3 System Services Regulated Arrangements, the SSRP scalar is set at 2 when the unit has an Automatic Voltage Regulator (AVR) which provides a more responsive service.

As part of this procurement, as set out in Section 3.2.2 on the LCIS provider requirements, there is a requirement for all LCIS providers to have an AVR in addition to complying with several other minimum technical requirements which mean that a product scalar is less useful.

However, in Section 5.5 on the bid format and evaluation, we propose for Option 3 that bids are in a price per MVA.s which would have the advantage of making the ranking of offers simpler and transparent. In order to balance the provision of short circuit contribution and reactive power

capability with the inertia of the unit, we propose that, if Option 3 is retained, we would consider the application of product scalars as indicated in Table 9.

Technical Requirement at the connection point	Range required	Indicative Product Scalars if Option 3 for bid format retained
Inertia constant H (MVA.s/MVA)	less than 20s	<5s → Scalar 1.25 ≥5s <10s → Scalar 1.2 ≥10s <14s → Scalar 1.15 ≥14s <17s → Scalar 1.05 ≥17s <20s → Scalar 1.0
Short Circuit (or fault) Contribution (MVA)	>=3 p.u.*	≥5 p.u. → Scalar 1.15 ≥4 <5 p.u. → Scalar 1.1 ≥3 <4 p.u. → Scalar 1.0
Reactive Power (MVAr) * per unit of rating in MVA	Lagging min 0.8 p.u.* Leading min -0.5 p.u.*	≥0.9 p.u. → Scalar 1.05 ≥0.8 <0.9 p.u. → Scalar 1.0 ≤-0.6 p.u. → Scalar 1.05 ≤-0.5 >-0.6 p.u. → Scalar 1.0

Table 9: Indicative Product Scalars if Option 3 for bid format retained

We propose that these product scalars for enhanced provision of the services would be applied to a service provider's remuneration but not applied in bid assessment. We believe that this allows providers the flexibility to factor in potential revenues from the product scalars in their bids.

Caveats:

Note that these Product Scalars are indicative; If Option 3 should be retained further analysis might be necessary to set the value of each component.

TSOs' Proposal:

Product Scalars would not be retained, unless Option 3 for the bid format is retained. This is because bidding a MVA.s per hour price might otherwise lead to reduced reactive power and short circuit capability if tenderers seek to be more competitive for inertia provision.

Product Scalars would be applied to a service provider's remuneration but not applied in bid assessment.

4.3.2.4 *Wattless Scalar*

This scalar was introduced to offer a higher remuneration to units providing reactive support at 0 MW output level in the DS3 System Services Regulated Arrangements. In the context of this procurement, all LCIS providers will provide a 0 MW output service for which we propose to cover the costs of imported energy. For this reason, this scalar is no longer useful for this procurement and it is proposed to exclude it.

TSOs' Proposal:

The Wattless Scalar should be excluded as all LCIS Providers will provide a zero MW output service.

4.3.2.5 *Locational Scalar*

As set out in Section 3.1.4, we propose a locational scalar to incentivise the placement of LCIS in the zones that provide most benefits.

Zones	Locational Scalar
Zone 1	1.2
Zone 2	1.2
Zone 3	1.2
Outside Zones 1, 2, 3	1.0

We propose that the locational scalar would be applied to a service provider's remuneration but not applied in bid assessment. We believe that this allows providers the flexibility to factor in potential revenues from the locational scalar in their bids and to be more competitive against providers outside of these defined zones.

Caveats:

Note that these Locational Scalars are indicative at this stage and may still evolve.

TSOs' Proposal:

A locational scalar shall apply to LCIS Providers to incentivise them to connect in the zones that bring most benefits.

4.3.2.6 *Temporal Scalar*

The TSOs consider that the introduction of a temporal scalar would mean that the revenues obtained by the LCIS providers would depend on system conditions, which could introduce uncertainty if, for example, in the course of the contract we have a year with low wind/solar output. The objective of these fixed contracts is to provide greater certainty of revenue (for units that perform to the standard expected) which should also translate into lower bids. We also believe that the performance scalar proposed in Section 4.3.2.2 incentivises sufficiently a high availability and thus does not require the introduction of a temporal scalar.

TSOs' Proposal:

The temporal scalar should be excluded.

Question 7: Do you have any comments on the proposed application of the scalars?

4.4 Transmission Network Availability

In consideration of the availability requirements proposed in Section 4.3.1, the impact of potential transmission network limitations have been considered. Whilst a unit may itself meet the availability obligations outlined above, transmission network constraints could mean that the provision of some or all aspects of the LCIS is restricted.

LCIS Providers will have a 0 MW MEC so the traditional concept of firm/non-firm access will not apply. LCIS providers will draw power to start-up and run and will also be required to import and export reactive power to/from the transmission system.

We do not believe that transmission network constraints will significantly impact on the deliverability of the LCIS service where the device is connected to a meshed part of the transmission system (i.e. a connection with multiple transmission circuits). However, where a device is connected via a 'tail' (i.e. a single transmission circuit) there is more risk to the deliverability of the LCIS service.

We therefore consider it appropriate that LCIS Providers who are fully or partially unavailable for service provision due to transmission system limitations will be deemed available for service up to the level of provision allowed by the transmission system.

TSOs' Proposal:

LCIS Providers who are fully or partially unavailable for service provision due to transmission system limitations will be deemed available for service up to the level of provision allowed by the transmission system.

Question 8: Do you have any comments on the proposed approach to Transmission Network Availability?

4.5 Network Charges and Licensing

LCIS providers will be subject to the relevant network charges for their connection. The process for this application and charging exists outside of the requirements for this procurement competition and will be progressed separately.

5. Competition aspects

5.1 Procurement Process Overview

With respect to the requirements laid out in this document, a mechanism by which tenders will be assessed to decide on successful bids is needed. An overall general outline of the procurement process to be undertaken is set out below. This is high level for the purposes of this consultation only and is subject to change based on the final requirements of the services being procured and the procurement procedure selected which must comply with the procurement obligations in each jurisdiction.

Step 1: Pre-Qualification Questionnaire (PQQ) application deadline: only submissions received by the TSOs by the set deadline will proceed to Step 2.

Step 2: Assessment of PQQ submission completeness and responses: only submissions containing required information and meeting the specified requirements will proceed to Step 3.

Step 3: Request for Proposal (RfP) application deadline: only submissions received by the TSOs by the set deadline will proceed to Step 4.

Step 4: Pass/Fail Evaluation Criteria will be used to filter submissions before proceeding to Step 5.

Step 5: RfP submissions that meet the Pass/Fail Evaluation Criteria will be sorted based on ultimate cost: Bids will be compared on a price per MVA.s per hour basis and contracts awarded up to the volume available in Phase 1 of the procurement.

Note that Phase 2 of the procurement will be subject to a separate procurement process that will be informed by the outcome of Phase 1 and further technical analysis.

Question 9: Do you have any comments on the proposed mechanism for assessing tenders?

5.2 Grid connection offer and planning permission requirements

A significant consideration is whether LCIS providers must have a grid Connection Offer or a Connection Agreement in place to be considered eligible to participate in this procurement process. It should be noted that the Connection Offer Processes are jurisdictional in nature and hence different in Ireland and Northern Ireland.

Connection Offer processes

In Ireland, the Enduring Connection Policy (ECP) process is the standard process by which projects obtain a connection offer. For Category A projects, this process only allows developers

to apply for a Connection Offer during September and to receive an offer over the next year as described in the CRU decision[8]. Note that planning permission is one of the conditions to apply.

In Northern Ireland, any person can apply for a Connection Offer at any time. Once the connection application is deemed effective, a Connection Offer will be issued within 3 months (90 days)[9] and will remain open for acceptance for 90 days. A condition of the acceptance is that the 'relevant consent' is in place (which for onshore projects is full planning permission). Please see the SONI Connection Policy[10] for more detail.

Risk and viability of the projects

One of the considerations for this procurement is that non-delivery of the capability would have a substantial impact on our operational roadmap that aims at relaxing the operational constraints (e.g. reducing the minimum number of conventional units on the system) to reach the 2030 targets.

In order to obtain more certainty about the viability of the projects, the request for a Connection Offer received or accepted as a prerequisite to participate in this tender was considered. However, given the tight timeline between the decision that will be taken on the procurement approach and the beginning of this tender, potential tenderers might not have time to get a Connection Offer in Ireland for example and this could limit the competitiveness of the procurement process.

For these reasons, we propose that full planning permission granted will be required to pass the pre-qualification stage. This requirement would allow us to award contracts with a good degree of confidence that the projects will deliver within the required timeframes.

TSOs' Proposal:

Full planning permission will be required to pass the pre-qualification stage.

5.3 Connection Offer for successful projects in Ireland

In Ireland, in order to expedite the issue of Connection Offers to LCIS projects that are successful in the procurement process, EirGrid proposes that a Connection Offer would be issued outside of the ECP process for successful projects. A CRU direction would be required to do this.

TSOs' Proposal:

In Ireland, successful LCIS tenderers who do not have a connection offer will be able to apply for a Connection Offer outside of the ECP process (subject to CRU direction).

[8] https://www.cru.ie/wp-content/uploads/2020/06/CRU20060-ECP-2-Decision.pdf

[9] Subject to any extension that may be granted to SONI under Condition 25(5) of the SONI Licence.

[10] https://www.soni.ltd.uk/media/documents/SONI-Connections-Policy.pdf

Question 10: Do you have any comments on the proposed prerequisites with respect to grid connection and planning permission requirements?

5.4 Bid format

The LCIS requirements proposed in Section 3.2 include the provision of different service components: Synchronous Inertia; Reactive Power and Short-Circuit contribution. The following options set out our consideration of the proposed LCIS remuneration structure.

Option 1: Bidding a MVA.s per hour and a MVAr per hour price

In this option, the bidder would submit a price per MVA.s per hour to provide synchronous inertia and another price in MVAr per hour to provide reactive power capability. This solution clearly separates and defines the revenues for different components of the LCIS provider that could be compared to the existing SIR and SSRP services currently procured under the DS3 System Services Regulated Arrangements.

However, the LCIS service also includes the provision of short circuit contribution and for this reason the TSOs believe that it would better to consider the LCIS service as a unique service rather than trying to define a value for each component. In addition, with such an approach, it would be very difficult to rank the projects as one bidder might offer a very competitive price for inertia and be very expensive to provide reactive power support, while another bidder might be more competitive for reactive support and less on inertia. Therefore, it would be very difficult to rank these two bidders.

If this solution is retained, the TSOs would consider introducing a grading scale awarding points for each of the component according to the price offered.

Option 2: Bidding a discount factor against the tariff rates, with a consistent percentage figure for SSRP and SIR

In this option, the current tariff rates used for SIR and SSRP services under the DS3 System Services Regulated Arrangements would be used as a reference. Bidders would bid a unique discount factor applicable to SIR and SSRP tariff rates. This approach would allow ranking of the bids from the cheapest (largest discount) to the most expensive (least discount). Discounts of less than 0% would be prohibited, achieving a cap on bidders of the tariff rates for SSRP and SIR.

However, the payment mechanism proposed in this procurement, based on availability, is very different from the existing one under the Regulated Arrangements. Therefore, using the tariff rates as a basis might not be relevant and might create some complexity or misinterpretation. For example, bidding a discount does not necessarily mean that the overall cost of the service is going to be cheaper, as this lower hourly rate will be paid for each hour of the year if a unit is able to have availability of 97% or higher. In addition, the TSOs propose to factor the cost of energy consumed in the evaluation mechanism (see Section 4.4). With such an approach, it would be difficult to factor and allocate these costs for the evaluation.

<u>Option 3</u>: Bidding a MVA.s per hour price for the bundle of LCIS services with application of a product scalar to incentivise the provision of reactive power capability and short-circuit contribution

In this option, the bidder would submit a price per MVA.s per hour only. This would have the advantage of making the ranking of offers straightforward. The cost of imported energy (losses) could also be converted to a cost per MVA.s and added to the bid submitted by the bidder.

However, with such an approach, the bidders might be incentivised to minimise their reactive power to be more competitive in this auction which would be a missed opportunity to ensure the provision of needed short-circuit contribution and reactive power capability. Also, some projects at an advanced stage of development may already provide better reactive power and short-circuit contribution capability and may not be competitive against projects that might only maximise their inertia capability.

The application of a product scalar could be used to avoid this happening. The application of a product scalar would be expected to incentivise a tenderer with better reactive power and short circuit capability to bid more aggressively knowing they will have additional remuneration as set out in Section 4.3.2.3.

Table 10 below summarises the pros and cons, as we see them, for the different options.

Options	Pros	Cons
<u>Option 1</u>: Bidding both a MVA.s per hour and a MVAr per hour price	• Clearly separate and define the revenues for providing inertia and reactive power capability	• Allocating value between the two is challenging • LCIS service covers more than inertia and reactive power • Grading scale would need to be developed to award points and rank projects • No cap
<u>Option 2</u>: Bidding a discount factor against the tariff rates	• Simple way of ranking the bids (except for cost of energy imported) • Cap at the current tariff rates	• Complexity and risk of confusion due to two very different remuneration mechanism • Difficulties to factor the cost for imported energy
<u>Option 3</u>: Bidding a MVA.s per hour price only + product scalar to incentivise reactive power and short circuit capability	• Simple way of ranking the bids • The cost for imported energy (losses) could be converted to a cost per MVA.s and added to the bid submitted by the bidder	• Product Scalars needed to compensate projects with better capability • No cap

Table 10: Bid format options

Option 1: Bidding both a MVA.s per hour and a MVAr per hour price

Option 2: Bidding a discount factor against the existing tariff rates for SIR and SSRP

Option 3: Bidding a MVA.s per hour price only + product scalar to incentivise reactive power and short circuit capability

TSOs' Proposal: Option 3 will be used as it allows a transparent way of ranking the bids while incentivising the provision of reactive power and short circuit capability.

Question 11: Do you have any comments on the bid format option proposed?

5.5 Cost of Energy

We propose that recovery of the cost of imported energy for times when the LCIS provider is synchronised will be through the energy market arrangements. We propose that the cost of this energy consumption will be factored into the evaluation of the bids.

To factor these costs into the evaluation, it is necessary to consider:

- the operating reactive power ranges;
- an assumed imbalance energy price;
- the consumption of the device for different reactive power ranges (provided by bidders).

The cost of energy would then be calculated based on the information summarised in .

Elements to consider to factor in cost of imported energy	Proposal
Imbalance energy price (€/MWh or £/MWh)	An assumed Imbalance Price to be confirmed at the procurement stage.
Energy consumed (MWh)	To be provided by the tenderer for the LCIS device at: • 25% of rated reactive power • 50% of rated reactive power • 75% of rated reactive power
Operating reactive power ranges	Operating for: • 80% of the time in 0-25% Q range • 16% of the time in 25-50% Q range • 4% of the time in 50-75% Q range

Table 11: Elements required for factoring cost of energy imported

Note:

- the assumed imbalance price used for the purpose of this evaluation will be confirmed at the procurement stage.
- the operating reactive power ranges are based on the use of representative conventional generator data from 2021.

Based on the operating reactive power ranges and energy consumed, an average consumption in MWh shall be calculated for each applicant. The average consumption shall be multiplied by the assumed imbalance price giving an energy cost per hour.

This cost shall be divided by the MVA.s of the unit in order to obtain an energy cost per MVA.s per hour. Then, this cost shall be added to the bidders MVA.s per hour offer for the evaluation.

TSOs' Proposal:

The cost of energy consumed by the LCIS provider should be factored into the evaluation. The cost of energy per hour would be converted to a cost per MVA.s per hour and be added to the bidders MVA.s per hour offer for the evaluation.

Question 12: Do you have any comments on the approach to factor in the cost of imported energy?

5.6 Price determination

There are two main mechanisms which are generally used in electricity markets/auctions to determine price: pay-as-bid and pay-as-clear. In the former, a successful applicant will be paid the price which they submitted as part of their bid. In pay-as-clear, all successful applicants will be paid the price of the most expensive successful applicant (i.e. the clearing price).

Various frameworks across Europe use both mechanisms and in theory, both pay-as-bid and pay-as-clear should produce similar results. This, however, assumes sufficient competition, which in the case of this procurement exercise may not be the case.

A pay-as-bid mechanism is generally seen as preferable in market power scenarios i.e. where market liquidity is relatively low. Conversely, pay-as-clear pricing is generally seen as a more 'market like' approach and given this, is generally favoured by European Framework Guidelines as the means by which to determine a price for services.

Whilst we consider either option as a credible mechanism by which to determine remuneration for successful applicants, we propose a pay-as-bid approach as better suited to the procurement of a limited quantity of a service that is new to the All-Island power system.

TSOs' Proposal:

Pay-as-bid pricing will be used for remuneration of the LCIS service.

Question 13: Do you have any comments on the proposed 'pay-as-bid' mechanism for remuneration of the LCIS service?

6. Funding Arrangements

The existing System Services arrangements and budgetary allowance is associated with delivering the 2020 objectives, such as operating up to 75% SNSP, and reaching 40% RES-E. These targets have now been achieved. Therefore, new and enhanced System Services and associated funding are required urgently to deliver on the governments' ambitious targets for renewable integration and decarbonisation.

LCIS is one of these new services and requires additional annual budgetary allowance outside of the €235 million allowance as provided for under the existing arrangements.

Proceeding with this LCIS procurement process in 2023 will be subject to agreement on funding arrangements with the Regulatory Authorities.

7. Next steps

7.1 Summary of Consultation Questions

Question 1: Do you have any comments on the proposed phased procurement approach?

Question 2: Do you have any comments on the volume to be procured and the definition of incentivised zones?

Question 3: Do you have any comments on the LCIS Provider requirements?

Question 4: Do you have any comments on the start dates and duration of the contracts?

Question 5: Do you have any comments on the Performance Bond and Milestones?

Question 6: Do you have any comments on the payment mechanism based on availability?

Question 7: Do you have any comments on the proposed application of the scalars?

Question 8: Do you have any comments on the proposed approach to Transmission Network Availability?

Question 9: Do you have any comments on the proposed mechanism for assessing tenders?

Question 10: Do you have any comments on the proposed prerequisites with respect to grid connection and planning permission requirements?

Question 11: Do you have any comments on the bid format option proposed?

Question 12: Do you have any comments on the approach to factor in the cost of imported energy?

Question 13: Do you have any comments on the proposed 'pay-as-bid' mechanism for remuneration of the LCIS service?

7.2 Consultation Responses

SONI and EirGrid welcome feedback on the questions posed within this paper.

Responses should be submitted through either our EirGrid or SONI consultation portals **before 5 August 2022.**

It would be helpful if answers to the questions include justification and explanation and where submitted within the questionnaire template provided with publication of this consultation. If there are pertinent issues that are not addressed in the questionnaire, these can be addressed at the end of the response.

It would be helpful if responses are not confidential. If you require your response to remain confidential, you should clearly state this on the coversheet of the response. We intend to publish all non-confidential responses.

7.3 Consultation Information Session

An information session will be held on **19 July 2022 from 14:30 to 16:00**.

The purpose of this session is to bring you through the key areas of this consultation paper and to allow time for questions and clarifications.

If you would like to attend this information session, **click here to register**.

Appendix A: List of Transmission Stations within the LCIS Incentivised Zones

Zone 1	Zone 2	Zone 3
Agivey 110 kV*	Bellacorrick 110 kV	Ballydine 110 kV
Brockaghboy 110 kV	Buffy 110 kV*	Butlerstown 110 kV
Coleraine 110 kV	Cashla 110 kV	Cullenagh 110 kV
Coolkeeragh 110 kV	Cashla 220 kV	Cullenagh 220 kV
Coolkeeragh 275 kV	Castlebar 110 kV	Dungarvan 110 kV
Dromore 110 kV	Cathaleens Fall 110 kV	Great Island 110 kV
Drumquin 110 kV	Cloon 110 kV	Great Island 220 kV
Dungannon 110 kV	Corderry 110 kV	Killoteran 110 kV
Gort 110 kV	Croaghaun 110 kV*	Knocknamona 110 kV*
Killymallaght 110 kV	Cunghill 110 kV	Lodgewood 110 kV
Limavady 110 kV	Dalton 110 kV	Lodgewood 220 kV
Loguestown 110 kV	Galway 110 kV	Loughtown 220 kV*
Magherakeel 110 kV	Garvagh 110 kV	Rosspile 110 kV*
Omagh 110 kV	Glenree 110 kV	Waterford 110 kV
Rasharkin 110 kV	Knockalough 110 kV	Wexford 110 kV
Strabane 110 kV	Knockranny 110 kV	Woodhouse 110 kV
Tamnamore 110 kV	Moy 110 kV	
Tamnamore 275 kV	Salthill 110 kV	
Tremoge 110 kV	Shantallow 110 kV*	
	Sligo 110 kV	
	Srahnakilly 110 kV	
	Srananagh 110 kV	
	Srananagh 220 kV	
	Tawnaghmore 110 kV	
	Uggool 110 kV	

* New Transmission Stations expected to be built before 2026