



SINGLE ELECTRICITY MARKET COMMITTEE

System Services

Future Arrangements

High Level Design Decision

SEM-22-012

14th April 2022

1 EXECUTIVE SUMMARY

The System Services Future Arrangements (SSFA) project was formally launched by the SEM Committee in July 2020 with the publication of a Scoping Paper (SEM-20-044) for public consultation. Following on from this the SEM Committee published the SSFA Decision Paper 1 (SEM-21-021) in March 2021. This closed the scoping phase (Phase I) and initiated the High Level Design Phase (Phase II).

The High Level Design Consultation paper (SEM-21-069) was issued in August 2021, with consultation on that paper closing on 21 October 2021. This decision paper represents the next step in this process, and sets out a range of decisions that form the SSFA High Level Design. This decision closes Phase II of the project and commences Phase III, Detailed Design and Implementation.

1.1 High Level Design

The SSFA High Level Design Decision puts in place a framework for the competitive procurement of System Services, required for the stable and secure operation of the power system across the island of Ireland. The following elements will make up the framework:

- A daily auction framework will be developed for the procurement of System Services within one day of energy dispatch. This will initially apply to reserve and potentially other products such as ramping and will:
 - Set a price for each relevant service, for specific time periods of the following day; and
 - Award contracts to service providers covering those specific times within the following day.
- A Layered Procurement Framework for longer-term contracts of up to 12 months will be established to work in tandem with the daily auctions to ensure appropriate volumes of System Services are procured. Procurement under this framework will be subject to SEM Committee approval following a recommendation from the TSOs.
- The already established Fixed Contract Framework will be utilised to remove barriers to entry for new technologies and ensure sufficient volumes of System Services, as required.

While the ultimate aim is that daily auctions will sufficiently procure the required volumes for all System Services, alongside the Layered Procurement and Fixed Contract Frameworks, the SEM Committee considers that a period of transition will be required whereby a suite of products will be procured through longer-term contracts or tariffs.

Units which are successful in auctions will be obliged to make themselves available to provide services to the TSOs. Rules around commitment obligations will be established, which will:

- monitor whether contracted units make themselves available as contracted; and

- provide financial incentives and penalties on providers to be available as contracted.

Providers will need to qualify to participate in the auctions. A qualification process is required to establish each provider's capability to provide the relevant service(s). This qualification has two parts:

- All participants will be required to register with the relevant TSO. Participants will be able to apply for registration at any time, with the relevant TSO endeavouring to process each such application within 90 days;
- To allow new technologies to evidence their ability to provide specific services, the TSOs will be required to explore the need for a Qualification Trials Process (QTP) at least annually.

The registration process will confirm the maximum capacity that each provider can offer for the relevant services. Where providers are connected to a distribution network, this capacity may be adapted to reflect the ability of that network to deliver the service to the transmission system. This adjustment will be in line with the relevant Distribution System Operator's (DSO's) Operational Envelope.

Providers of System Services will receive payment from the TSOs in the first instance. The TSOs will recover these costs through a new charge to be imposed on Suppliers, who may in turn recover this from the customer. It is envisaged that this charge will initially be set on an annual basis, but may move to being set more frequently as experience develops on the nature of prices observed in the System Services markets, and how these relate to those observed in energy markets.

Considering the above, it is important that the System Services Future Arrangements Framework is delivered in a manner which enables the SEM Committee and stakeholders to have clear sight on the financial impact of TSO decisions in terms of operational constraints and dispatching of units on the system in terms of System Services Costs, Imperfections Costs and Balancing Market Costs. It is also vital that it is sufficiently flexible in order to enable the introduction of additional measures which can reduce these costs, and can hold the TSOs to account if their performance does not meet the standards that the SEM Committee expects.

As SSFA is developed further through the Detailed Design Phase, these arrangements will be captured in a single document to be known as the System Services Code. Changes to those arrangements will be overseen by a new panel of relevant stakeholders.

1.2 Decisions

Following consideration of the responses to the High Level Design Consultation, the SEM Committee has developed a set of decisions across three main areas:

- Governance;
- Auction design; and
- Market design.

The key decisions relating to governance are:

- **Registration Process:** The SEM Committee has decided on a rolling application process for all services being procured through the System Services Future Arrangements. Under this rolling application process, potential providers will be able to submit an application to the relevant TSO at any time.

This option has been selected as it provides greater flexibility for applicants, will be simpler for stakeholders to understand, and is more adaptable than other options considered.

- **Qualification Trials Process:** The SEM Committee has decided to formalise the QTP and require the TSOs to explore whether a trial is necessary at least every 12 months. This process will include a number of steps to ensure it is transparent and open.

The SEM Committee has decided to formalise this process to provide clarity that the market will remain open to new and innovative technologies, with a clear and transparent route for those technologies to establish their capabilities. This leads to a wider range of technologies being available, which will support lower costs for consumers, as well as reducing the challenges in addressing future system needs.

- **System Services Code:** All arrangements relating to the governance, settlement and procurement of System Services will be set out in a System Services Code. Qualification aspects may also be included within the code. It is envisaged that the System Services Code will be in place by the go-live of the Future Arrangements, however, it is acknowledged that a transition period may be required. The SEM Committee acknowledges that this will require substantial work and legal support to put in place, the scale of which will be greater understood through the implementation phase, to be carried out by the TSOs.

This option has been chosen to improve the transparency of the System Services arrangements.

- **System Services Panel:** A System Services Panel will be established. The panel will be consulted on any changes to the System Services Code or other documentation relating to the procurement of System Services. Membership of the Panel will comprise representatives from industry. The TSOs will be responsible for drafting and submitting modification recommendations to the Regulatory Authorities, and will ensure the views expressed by the Panel are clearly set out.

Consideration will also be given to the development of a preliminary consultative body to convene during the scoping and detailed design phases of the project ahead of the formal establishment of the Panel.

This option has been selected to improve transparency over the evolution of the arrangements, enabling a clearer understanding of any rules changes in the interest of consumer protection and investor clarity.

- **Cost recovery:** The SEM Committee has decided to recover the cost of System Services through a new charge to Suppliers. The creation of this new charge has benefits in:
 - Clearly identifying the costs of System Services as separate to those of Transmission;
 - Allowing flexibility to change the period for which the costs to be recovered are fixed (e.g. from annual to seasonal or monthly etc) as the pattern of costs arising from System Service markets becomes apparent;
 - Initially, due to the charge being set on an annual basis, the cost of System Services will be estimated by the TSOs on an annual basis and will require approval from the Regulatory Authorities. The estimated cost will be then recovered from suppliers through a tariff, set by reference to forecast annual all-island energy demand, also to be forecast by the TSOs. Any deviation from the estimate of costs and actuals will be catered for through a k-factor mechanism, with SEM Committee approval required for recovery of a submitted k-factor value by the TSOs.
- **DSO Interaction:** DSO interactions will proceed on a generally “TSO Led” basis. The distribution system interactions will be agreed by the relevant TSOs and DSOs in accordance with the principles set out below:
 - The process will be TSO-led in relation to the qualification of providers and the procurement of services from those providers;
 - The TSOs will ensure that any limitations on a distribution-connected provider considered necessary by the relevant distribution operator for the secure and safe operation of its system are adequately reflected in the TSOs’ operation of the system services arrangements; and
 - All network operators should work co-operatively to safely maximise access to the system services arrangements by distribution connected providers.

The key decisions in terms of auction design are set out below:

- **Auction Design:** The SEM Committee has decided to proceed on the basis of a daily market auction to take place at some point after the closure of the DAM. This will be followed by a top-up physical auction, based on the TSOs physical dispatch of the system,

if required in order to ensure sufficient volumes of deliverable System Services are procured.

Initially the daily auction would apply to reserve products (POR, SOR, TOR1, TOR2, RRD and RRS), and possibly ramping products (RM1, RM3, RM8) and Fast Frequency Response (FFR) with the aim that all products will eventually be procured through the daily auction framework. The specific timing and operation of the auction will need to be determined through a further consultation in the Detailed Design Phase.

Additionally, the arrangements that will be developed in the Detailed Design phase will ensure the primacy of the market auction, with measures to be put in place to ensure the TSOs seek to dispatch the system as closely as is feasible in line with energy and System Service market results. It is also vital that there is clear transparency on the effect that TSO dispatch decisions have on Imperfections Costs when they are not aligned with the market outcomes. The detailed design will also consider TSO proposals for a forward contracting approach.

The key decisions relating to market design are:

- **System Services Volumes:** A framework for reporting on historic and forecast volumes by the TSOs will be established. This will include long term (10 years), medium term (1-2 years), and short term (daily & weekly) reporting requirements.
- **Secondary Trading:** A platform for secondary trading will not be developed as part of the initial design of the SSFA. However, given the potential benefits of secondary trading, the TSOs shall ensure that their systems are developed with the potential to allow for any necessary system modifications, to enable the operation of a secondary trading platform. Following 18 months operation of the new market arrangements the SEM Committee requires that the TSOs issue a consultation on whether or not a secondary trading platform should be implemented. The outturn of this consultation will be communicated to the SEM Committee. If the SEM Committee decides to opt for a secondary trading platform, then the TSOs will be required to implement a suitable platform within a reasonable timeframe, to be determined by the SEM Committee.
- **Commitment Obligations:** The SEM Committee is committed to the principle of a Commitment Obligation, and will work with relevant stakeholders through the detailed design phase to develop a framework which works for all technology types.
- **Scalars:** The inclusion of scalars will be considered further as part of the detailed design.
- **Firm access rights:** Transmission connected System Services providers will be granted Firm Access to System Services markets for their geographical zone once structural issues related to their connection have been resolved to the satisfaction of the TSOs and the SEM Committee. This Firm Access to System Services markets may also be granted on a product-by-product basis, hence it may (for instance) be possible for a provider to be

granted Firm Access to a reactive market, before it is granted Firm Access to reserve markets.

Market access for distribution connected providers will be determined through the operational envelope to be agreed between the TSOs and DSO/DNO.

This option has been selected to support efficient investment in the provision of system Services and to ensure that only Units that are capable of providing the service are able to partake in the auctions.

- **Layered Procurement:** The SEM Committee has decided to implement a Layered Procurement Framework from the date of this decision, in accordance with Directive (EU) 2019/944 and Regulation (EU) 2019/943. The intention of this framework is to provide a means of procuring System Services ahead of the short-term energy and balancing capacity markets where appropriate. The TSOs will assess, at least annually, whether there is a need for longer-term procurement of System Services, either by its own initiative or at the request of the Regulatory Authorities. The proposal will be subject to SEM Committee approval, and once approved the TSOs may use the Layered Procurement mechanism to competitively procure System Services volumes through contracts of up to 12 months.
- **Locational issues:** The SEM Committee has decided that system services should be procured locationally where there are locational requirements. With reference to the methodology to determine the volume requirements, the TSOs will develop a methodology to determine the appropriate locational zones for system services procurement. During the detailed design phase, the Regulatory Authorities will work with the TSOs and other stakeholders to determine the appropriate locational framework.
- **Transition:** The SEM Committee has decided that a phased approach to the introduction of the System Services Future Arrangements will be required. Under this approach, daily auctions will initially be introduced for reserve services, and possibly also ramping services. The means by which other services will be procured during the transitional phase will be consulted on further during the detailed design.

1.3 Next Steps

The publication of this decision marks the end of Phase II of the System Services Future Arrangements project. Phase III, Detailed Design, will now commence with further consultation papers to be published in 2022.

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2 INTRODUCTION

The purpose of this paper is to set out the decisions on the High-Level Design (HLD) of the System Services Future Arrangements (SSFA), to apply from 1 May 2024.

On 8 July 2020 the SEM Committee published a Scoping Paper on the Future Arrangements for System Services (SEM-20-044). This paper was open for public consultation for a period of 12 weeks. It set out at a high level, the SEM Committee's initial thinking on the System Services arrangements that will apply following the conclusion of the Regulated Arrangement contracts and invited views from stakeholders. The consultation period ended on 2 October 2020, and 24 responses were received. The responses were published in November 2020 (SEM-20-074).

Following on from this, the SEM Committee published Decision Paper 1 of the Future Arrangements on 30 March 2021 (SEM-21-021). This paper provided a summary of the responses to the Scoping Paper and made a number of decisions. Specifically, decisions were made on the Objective and Assessment Criteria for the project, the Regulated Arrangements were extended by 12 months to 30 April 2024, and a framework for procurement of System Services through Fixed Contract Arrangements was put in place. The paper also set out the SEM Committee's approach to the project, with three phases, the Scoping Phase which concluded with publication of SEM-21-021, the HL Design Phase which commenced following conclusion of the Scoping Phase, and the Detailed Design Phase, which will commence following conclusion of the HLD Phase, expected by the end of 2021.

This High-Level Design consultation (SEM-21-069) was published on 26 August 2021 and was open for comment for eight weeks. The paper covered SEM Committee proposals relating to the auction and market design and governance arrangements. The SEM Committee set out options and proposals in these areas, and sought the views of stakeholders. Two workshops were held with stakeholders, along with a number of bilateral meetings with various stakeholders. This paper now sets out the key decisions on the High-Level Design following review of the responses to the consultation. Following on from this paper, the project will move to the Detailed Design Phase, and a number of further consultations on specific areas will be held.

11.1 2.1 Objective and Assessment Criteria

SEM-21-021 set out a final decision on the Objective of the project and Assessment Criteria. The objective of the project is:

“to deliver a competitive framework for the procurement of System Services, that ensures secure operation of the electricity system with higher levels of non-synchronous generation.”

In order to better facilitate the achievement of this objective, the SEM Committee has developed a set of criteria for assessing the proposed framework:

- **Consumer Value:** The pricing of services will be market-based in so far as these secure competitive outcomes in order to deliver consumer value, while taking into account levels of market power for each service;
- **European Compliance:** The arrangements will comply with relevant legislation including the Clean Energy Package (CEP) and the Electricity Balancing Guideline (EBGL) Network Code;
- **System Need:** The framework will operate in a manner which ensures the needs of the system including security of supply are maintained;
- **Alignment:** The SEM Committee will seek to ensure appropriate alignment between the markets in energy, capacity, and System Services, along with all other relevant revenue streams, to ensure an efficient overall outcome for consumers;
- **Accuracy:** The volume of services procured should match the requirements of the system as accurately as possible;
- **Adaptability:** The framework should be sufficiently agile to meet any system changes caused by future policy developments;
- **Simplicity:** The framework should be sufficiently simple and transparent to be readily understood and accessible to all stakeholders;
- **Enable the Energy Transition:** The arrangements will be cognisant of policy decisions in Ireland, Northern Ireland and the UK, and will enable the energy transition in so far as possible;
- **Clarity for Investors:** The arrangements will be clear in terms of how auctions will operate, in order to give a reasonable degree of clarity to developers in terms of financing; and
- **Transparency:** The framework will be transparent such that there will be no imbalance of information among market participants, and full sight of auction results and procurement requirements will be fully visible.

The SEM Committee considers that these arrangements will be in place on an enduring basis. Therefore, the SEM Committee considers that it is important that the High-Level Design appropriately balances the above assessment criteria to ensure the arrangements are sustainably delivering long-term consumer value. Furthermore, the SEM Committee considers that system services will play an increasingly central role in the market. Therefore, the SEM Committee considers it important that clear economic signals are sent to the market to ensure appropriate investment in the sector delivering an overall efficient outcome across energy, system services, and capacity.

2.2 Responses Received

In total 28 responses were received, with 3 of these marked as confidential. The 25 non-confidential responses have been published on the SEM Committee website ([SEM-21-090](#)) and are listed below.

| | | | |
|-----------------------|------------------|--------------|----------------------|
| Aughinish Alumina Ltd | Bord Gais Energy | Bord na Mona | Cruckaclady Mountain |
| DRAI | EAI | EDF | EirGrid/SONI |
| Enerco | Energia | ESI | ESB G&T |
| ESBN | Indaver | iPower | IESA |
| ISS | Moyle | NIEN | Orsted |
| Powerhouse Generation | RWE | SPR | SSE |
| SSP | WEI/RNI | | |

2.3 Paper Structure

Section 1 of the paper sets out the Executive Summary while Section 2 gives an introduction and background to the project.

Section 3 summarises the consultation responses on governance issues, alongside the SEM Committee's comments on the responses, and relevant decisions.

Section 4 summarises the consultation responses on auction design issues, alongside the SEM Committee's comments on the responses, and relevant decisions.

Section 5 summarises the consultation responses on market design issues, alongside the SEM Committee's comments on the responses, and relevant decisions.

Section 6 pulls together all the key decisions into a single section.

Finally, Section 7 sets out the next steps for the project.

3 GOVERNANCE

This section sets out a summary of the responses received to the governance areas of the High-Level Design consultation. This covers the following questions:

- Question 1: Certainty of process
- Question 2: Qualification/registration arrangements
- Question 3: Qualification trial process
- Questions 4, 5 and 6: Governance of rule changes
- Question 7: Funding arrangements
- Questions 8 and 9: DSO interactions
- Question 10: Additional governance considerations

For each of the above, this section summarises:

- The position set out in the consultation paper;
- The main points raised by respondents;
- The SEM Committee's response to the points raised; and
- The SEM Committee's decision (where relevant)

3.1 Question 1: Certainty of process

In previous papers, the SEM Committee stated that the proposed Future Arrangements would be implemented on an enduring basis. The intention of this position was to provide clarity that the SEM Committee did not envisage these arrangements as being revised in the short term, and that they would be in place over a long period of time, while being adaptable in meeting system and policy driven changes over time.

Following engagement with the TSO's while developing the High-Level Design Consultation, the TSOs communicated a view that the term "enduring" did not provide sufficient certainty of process in the length of time the arrangements would be in place. While the SEM Committee considers that the term "enduring" indicates that there will not be wholesale changes to the arrangements over a significant time horizon, for clarity, additional text was included to assure stakeholders no changes would be made until at least 2030 and beyond, and would not have a fixed end date.

Following on from this addition, views were sought on whether the terminology used provided sufficient certainty of process in terms of the proposed enduring nature of the arrangements.

3.1.1 Summary of consultation responses

18 of the 28 respondents sets out views that the arrangements should be in place beyond 2030, on an enduring or "evergreen" basis, with some noting that it would be expected that a market-

based approach would not have a fixed end date. These respondents considered that, if the SSFA will not go-live until 2024, guaranteeing these arrangements only until 2030 represented a guarantee of only six years, and that investors were looking for greater certainty of process than six years' worth of certainty. Some argued that a ten-year or fifteen-year guarantee, represented more certainty of process, and one respondent asked for a minimum 5-year notice of any changes to the regime. Eight of the 28 respondents indicated that the SEM Committee's commitment to enduring arrangements represented sufficient certainty of process.

Three responses recognised that there were limits to which the SEM Committee could guarantee certainty of process, as, for instance, the SEM Committee has to work within the constraints of the EU regulation, particularly when Ireland is physically connected to France via the Celtic interconnector. It was also recognised that unanticipated technological change may drive the need for changes to the regime.

Some respondents noted that there may be a need for a transitional path to an enduring regime (and some made specific proposals for the transition path), but sought greater clarity over the transitional path and/or a "roadmap" to the enduring arrangements.

A number of respondents raised other issues about the other areas in which investors are seeking greater certainty, which are discussed under the relevant headings in this document.

3.1.2 SEM Committee Response

The SEM Committee welcomes the comments from stakeholders in relation to certainty of process. As indicated previously, the intention is that these arrangements will be in place for a long period of time, which is what was meant by the term "enduring". The SEM Committee considers that, in line with the views of most stakeholders, the intention is that these arrangements will be enduring, or "evergreen" and that they will be sufficiently adaptable in order to meet system and policy driven changes, while maintaining the core principles of the framework over a long period of time. An important consideration in this regard is developing arrangements that are consistent with the direction of travel of the EU target model to minimise future legislation driving fundamental changes. The suite of High Level Design decisions have been made with a view to minimising the likelihood of requiring further revisions as a result of developments in policy.

3.2 Question 2: Qualification/Registration Arrangements

The current qualification arrangements involve a procurement window or gate every six months under the TSOs' Gate Tendering Process. In general, tender submissions for each gate must be submitted two to three months ahead of the contract execution date, while testing must be completed approximately two months ahead of the contract execution date.

The SEM Committee wishes to implement a framework which facilitates greater flexibility while maintaining an appropriate level of TSO oversight, to ensure that participating providers are capable of reliably providing services. To that end, the SEM Committee developed two options:

- **Option 1: Gate Tendering Process.** Under this approach the basic structure of the existing Gate Tendering Process would be maintained, but with more gates than the current two per year, to increase the frequency with which providers can access the market.
- **Option 2: Rolling Application Process.** Under this option an open application process would be maintained throughout the year. Potential providers could submit an application to the TSOs to provide services at any time, this would then commence a process with a clearly defined end-to-end timeline. The process would be similar to the existing process, albeit the gates would essentially be open year-round. The SEM Committee further proposed that the responsibility for defining the process would sit with the TSOs but that the process should take a maximum of 90 days from date of application to the TSO's qualification decision (i.e., the point at which the provider could participate in the system services market).

In the HLD Consultation, the SEM Committee proposed Option 2, as it considered several of the assessment criteria to be better met by this option given its greater flexibility and removal of a barrier to entry.

3.2.1 Summary of consultation responses

25 of 28 respondents issued a response to the question on the qualification/registration arrangements, with 22 of the responses favouring the SEM Committee's proposal of adopting a rolling application process. One industry respondent was in favour of Option 1, while the remaining two respondents that replied to the question were the TSOs and the DNO, NIE Networks, neither of which definitively set out a preference for either option.

The TSOs argued that neither option was feasible until such time as all relevant System Services are fully auctioned, due to OJEU requirements. They argued that the quarterly gates aspect of Option 1 would not be consistent with required OJEU timescales as long as some System Services are provided on tariff. They further argued that a rolling application process with 90-day timescales would not be consistent with required OJEU timescales either if some System Services remained on tariff. The TSOs also noted that additional resources and costs would be associated with moving to a 90-day rolling application process (Option 2) but did not provide a ball-park estimate of the order of magnitude of the costs involved.

ESB Networks noted *“that the current application, registration and qualification arrangements were developed from the perspective of the transmission system (as was appropriate at that time) and thus reflect the characteristics of larger, transmission connected services providers. Close*

collaboration between the DSOs and TSOs will be needed to ensure that the future system services arrangements reflect the operating context of smaller, distributed providers (including aggregators of small distribution connected providers)."

One market participant was of the opinion that the 90-day maximum from application to decision was excessive, whilst another cautioned that the testing process can be a time-consuming part of the qualification process and at times, a 90-day window to complete the process from start to finish may prove difficult. Six further respondents highlighted existing issues with TSO resourcing, which could impact ability to process applications within the 90-day window.

3.2.2 SEM Committee Response

The SEM Committee acknowledges the support for a rolling application process by the majority of respondents. The TSOs' comments on the requirements arising from the Utilities Procurement Directive¹ are also noted. This interpretation notwithstanding, the TSOs' are also bound by European law to prequalify potential providers of Reserve within prescribed timescales. These requirements are set out in Regulation 2017/1485.

In each case, the timescales set out in the regulation start from the submission of an application from a potential provider for qualification and regulation, and then set out the **maximum** allowed time for each of the following steps.

- TSOs have 8 weeks from the receipt of an application to confirm whether that application is complete, with the applicant having 4 weeks to provide the missing information. This 4-week period starts from the point at which the applicant is notified of their information deficiencies;
- Once the TSO's have decided an application is complete, they are then allowed to take up to three months to decide whether the providers qualify for the provision of FCR.

On the basis of these requirements, the SEM Committee requires that the TSO endeavours to process all applications within 90 days of receipt of a completed application.

In terms of the comments by ESNB in terms of the design of the current arrangements – the SEM Committee acknowledges the need for close collaboration of the TSOs and DSO/DNO in relation to the Future Arrangements and considers that the suite of High Level Design Decisions reflects this.

3.2.3 SEM Committee Decision

The SEM Committee has decided on a rolling application process for services being procured through the System Services Future Arrangements framework. Under this rolling application

¹ Directive 2014/25/EU

process, potential providers will be able to submit an application to the relevant TSO at any time. Certain services may continue to be procured through the gated process during the transitional period, depending on the approach chosen for procurement of non-reserve services at this time, however the rolling application process will apply to all services upon completion of the transition period.

These arrangements will be developed by the TSOs in consultation with stakeholders. The TSO will be responsible for the administration of these arrangements. In developing these arrangements, the TSOs are required to ensure the process and time scales for the processing of applications consistent with the requirements arising from European legislation. Consistent with these requirements the SEM Committee requires that the TSOs endeavour to complete the process 90 days from receipt of a valid application.

3.3 Question 3: Qualification Trial Process

The Qualification Trial Process (QTP) is carried out in order to determine the ability of technologies to provide System Services products and has also been used to trial communications protocols and performance monitoring improvements. The parameters for any QTP trial are set by the TSOs in advance and participants are invited to tender to take part in the trial.

The SEM Committee acknowledged the positive impact of the QTP to-date, in facilitating the entry of different technology types to the System Services market, and proposed that the QTP should be maintained. However, as the arrangements set out in this paper are intended to be enduring, the SEM Committee considered it appropriate that the QTP should be a formal, predictable, and transparent process for the design of trials and the selection of technologies and participants. Based on this, the SEM Committee supported increasing the formality of the QTP process.

3.3.1 Summary of consultation responses

22 of 28 respondents were in support of, or had no issue with, the increased formalisation of the QTP. Two respondents felt that the QTP worked well as is or, in the case of the TSOs, that a formal process already exists, which has been successful in bringing forward new technology, and that further change would add cost.

A number of responses made additional requests relating to the process, including:

- Streamlining of the process, including the annual consultation process;
- Clear timelines for duration of trials to be specified upfront;
- Appropriate resourcing;
- A move to reliance on penalties for non-performance, as opposed to re-testing; and

One market participant expressed concerns at the potential overlap between proposals set out in the Flextech Hybrid Working Group and the proposals set to formalise the QTP, set out in SEM-21-069. Another respondent noted that the QTP may be used as a vehicle to secure funding for unproven technologies.

3.3.2 SEM Committee Response

The QTP has delivered clear benefits in how the TSOs have deployed it to date, and will continue to have an important role to play in allowing electricity consumers to benefit from new and innovative approaches to the provision of System Services.

The SEM Committee has considered the responses to its consultation – including the TSOs' comments that the process has been established by them, and continues under their control. On balance, the SEM Committee has decided to adopt the proposals set out in its consultation paper. The SEM Committee will introduce a formalised process for the QTP which will require the TSOs to explore the need for a trial at least every 12 months.

Adopting these measures provides a demonstrable ongoing commitment from the SEM Committee to support innovation in the provision of system services, and to ensure fair, transparent and open market access for such novel solutions. This ongoing commitment, in turn, will support investor confidence and consumer benefit in this area.

3.3.3 SEM Committee Decision

The SEM Committee has decided to establish a formalised process for the QTP. This process will include the following steps:

- The TSOs shall issue a call for evidence at least every 12 months to allow for industry, new entrants, and new technologies to input into the design of the trial.
- Following this the TSOs may then design a trial and publicly consult on its proposed trial design. Where the TSOs decide not to run a trial, they will notify the SEM Committee setting out their rationale. In such cases the SEM Committee may direct the TSOs to design a trial in accordance with guidance included in the SEM Committee's direction.
- Taking the output of the consultation process into account the TSOs will notify the SEM Committee for of the TSOs' intended approach. This notification shall include:
 - the objectives of the trial;
 - the technologies and services to be included;
 - the cost of the trial; and

- the period² for which the trial would run, including the dates of key milestones.
- The TSOs shall publish update reports at each key milestone of a trial and a full report when the trial has been completed. The final report shall include sufficient technical detail, and clear conclusions and recommendations.

3.4 Question 4, 5 and 6: Governance of Rules Changes

In the Consultation Paper the SEM Committee proposed that a single document or code should be developed in conjunction with the design of the Future Arrangements, and sought views on this proposal.

Additionally, the SEM Committee proposed two options on the governance of any changes to the proposed code:

- **Option 1:** Maintain the current approach, whereby the TSOs are responsible for the maintenance of all rules and contractual documents and for identifying any necessary modifications, in order to ensure system security and the efficient operation of the arrangements. Under this option the SEM Committee proposed to introduce formalised processes.
- **Option 2:** The TSOs, distribution operators and a set number of members selected by industry would sit on a Panel, which would govern any modifications to the Code. It was proposed that:
 - One of the TSOs would act as chair and secretariat.
 - Any member of the Panel could propose a modification for consideration by the Panel.
 - A modification recommendation would be submitted to the SEM Committee for approval by the TSOs following discussion at a panel meeting.
 - All submissions to the RAs would include the recommendations of the TSOs and also a summary of comments from Panel members (including situations where the TSOs' recommendation differs from that of the Panel).

The SEM Committee stated that both options support consumer value, European compliance, and enabling the energy transition. Option 1 may be more administratively straightforward and better facilitate system needs as the TSOs have greater control over the process, while Option 2 may require a greater balancing of commercial concerns with the TSOs' requirements. The greater role for industry under Option 2 should improve alignment between markets as participants will have an interest in ensuring the markets work effectively together at an operational level. Similarly, this process should improve adaptability relative to Option 1, as issues are more likely to be discussed

² It is noted that while the process proposed in this paper is an annual process, it may be appropriate for any given trial to be of a longer or shorter duration than a year. Therefore, the conclusion of one trial may not line up with the start of the next trial.

earlier and in greater detail through a Panel process. The additional transparency and industry input in Option 2 is likely to better facilitate clarity for investors. Therefore, having considered both options against the assessment criteria the SEM Committee proposed to adopt Option 2.

Views were also sought on the potential to amalgamate the Panel with panels for other Codes.

3.4.1 Summary of Consultation Responses

There was strong support from market participants for a single System Services Code with 23 respondents supporting the SEM Committee's proposal in this regard. The key reason given was the improved transparency, which would aid competition and improve investor clarity. Four respondents recognised the amount of work involved in creating such a code.

Whilst generally supporting the objective of a single System Services Code a number of additional points were raised, including:

- A need for clarity on the precise scope of the Code, given the commercial and legal implications;
- The relationship to other Codes and Licences, and the precedence of other Codes, such as the Grid Code with respect to the System Services Code;
- Jurisdictional issues; and
- The legal structure of the System Services Code, and contractual mechanism for signing up and being paid.

The TSOs did not object to the principle of a single System Services Code, but emphasised that the governance arrangements must allow them to comply with the obligations placed upon them by EU regulations, highlighted the work involved, and sought clarity on whether the System Services Code will cover all services. The DSO/DNOs were also keen to ensure that the governance arrangements did not expose them to the risk of non-compliance with EU regulations.

Additionally, in their response to Question 9, the TSOs proposed segmentation of System Services Code document(s), with different governance arrangements to support TSOs/DNO/DSO compliance with European obligations. In SEM-21-069 the SEM Committee proposed that there be a single document housing the terms and conditions (contractual rules) of the SSFA, but the TSOs proposed 3 separate documents (or at least 3 differently governed sections), as follows:

- Contractual rules for system services arrangements;
- A document for technical processes affecting DSO/DNO networks (managed by the DSO/DNO- i.e. the DSO/DNO make recommendations to RAs); and
- A document for technical processes affecting TSO networks (managed by TSOs, i.e. TSOs make recommendations to RAs)

The implication of the TSOs' proposals is that the Panel would provide advice to the SEM Committee on the contractual rules for system services arrangements, but the TSOs and DSO/DNO would retain authority on amendments concerning their respective technical processes, subject to RA approval.

19 of 28 respondents favoured or did not oppose the Panel approach to governance, with a number of respondents making detailed representation with respect to the composition, voting rights and operating model of the Panel. No respondents supported Option 1, or opposed Option 2, the remaining respondents raised separate points, or did not answer the question. A number of respondents cited the TSC Panel as an appropriate model, whilst others sought wider representation from less mature / emerging technologies. There was a clear consensus not to merge the System Services Panel with other Panels, but to ensure that meeting dates were appropriately co-ordinated.

ESB Networks (DSO) saw themselves as observers on the Panel, and did not feel that it was appropriate for themselves to have voting rights on contractual rules where they were neither the buyer (which they assumed would be the TSOs) nor the seller. NIE Networks see the DSO and DNO as having central roles in governance of the arrangements, and sought to clarify that any decisions which would affect legal and statutory obligations in terms of operating the distribution system must be outside the scope of any panel.

3.4.2 SEM Committee Response

The following paragraphs set out the SEM Committee's response for each of:

- The formation of a code for System Services; and
- The governance of changes to System Services arrangements.

Formation of a code for System Services

A number of responses to the consultation paper combine the governance of changes to the System Service arrangements with whether those arrangements are contained within a code. The SEM Committee sees these as separate issues.

The SEM Committee remains of the view that a code for System Services will bring benefits to the industry, but recognises concerns around the time it would take to form a new code at this time. The key benefits the SEM Committee sees from such a code are:

- Improving the overall transparency of arrangements. A code means that all stakeholders can:
 - easily find and understand the specification of the services; and
 - understand contractual commitments in providing those services;

- Simplifying the specification of the scope of matters to be considered by any System Services industry panel.

Whilst it may be prudent for the System Service Code to evolve over time, the SEM Committee is keen that the above benefits are delivered as quickly as possible.

A number of participants asked whether a System Services Code would take precedence over other codes – such as the Trading and Settlement Code or each of the TSO’s Grid Codes. At this time, the SEM Committee does not believe it would be appropriate to specify an order of precedence between the codes, but will consider this as part of the detailed design. In this respect, the SEM Committee note that:

- This issue of precedence is independent of whether these arrangements are captured in a code or elsewhere;
- The detailed design will consider the scope of the System Services Code, including with regard to other Codes.

Governance of changes to the System Service Arrangements

The governance of changes to the arrangements in System Services has a critical role in developing and maintaining investor confidence and in protecting consumer interest, in those arrangements. There is a balance to be struck between:

- The statutory duties of the TSOs to procure those services necessary for operational security;
- The need for stability, so that stakeholders can understand how the arrangements are working, and the likely value of the various system service products; and
- The need for evolution – both to reflect emerging technologies to provide System Services, and to highlight any changes to the requirements for System Services as we move towards a low carbon economy.

The SEM Committee believe that an industry panel for System Services has an important role in delivering this balance. Notably:

- The value of existing industry panels in their development and scrutiny of proposals, helping to shape arrangements elsewhere in the electricity industry – including changes to the Grid Code, as well as the Trading and Settlement Code.
- To provide investor transparency around the potential for future changes, the Panel will be required to maintain its own website (or dedicated section of a website), and publish:
 - A periodic statement of its forward work-load, including the specific issues being considered;
 - A log of historic decisions – linked to appropriate papers; and
 - An agenda, minutes and papers from each meeting.

As cited by a number of respondents, EU law already makes a number of statements relating to the preparation and approval of arrangements to procure System Services (referred to as Ancillary Services by the EU). This legal framework envisages that those arrangements, and any changes to them, will be subject to approval by the Regulatory Authorities. Consistent with these requirements, the Regulatory Authorities will now require (as part of their approval) that such proposals have been progressed through the industry panel.

The SEM Committee acknowledges the comments in relation to the potential to amalgamate the proposed Panel with other Code Panels and will not progress such a proposal any further.

3.4.3 SEM Committee Decision

The SEM Committee Decision relating to the System Services Code and System Services Panel are set out in the following paragraphs.

System Services Code:

- All arrangements relating to the governance, procurement, settlement and, potentially, qualification of System Services will be set out in a System Services Code.
- It is envisaged that the System Services Code will be in place by the go-live of the Future Arrangements, however, it is acknowledged that a transition period may be required, given the large volume of work and legal input required to implement the Code.
- The TSOs shall develop the System Services Code and, following public consultation, submit it to the SEM Committee for approval. The TSOs shall ensure that the Code reflects all relevant SEM Committee decisions and relevant legislative requirements.
- The TSOs shall develop a transition plan for the governance arrangements and the incorporation of all relevant documentation into the System Services Code. Where policy development and licence modifications are identified through this process, this will be led by the Regulatory Authorities.
- To facilitate this process and to provide transparency for stakeholders, by the end of 2022 the TSOs will ensure that all currently applicable System Services documentation can be easily accessible and permanently available in a defined area on the each of the TSOs' websites, with that area being accessible directly from the relevant home page.

System Services Panel

- A System Services Panel will be established.
- The System Services Panel will be consulted on changes to the System Services Code or other documentation relating to the procurement of System Services.
- Membership of the Panel will comprise representatives from industry. The selection process for the Panel members is not within the scope of this paper, however, it is noted that the selection of members based on technology type may not be appropriate for system services.

- Attendance of Panel meetings will include the Regulatory Authorities, TSOs, Distribution Operators, Panel Members and other attendees as may be provided for in the terms of reference for the Panel.
- The TSOs will be responsible for chairing the meetings and the secretariat functions.
- The Modifications process will be defined as part of the detailed design phase of this project, however, it will provide for the following:
 - Any Panel Member may propose a modification to the System Services Code or other documentation relating to the procurement of System Services.
 - Any proposed modification must be discussed at the Panel.
 - The TSOs will be responsible for drafting and submitting modification recommendations to the Regulatory Authorities and will ensure the views expressed by the Panel are clearly set out. For the avoidance of doubt, this includes modifications where the TSOs' recommendation is for the Regulatory Authorities not to approve the proposed modification. Modification recommendations should include the considerations of the TSOs alongside a detailed summary of the views of the Panel.
 - Where a modification is initiated by the Regulatory Authorities, the Regulatory Authorities will present the proposals to the Panel for discussion and may also consult publicly before presenting to the SEM Committee for decision.

3.5 Question 7: Funding Arrangements

In the consultation paper, the SEM Committee set out a number of options in terms of how System Services payments would be recovered. Under the Regulated Arrangements, the TSOs provide a forecast as part of their respective Annual Revenue Requirement submissions. The forecast amounts are then recovered through the System Services Charge under DTUoS in Ireland, and through the SSS Tariff in Northern Ireland. The consultation options are set out below:

- **Option 1: Network Charges.** Under this approach, the process for recovering the System Services costs would remain the same. The TSO would provide a forecast of expected expenditure on an annual basis. This would be a factor in the calculation of the DTUoS and SSS tariffs, and any over or under recovery would be accounted for in the respective k factor calculations.
- **Option 2: Annual Supplier Based Charge.** This option would see a new standalone all-island charge to Suppliers being created. Similar to Option 1, the TSOs would provide an annual forecast of the required revenue, and similar to the Imperfections Charge, a MWh charge would be levied on Suppliers based on the all-island energy demand forecast. Variance in the forecast would be carried by the TSOs and would be recovered through a k-factor applied subsequently.
- **Option 3: Trading Period Supplier Based Charge.** Under this option the System Services costs over a defined trading period would be levied on Suppliers based on their MWh demand for that trading period. Whilst the granularity (e.g. hourly, daily, monthly,

yearly etc) of the Trading Period was not specified, it was assumed that costs would be allocated to those whose customers were consuming electricity in the Trading Period, pro-rata to their consumption.

- **Option 3a: Allocation of costs to grid users causing increased costs.** Under this option the incremental costs driven by grid users (e.g. generators, interconnectors, etc) would be borne by those grid users. For example, the difference in system services costs between the largest and second largest infeed would be borne by the largest infeed. This would ensure that the incremental cost of system services would be allocated to the grid users driving those costs.

3.5.1 Summary of Consultation Responses

There was a range of opinions amongst respondents, without a clear consensus. 11 out of 28 respondents were opposed to the SEM Committee's preferred Option 3 (Trading Period Supplier Based Charge), while a further two did not express strong views but had some reservations about Option 3. There were a variety of reasons for this position, including concerns that:

- The requirements for System Services, and hence costs of System Services would be higher at times of high wind output, and that this would serve to offset the reductions in energy prices caused by high wind, and disincentivise consumers to switch consumption away from low wind periods to high wind periods. This was the most widely cited concern;
- It would create potential volatility in charges faced by Suppliers, with there likely to be a dearth of hedging products and/or liquidity in those hedging products;
- It would increase the amount of collateral that Suppliers would be required to provide.
- It would require significant changes to Supplier billing systems; and
- It would reduce competition in Supply by favouring large Suppliers because it would increase risk to Suppliers, and favour larger Suppliers with more risk capital available.

The majority of those who argued the disadvantages of Option 3 favoured Option 2, where they expressed a preference, with Option 2 most often being preferred on grounds of predictability for Suppliers. One of the respondents favoured Option 1, but could also see merit in Option 2.

6 respondents were supportive of some form of Option 3, with support for the economic arguments. Three were supportive of the principle of a shorter period of charging but felt it should be based on a daily total as opposed to a trading period basis. Two, including the TSOs, saw the economic logic of the "causer pays" principle, Option 3a.

The TSOs saw economic logic in the application of the causer pays principle, particularly around the treatment of reserves services, and raised issues about whether there would be fair treatment of DSUs, if charges were placed on the demand side, such as in Option 3. The TSOs were also concerned that TSOs should not be required to fund variances between forecasts and actual costs from TSOs' working capital under Options 1 or 2. Options 3 and 3a do not rely on a year

ahead forecast of payments to providers, with volatility in costs being passed on to the payer immediately. The TSOs also questioned whether the same approach would apply to any long-term contracts / layered procurement, and whether the costs of these contracts would/should be recovered under the System Services Code.

A majority of those respondents who commented on Option 3a pointed out the potential complexity in identifying causer, and/or thought that it sends the wrong signals with regard to interconnector and/or intermittent renewables investment (who might also be argued to be a causer of the need for more and faster acting reserve services).

A number of respondents felt they had insufficient information to be able to comment.

3.5.2 SEM Committee Response

There are multiple issues that impact the relative merits of the different options set out in the consultation paper, with most such issues highlighted in the response to the consultation paper.

Firstly, the SEM Committee acknowledges the concerns the points raised by respondents in terms of the complexity in identifying the causer. On this basis, the SEM Committee has decided not to pursue a causer pays approach at this time.

A further point raised relates to cash flow risk. Most respondents expect the magnitude of the cashflow risk to increase initially, as a move to a market based approach will lead to greater uncertainty in expected costs until market behaviours are established and understood. This leads to a potential for greater divergence between forecast and outturn costs.

A defined period of less than twelve months has the potential to pass-on price volatility risk to suppliers whereas an annual cost would be more easily managed by suppliers. Additionally, it is the TSOs' responsibility to forecast outturn annual System Services requirements. For that reason, the SEM Committee has opted to initially adopt a period of 12 months as the basis of the charge.

Additionally, a number of respondents have noted that Suppliers would be required to post collateral to cover their "worst case" liability for System Service cost recovery. This "worst case" will increase in a time-of-use world (Option 3) over that observed where System Service costs are recovered through a tariff that is re-set on a periodic basis (Option 1 or 2).

The SEM Committee acknowledges there could be an increase in the supplier collateral requirements associated with Option 3 if it results in more volatile charges. However, if the charge was made less volatile- e.g. by lengthening the Trading Period over which it was averaged, it would not necessarily materially increase collateral.

The SEM Committee notes that the amount of collateral required may increase under any option if the total annual System Services bill increases as anticipated.

The current arrangements (Option 1) lack transparency. Costs to suppliers and consumers sit within an overall network charge, and are not as visible as they could be. A move to an Annual Supplier based charge (Option 2) would increase transparency, by separating out forecast and outturn System Service costs from network charges. Option 3 provides the potential for greater transparency by providing more granular reporting and charging of costs, as well as having a separate charge.

Whilst there may be issues (as discussed above) associated with risks to suppliers associated with a move to a highly granularity version of Option 3 (such as hourly varying charges), the SEM Committee sees advantages in implementing a Trading Period based charge, with the rate set at the beginning of the tariff year initially.

By implementing an initial Trading Period of one-year, the SEM Committee hopes to mitigate potential cash flow and collateral risks faced by suppliers, and believes that cashflow risks to the TSOs are manageable, and at least partially controllable by the TSOs.

The implication of stipulating Option 3 at this stage is that System Services settlement systems should be specified to be adaptable to accommodate a move to a more granular Trading Periods, as and when appropriate in the light of operational experience of the market.

3.5.3 SEM Committee Decision

A supplier-based MWh charge in line with option 2 in the consultation paper will be implemented initially. As market behaviours become better understood and the relationship between energy costs and system services costs becomes clearer the SEM Committee may move to Option 3, i.e. a trading period based charge. This decision will be provided for in the systemisation that will be undertaken by the TSOs following the publication of this decision paper.

Initially the charge will be set by reference to an annual TSO cost estimate and energy demand forecasts, and charged to suppliers based on actual demand in each period. This will be revisited upon any review of the granularity of the charge.

3.6 Question 8 and 9: DSO Interactions

Following consideration of the responses to the Scoping Paper in relation to the interaction with the distribution systems, the SEM Committee's view is that it is important that the role of the DSO/DNO is accounted for in the arrangements. In terms of the governance of ongoing rule changes, the SEM Committee considers that its proposals in section 3.4, ensure that the needs of the distribution systems will be adequately represented.

Additionally, the SEM Committee developed the following proposals in relation to potential system services providers connected to the distribution system, and how they interact with the TSO and DSO/DNO:

- **Option 1: Provider-Led.** Under this option, the provider would be responsible for engaging with the relevant DSO and TSO separately, that is the provider would engage directly with the relevant TSO to qualify as a system services provider and would also engage directly with the relevant DSO to obtain their consent to provide system services to the TSO. It would be the provider's responsibility to comply with the requirements of both the TSO and DSO, for example only contracting with the TSO for the volume of services agreed with the DSO.
- **Option 2: DSO-Led.** Under this option, the provider would have its primary relationship with the relevant DSO who would then engage with the relevant TSO. This approach has the advantage of allowing the DSO to optimise the contracted system services volumes and consider system level issues directly with the TSO given the needs of the distribution and transmission systems. However, this approach may provide less flexibility for the provider and may complicate the TSOs' qualification process.
- **Option 3: TSO-Led.** Under this option, the provider would have its primary relationship with the relevant TSO who would then engage with the relevant DSO. This approach is similar to the current process where providers apply directly to the TSO and has the benefit of maintaining a direct relationship between the provider and the TSOs while allowing the TSOs and DSOs to co-ordinate a system level approach.

Under all three options, it would be the responsibility of the relevant DSO to set any restrictions on a provider's ability to offer System Services to the TSOs.

The SEM Committee did not express a preference for any of the options in SEM-21-069, but sought feedback on the following questions:

- What level of involvement should the DSO/DNO have in the governance process?
- How should the interactions with distribution connected parties be governed?

3.6.1 Summary of Consultation Responses

11 respondents supported the TSO-led approach (Option 3), with appropriate DSO/DNO involvement/interaction, including DSO/DNO Panel membership. Generally, respondents noted that the direct commercial relationship was between the TSO and the Providers, although five further respondents, including both DSOs and TSOs, did note that there was a requirement for greater nuance, and a more hybrid approach between the network companies.

ESB Networks argued that the high-level models set out in SEM-21-069 were insufficiently nuanced to capture the required interactions, and argued for a more nuanced approach to

distribution system interactions than the pure “DSO led”, “TSO led” and “Provider led”. They argued that the detailed design of the governance arrangements needs to reflect direct commercial relationship between the TSO and the provider, but direct operational relationship between the DSO and the provider.

Most potential providers argued against the complexity and administrative burden placed on investors by the “Provider-led” model, although four respondents favoured this approach.

NIE Networks was an outlier in expressing preference for Provider-led, although two market participants also supported this view.

3.6.2 SEM Committee Response

The SEM Committee remains of the view that any of the options presented in the consultation paper can work; however:

- As highlighted by ESB Networks, the key issue relates to understanding what services can be physically delivered from DSO connected providers to the Transmission System; and
- Each option has different strengths and weaknesses – as highlighted in a number of the responses.

These considerations are discussed further below under the following headings:

- DSO Delivery Capability;
- Integrity of managing DSO capability information; and
- Ease of consumer interface.

DSO Delivery Capability

The deployment of System Services from DSO connected assets depends on the DSO’s network being capable of transporting the service to the relevant Transmission System. This DSO network capability varies over time, depending on:

- The load of customers connected to that DSO network;
- The output of DSO connected (i.e. embedded) generation; and
- The physical capability of the components that make up that network.

The DSOs have informed the SEM Committee that they need to analyse these factors on an ongoing-basis as we approach delivery to form an “operational envelope” giving the bounds on service delivery.

Integrity of managing DSO Capability information

As discussed above, the DNOs will need to determine an operational envelope – which may restrict the quantity of services that can be delivered to the relevant Transmission System for use by the TSOs. It is critical that the TSOs then have full and accurate information on:

- The actual limitations; and
- What this means for the specific plant (within a DSO's network) it can call on for service provision.

This factor argues against Option 1 (Provider led), where that information would flow from the relevant DSO to the provider, and then from the provider to the relevant TSO. Experience elsewhere suggests that lengthening communications chains increases the risk of information errors. This is compounded in this case by:

- The potentially large number of providers;
- The potentially low importance of System Service provision within the generality of things managed by those providers;
- The cost (to the providers) of managing these frequent information flows;

Ease of consumer interface

How DSO interactions are managed will impact how easy it is for providers to operate under any arrangements. The simpler those arrangements, the more likely it is that providers will enter the market.

This factor argues against our Option 1 (Provider led), where the provider has to understand the requirements of, and then interface with, each of the TSO and DSO that are relevant for where it is connected. Barriers to entry will be lower if the provider interfaces with a single party – be that its relevant TSO or DSO.

3.6.3 SEM Committee Decision

The SEM Committee has decided on a TSO-led approach. The distribution system interactions will be agreed by the relevant TSOs and distribution operators in accordance with the principles set out below:

- The process will be TSO-led in relation to the qualification of providers and the procurement of services from those providers;
- The TSOs will ensure that any limitations on a distribution-connected provider considered necessary by the relevant distribution operator for the secure and safe operation of its system are adequately reflected in the TSOs' operation of the system services arrangements; and

- All network operators should work co-operatively to safely maximise access to the system services arrangements by distribution connected providers

3.7 Question 10: Additional Governance Considerations

3.7.1 Summary of consultation

In SEM-21-069 the SEM Committee also asked if there were any further considerations that should be taken into account for the High-Level Design of the Governance Arrangements?

3.7.2 Summary of Consultation Responses

The consultation responses in this part are made up of two parts:

- A number of respondents provided a direct response to the question of whether there were any further considerations;
- Respondents also provided comments against other governance questions that were not directly related to that question.

The responses, in each case, are summarised below.

Direct responses on Additional Considerations

A wind industry participant noted the recent decision by Ireland Department of Energy and Climate Change (DECC) in May 2021 to make EirGrid the Offshore Transmission Operator (OFTO) and Transmission Asset Owner and argued that this decision, may, going forwards, impact upon the reactive power services. They noted that whilst some decisions still need to be taken in this regard, they noted the potential role of offshore wind in providing reactive power and expressed a concern that their ability to provide services may be affected by the potential different relationship between onshore EirGrid TSO and EirGrid Offshore entity. They further noted that, *“Based on our existing experience in the UK where there is ownership separation between the offshore wind farm and OFTO it is critical to understand which assets are providing the reactive power and how it is instructed (i.e. via automated settings / obligations in connection contract) and how the provider will be paid”*.

ESB Networks noted that, discussion of governance arrangements has *“failed to identify the need for distribution interactions in either day ahead or intraday market operations. If this were the case in the design which is realised, the potential resource delivered by distribution connected users would be significantly reduced. Any proposal which does not involve active DSO interactions at the bidding, scheduling and dispatch phases will result in substantially greater and unnecessary restriction of providers participation.”*

A number of storage providers and demand-side providers expressed frustrations at a range of limitations on their ability to participate in current DS3 markets and expressed a concern that they be rectified for the SSFA, if not before the SSFA come into force.

Additional Governance Considerations raised elsewhere

Respondents provided a number of comments against other governance questions that were not directly related to that question. The key comments are:

- **Cost Recovery for Qualification & Registration:** NIE Networks highlighted potential administrative issues with the preferred option, as well as noting that it currently absorbs costs associated with network adequacy assessment related to System Services qualification into its RP6 allowances, and would require additional Price Control allowances for the more intensive process proposed.
- **Need for Retesting under the Qualification and Trials Process:** One respondent questioned the need for re-testing, suggesting a move to reliance on penalties for non-performance, as opposed to 'bureaucratic' re-testing.
- **Privacy of Customer Data:** The DSO's have highlighted concerns over the privacy of some information that may be shared with the TSOs.

3.7.3 SEM Committee Response

The SEM Committee's response to each of the above points is set out below.

OFTOs and Reactive Power Provision

As OFTOs are DC (Direct Current) assets, they cannot transport Reactive Power from the off-shore generators to the Transmission System. Any Reactive Power provided by OFTOs is as a result of the design of the (OFTO owned) on-shore equipment where the OFTO connects to the Transmission System. This gives rise to a number of issues:

- As the equipment that provides the Reactive Power is owned by the OFTO, it seems appropriate that the OFTO should receive payment for any Reactive Power provided;
- This may lead to a (at least perceived) bias to buy Reactive Power from an OFTO, where the relevant TSO is both the buyer of reactive Power, and the owner of the OFTO;
- The actual Reactive Power capabilities required of an OFTO is agreed with the relevant TSO at the time of agreeing its connection to the relevant transmission system.

The SEM Committee acknowledge there may be a perceived conflict of interest in this area, but note there are no current plans for competition between OFTOs, mitigating any potential for a TSO to specify higher cost connection requirements for OFTOs it doesn't own.

As we progress to detailed design the SEM Committee will keep under review the issue of potential bias in procuring Reactive Power from OFTOs.

DSO Interactions in Scheduling and Dispatch of System Services

The SEMO Committee agree that the DSOs have a key role to play in the scheduling and despatch of those System Service Providers connected to their networks. At a minimum, this role covers the determination of operational envelopes as discussed in 3.6 above. The exact processes for this will need to be defined during the detailed design.

Concerns of storage providers

The SEM Committee wishes to remove all artificial barriers to participation in System Service markets. In this respect, the SEM Committee notes the concerns raised by some storage providers, and will consider how these can be addressed as part of the detailed design.

Cost Recovery for Qualification & Registration

The SEM Committee notes the issues raised by NIE Networks relating to recovering any costs that may be imposed on NIE Networks by these arrangements. If and/or when these arrangements impose additional costs on the network companies or TSOs, that will be a matter for them to discuss with the relevant Regulatory Authority.

Privacy of Customer Data

The DSO's have highlighted concerns over the privacy of some information that may be shared with the TSOs. Other privacy issues notwithstanding, GDPR³ will provide protection for any information that identifies the location, contact details or characteristics (including electricity demand) of domestic customers.

The SEM Committee acknowledges the issues relating to the privacy of customer data; however, these are subject to separate regulation by:

- The Data Protection Commission in Ireland; and
- Information Commissioner's Office for Northern Ireland.

Companies will be answerable to the relevant of the above two entities for how they then manage the privacy of this data. At this stage, we do not believe this should restrict the development of the System Service Markets – provided all parties recognise and adhere to their statutory obligations.

³ Regulation 2016/679, "General Data Protection Regulation"

4 AUCTION DESIGN

The SEM Committee's consultation includes 2 questions (Questions 11 and 12) relating to Auction Design. This consultation paper set out three design options for the daily auctions:

- **Option 1: Post DAM Day Ahead auction.** The first design option is based on auctions that would take place after the publication of results from the Day Ahead Market for energy (DAM).
- **Option 2: Pre-DAM Day Ahead auction.** The second option would see the System Services auction take place ahead of the opening of the DAM; and
- **Option 3: Ex-Post Balancing Market Solution.** The third option is based on procurement taking place after the real time balancing of the market. Participation in this system services market is then constrained to those services plant could actually deliver given their implied running following the balancing market.

SEM-21-069 noted that, given the need for European Compliance, and the SEM Committee's considerations that Options 1 and 2 would be more readily adaptable to future changes in policy and developments in other markets, the SEM Committee considers that both Option 1 and 2 are more favourable compared to Option 3. Both these options also provide greater clarity for investors, and the SEM Committee considers that market-based solutions send appropriate economic signals. Option 3, while having the benefit of taking into account constraints, does not align as closely with European legislation as the other two options. Moreover, it could be interpreted as not being a market-based solution, and the determination of successful units may be unclear to bidders into the market as it is driven by TSO operational practice rather than price determined.

Between Options 1 and 2 the SEM Committee considered that, while both offer clarity for investors, European compliance, simplicity and adaptability, on balance Option 1 is more preferable. Under Option 1, the volumes forecast and auction would take place closer to real time, reducing the risk of variance with outturn requirements. Additionally, the majority of Scoping Paper responses indicated a preference for having sight of energy market outcomes prior to bidding on System Services. Whilst SEM-21-069 stated that the SEM Committee will continue to explore the merits of both Options 1 and 2 throughout the consultation and HLD decision making process, the SEM Committee proposed Option 1 (Post-DAM Day Ahead).

4.1 Summary of Consultation Responses

There was no clear consensus on which of the three Options presented was favoured. A number of respondents expressed a desire to see more detail prior to being able to make informed comment, and some respondents asked for worked examples to illustrate how the options would work, including illustrating timelines. Some respondents argued that it was either premature or unnecessary to lock-in a decision on auction timings at High-Level Design stage.

Of those who commented on the various options, the key points were:

- Of those that expressed a preference, there was generally more support for a post DAM ex ante auction (Option 1), although the majority argued that there was a need for more detail before a definitive response could be provided;
- Representatives of intermittent renewables/DSU/storage industry generally preferred options which operated close to real time, and urged the SEMC to consider models employed in New Zealand and Australia, which they argued are ex ante models with “gate closure” for System Services much closer to real time;
- The DSO/DNOs urged the SEM Committee to give more consideration to the time needed to calculate the “operational envelope” for distribution connected providers. It is recognised that an increasing proportion of System Services will come from distribution system connected providers, including DSUs, energy storage and smaller renewables. The DSO/DNO need time during the auction process to calculate and allocate the available capacity to provide System Services amongst distribution connected providers. They can calculate and allocate capacity at any point in the process, so can work with any of the three options. However, they will need to take a more conservative approach to available capacity, if required to undertake the calculation further ahead of real-time. Also, time needs to be built into the daily process for the “operational envelope” calculation;
- A number of respondents were concerned at the lack of transparency associated with Option 3, the ex-post option. The lack of transparency was argued to be detrimental to investment, and some market participants argued that the TSOs should be subject to more transparency in system services procurement in real time too;
- One market participant argued in favour of a “hybrid solution”, which is a hybrid of Option 1 and Option 2, with certain “unit commitment” services procured in daily pre-DAM auctions (Option 2), and other services procured post DAM (Option 1). We discuss their proposal further below.
- A number of respondents noted the increased importance of secondary trading, if market participants are to have Commitment Obligations based on the outcome of an ex-ante auction at Day-Ahead stage (either Option 1 or Option 2).
- The TSOs stated that there is mention in SEM-21-069 of Option 3 being less closely aligned with Europe, and that there were concerns that Option 3 is not compliant with European regulation. However, the TSOs stated that in their view, all of the options are compliant with European legislation and there is no obvious reason why it would need to change to match the European approach.

Since submitting their response to the consultation, the TSOs have engaged in a series of bilaterals with the RAs in which they have set out more detailed proposals for how a version of Option 3 would work. The TSOs are concerned that a post-DAM SS auction, would be “System Services insufficient”, i.e. there would not be sufficient volume which, based on its market position, would be in a position to provide the required volume of System Services. They are concerned

that only once the TSOs have undertaken balancing actions via the BM, will there be sufficient System Services volume available. Potentially this creates issues for Option 1, in that:

- The auction does not clear on a regular basis, so how does the price get determined;
- The SS auction pays market participants which are in-merit in the post-DAM market auction, but are not necessarily those market-participants who actually end up providing the service.

They have therefore proposed a variant of Option 3, which is arguably a hybrid of Option 1 and Option 3, which has a market-based auction (like Option 1) initially, but also has a “physical” auction as a fall-back, which also pays physical providers who were not necessarily in-merit in the market-based auction (i.e. like Option 3).

Under the TSO Option, the daily auction process would work as follows:

- Market participants would submit their bids for each of the auctioned services (volumes and prices) at a time to be determined depending on the timing of the auction. There are a few different options that should be considered in relation to this detailed design in conjunction with market power considerations. For example, whether the volume and price should both be submitted at the same time after the day-ahead market results, or if the price should be submitted at the same time as the day-ahead market gate closure time with volumes being submitted once the day-ahead market results are known;
- The TSOs run a SS “market” auction at the day-ahead stage, based on the bids submitted by market participants. All units with firm access would be free to bid into the auction, however if the commitment obligation is the Final Physical Notification (FPN), which through energy market arrangements is expected to align with the final net traded position of the unit, then it would be expected that only those market participants who have gained an energy market position⁴ consistent with provision of the relevant service in the day-ahead market, or who believe they could gain such a position through further intraday energy market trading, would submit a bid volume for the relevant services.
 - This is particularly the case for those conventional thermal generators who would need to be synchronised to a certain minimum generation level in order to provide the services. For other unit types such as batteries and DSUs, which can provide other services such as reserves without needing to have traded in the energy markets to a certain level, it is assumed that the default FPN which applies to them through the energy market arrangements in the absence of them trading or submitting one explicitly, i.e. a 0MW FPN, is sufficient to assume they are meeting their commitment obligations, although further information, such as their mode of operation, may be required from them to determine if and how they are meeting their obligations to provide the services. Further arrangements may need to be

⁴Depending on timings to be defined, this may include the intra-day market trades as well as DAM results

- considered if non-balancing market units are allowed to participate in the service auctions, such that the information they provide to demonstrate how they are meeting their commitment obligation is equivalent to the FPN information for units registered in the balancing market;
- The extent to which this non-bidding would occur in reality would depend on what the consequences will be for not meeting the commitment obligation, e.g. if a unit is obliged to provide the service through their FPN and therefore their market position, and if they do not do so, then they are subject not just to non-payment of the service due to non-delivery but also to a reduction in payments over an extended period of time through the relevant performance scalars. If service providers are subject to more impactful performance penalties that could actually result in units making a loss, then it is likely that they would not want to take on this risk and therefore would decide not to bid into the services auction if they believe they could not achieve the required FPN level. If the commitment obligation was different, or the results of not meeting the obligation less impactful, then there could be instances of units deciding to bid into the auctions even where they believe that they cannot meet the obligations needed to provide the services. This balance between having a strong commitment obligation and enabling units to bid into the services auction without excessive levels of risk would need to be discussed further in the detailed design.
 - The market position and FPN do not take into account any non-energy actions which the TSOs may need take to ensure that the minimum System Services requirement is met⁵. Therefore, if there is non-bidding due to the risk highlighted in the previous points, there is a chance that there will be insufficient volumes of bids to meet the required volume for a service, which would cause issues with the market auction which need to be resolved. Without any further design elements to account for these occurrences, it is likely that the auction for that service would fail to clear due to mathematical infeasibility where the supply and demand curves do not intersect⁶. However, in the detailed design it may be possible to develop additional elements which can prevent the market auction from failing, such as elastic demand or slack variables in the algorithm which could allow for the market auction to clear below the full required volume. If the market auction clears, either at the full required volume or a partial volume, auction winners are paid the clearing price for their cleared volume, adjusted by relevant scalars, if they provide the service through meeting their commitment obligations or if the reason for which they could not provide the service was not within their control e.g. redispatched by the TSO. If the auction winner fails to provide the service through their commitment obligation or some other reason which would have been within their control, then they would not be paid and would have further impacts on performance monitoring, scalars, etc. If the auction fails, then there are no cleared volumes and no clearing price for market auction winners to be paid.

⁵The market position does not take into account any early non-energy balancing actions which the TSOs undertake before Gate Closure

- Although this auction failure outcome is possible for all services and all periods, this is more of a concern for those services which rely on the units which would be most likely not to bid in, due to the risks of not being able to meet the commitment obligation, such as thermal units being unable to get an FPN which reflects them being synchronised in periods with very high forecasted renewable generation and therefore unable to provide inertia and reactive power services. It is less of a concern for those services which can be provided by units with a 0MW energy market position, such as reserves which can be provided by batteries and DSUs even in high renewable generation periods;
- If, in real-time, the actual System Services providers are different to the market auction winners, the TSOs conduct a “physical auction” as a method of determining which of the units which physically provided volumes should be paid for meeting the required quantity of service not met in real-time by those units which were successful in the market auction. The required volumes to be cleared in the physical auctions will be the volumes of required services not met by market-auction successful units, e.g. it could be the entire volume if the market auction failed, or it could be no volume to be cleared in the physical auction if all of the required volume is met in real-time by market-auction successful units, or it could be shortfall volume if the required volume of service in real-time is greater than was procured in the market auction, or if a market-auction successful unit did not provide the required volume of service in real-time. The price bids used for this physical auction need to be determined through detailed design with consideration of other elements such as market power, for instance bids could be based on previously submitted prices or there could be some allowance for closer-to-real-time resubmission of prices, but the volume of bids for the physical auction would be based on the volume of services the units actually physically provided after scheduling and dispatch by the TSOs and on the ability to provide the relevant service based on the real-time physical position⁷. Any SS volume which was not cleared in the “market auction”, but clears in the physical auction, gets paid a physical price – the volumes already cleared in the market auction cannot be bid into the physical auction and therefore would only be paid the market auction clearing price. What this physical price will be is to be decided upon in the detailed design phase, again taking into account other elements such as market power and incentives to ensure units participate competitively in the market auction.

Some respondents raised a number of wider points concerning the wider auction design. Key points include:

- Transitional approach: A number of respondents argued that it would be necessary/preferrable to employ a transitional approach to implementing auctions, and

⁷ Divergence between the real-time physical position and the market position may occur for a number of reasons, including due to TSO balancing actions to manage any of the following: transmission constraints; SNSP levels; System Service adequacy; unanticipated changes in demand; and forced outages

asked that the SEM Committee set out the transitional approach as part of the High-Level Design decision. In particular, the TSOs, set out a proposed transitional approach, which is described below.

- Other market participants proposed a system of long-term and short-term auctions, and set out their own design proposals for how long and short-term auctions could be implemented together;
- Constraints and curtailment: the TSOs stated that they “*believe that the fundamental question of potentially using constrained or unconstrained auctions is important to consider at this High Level Design stage. One specific concern is that the initialisation of the auction from the ex-ante schedule may well be at high SNSP system services deficient and as such intractable*”.
- Other respondents raised a number of other points of detail concerning the auction design, including:
 - Arguing that the auction design needed to have a locational element, for instance via nested zones like in the Capacity Remuneration Mechanism;
 - Arguing that there was no need for market power controls/price caps in the auction, and asking the SEM committee to set out its approach to market power (or that it will not employ market power controls) at high-Level Design stage;
 - Arguing against the use of a more complex combinatorial auction format;
 - Arguing in favour of pay-as-clear rather than pay-as-bid
 - Asking the SEM Committee to consider further how the proposed auction design relates to emerging SEM Committee decisions related to Electricity Balancing Guidelines (EBGL) and articles 12 and 13 of the Clean Energy Package related to priority/non-priority dispatch.
 - Asking how procurement via the auctions will relate to requirements to provide System Services under the Grid Code, and a fear that the TSOs would undermine the System Service market by opting for System Services provided for “free” under the Grid Code obligations.

The TSOs proposals for the phasing of a transitional approach as follows:

- Phase 1:
 - Reserve services procured via a daily auction;
 - Other services should continue to be procured via further extended tariff arrangements;
 - In addition, fixed contracts where there is a specific capability need, for example for zero carbon sources of inertia.
- Phase 2: expansion of the auction to include all System Services and to also incorporate long term Contracts for Difference (CfDs) and the use of locational scalars.

4.2 SEM Committee Response

The SEM Committee acknowledges the lack of support for Option 2, and will not be progressing an auction design which would take place before the DAM. In terms of the TSO's argument that the SEM Committee's evaluation of Option 1 is too favourable, and evaluation of Option 3 is too unfavourable as a result of a focus on EU Compliance, the SEM Committee wishes to clarify that it is not arguing that Option 3 is non-compliant with the EBGL, the Clean Energy Package or other relevant EC regulation. However, the available evidence suggests that the direction of travel of EU and GB markets is towards variants of Option 1, with auctions for frequency response capabilities being auctioned ex ante at Day-Ahead stage. It is therefore probable that EU regulation will be developed further in a manner that necessitates modifications to the System Services Future Arrangements. As mentioned in Section 3.1, it is the SEM Committee's intention to make these arrangements enduring in nature insofar as is possible.

The SEM Committee notes that stakeholders are looking for more detail prior to being able to make informed comment, and some respondents asked for worked examples to illustrate how the options would work, including illustrating timelines. The SEM Committee agrees that more work should be done before making decisions on precise auction timings.

With consideration to the views from some technology types in terms of having auctions closer to real time, the SEM Committee recognises the importance of these technologies in future System Services provision, as the SEM moves towards being able to accommodate levels of SNSP as high as 95% or higher. There are a number of unresolved uncertainties associated with respect to the precise timelines of a Post DAM approach.

The TSOs raised concerns that a Post DAM approach may lead to volume insufficiency and a mismatch between auction winners and the TSO dispatched real-time providers.

In terms of volume insufficiency, some technologies need to be running in order to provide most, if not all System Services. This is particularly true for more conventional technologies. However, less conventional technologies such as a battery or a DSU may be able to provide response much more quickly from a position where it was not previously scheduled in the energy market. Therefore, depending on what quantities of key technologies are available, is not necessarily the case that an ex-ante System Services auction will be volume insufficient. This point is further illustrated in a worked example in Appendix [2].

One way in which the risk of volume insufficiency risk may be mitigated is to hold the ex-ante auction later in the day, closer to real-time and after the LTS run results have been published. Holding the auction closer to real-time may increase the ability of some technologies, such as DSUs and wind to compete in the market, increasing volumes in the auction.

The precise timings of the auctions will be explored further as part of the detailed design process. It is important to note that the SEM Committee considers it important that through this market

design, the true market value is reflected in the auction price. While the SEM Committee acknowledges the potential for mismatches between auction winners and real-time providers due to limitations in TSO operational dispatch, it is considered important that every effort is made to dispatch the system with respect to the auction results for both energy and System Services insofar as possible. However, it is acknowledged that this may not always be feasible. A post LTS auction may help to bridge any mismatch between the market and real time dispatch and thus will also be considered further as part of the detailed design process. A potential solution may be to hold both a market auction, followed by a physical top-up auction, should all winners of the market auctions not be capable of providing services as a result of TSO actions.

Under this approach, it would be important to prioritise participation in the market auction, in order to ensure the primary role of the market auction— for this reason, further consideration will be given in the detailed design phase as to what payment those who provided volumes in the top-up physical auction are eligible to receive.

This approach aligns with further representations the TSOs have made in post-consultation engagements.

The SEM Committee acknowledges the respondents concerns around deliverability of the services. Based on these comments, and further engagements with the TSOs on this point, the SEM Committee considers it prudent to adopt a phased approach to introducing the framework with some products moving to daily auctions initially and the remaining products at a later date. The shape this transition takes, and the treatment of products not initially procured under the daily auctions will be developed further during the detailed design phase.

Further consideration will be given to the TSOs proposals around CfDs as part of the detailed design. However, as these proposals were not consulted on previously no decision can be made at this time.

The SEM Committee agrees with those respondents who saw advantages in introducing zonal requirements into the auctions, such as by introducing nested zonal requirements for some or all services. As can be seen from the TSOs operational constraints policy there are significant locational constraints on the all-island system. Other services such as reactive or inertia may be more local in their requirements, and it may be that different zonal definitions will be required for different services.

Employing a zonal approach, or locationally defined products, would also send price signals to investors to invest in the right location, and could replace administratively set locational scalars. Employing a locational approach also reduces the cost to consumers if providers are granted firm access (in the context of System service markets) - see discussion in Section 6.11.

4.3 SEM Committee Decision

The SEM Committee has decided to proceed on the basis of a daily ex-ante market auction to take place at some point after the closure of the DAM. This will then be followed by an ex-post physical top-up auction, based on the TSOs physical dispatch of the system, to take place if there are insufficient System Service volumes procured through the ex-ante market auction. Total volumes procured through the primary market auction and the top-up physical auction will not exceed the total service requirement. It is expected that the volumes procured through the top-up auction, and the necessity of the top-up auction, will reduce and phase-out over time.

Initially the daily auction would apply to reserve products (POR, SOR, TOR1, TOR2, RRD and RRS), and possibly ramping products (RM1, RM3, RM8) and Fast Frequency Response (FFR), with the aim that all products will eventually be procured through the daily auction framework. The specific timing and operation of the auction will need to be determined through a further consultation in the Detailed Design Phase. Worked examples of the potential steps in an auction to take place following closure of the DAM, and following the afternoon LTS run, are included in Section 8.

Additionally, the arrangements that will be developed in the Detailed Design Phase will ensure the primacy of the market auction, with measures to be put in place to ensure the TSOs seek to dispatch the system as closely as is feasible in line with energy and System Service market results. The market auction will account for the locational service requirements, this is addressed further below. The detailed design will also consider TSO proposals for a forward contracting approach.

5 MARKET DESIGN

This section sets out a summary of the responses received to the market design areas of the High-Level Design consultation. This covers the following questions:

- Question 13: Volumes
- Question 14: Secondary trading
- Question 15: Commitment obligations and scalars
- Question 16: Imperfections and firm access
- Question 17: Products and layered procurement
- Question 18: Additional market design considerations

For each of the above, this section summarises:

- The position set out in the consultation paper
- The main points raised by respondents;
- The SEM Committee's response to the points raised; and
- The SEM Committee's decision (where relevant).

5.1 Question 13: Volumes

The SEM Committee has consistently emphasised the importance of the TSO providing accurate, detailed, and timely analysis on volumes for System Services. Since the publication of SEM-21-069, the TSOs have carried out a substantial body of work in providing the RAs with analysis on volumes forecast for 2026 (on a confidential basis) and 2030. While the SEM Committee welcomes this important analysis, the SEM Committee considers that there is still a substantial amount of work to be done in order to give stakeholders a clear picture of the volumes of each System Services product that are currently required, and will be required in future years.

SEM-21-069 noted that it is important for the market to have accurate information on the future needs of the system in addition to the current needs of the system in order to make investment decisions. Additionally, as a practical matter the TSOs will have to select a volume for each service, including locational requirements, that will be procured in the auction.

The SEM Committee proposed that the TSOs produce annual reports on the long-term system services requirements, in addition to frequent publication of shorter-term forecast requirements. Daily volumes will also be required for the purposes of the auctions. The SEM Committee sought stakeholders' views, on what information is required of the TSOs, to ensure the efficient operation of the market.

5.1.1 Summary of Consultation Responses

The prevailing message from stakeholders, on volumes, is that clear data, increased transparency and defined ongoing reporting mechanisms are crucial to support investment cases, with 21 responses in agreement on the SEM Committee's comments on TSO volumes provision, and highlighting the need for increased TSO reporting.

The TSOs stated in their response that they were carrying out work on estimating volumes as part of a 2030 volumes exercise.

Three respondents stated that, that the information required in respect of system service volumes is not contained in published documents and cannot easily be accessed by the market. These responses considered that much more formalised and transparent reporting is required to meet the needs of the industry, and that the information that is currently available is insufficient for industry to make investment decisions.

It was also suggested that it would be useful if the TSO could produce a paper explaining the drivers for each of the system services and how they are inter-related i.e. how the requirements can be met in a number of different ways with different mixes of system services. There were additional suggestions that reporting requirements should be put on a statutory footing.

Respondents also provided detail of what they considered important in terms of the volumes information to be provided. Broadly speaking, the data that potential investors say they require varies over time as follows:

- Medium and longer-term data is required to support investment decisions; and
- Different and more accurate data is required to support the operation of existing assets.

Each of these are discussed further in the following paragraphs

Medium and Longer-Term data to support investment decisions

Respondents stated a need for improved transparency around volumes including:

- Detailed 10-year ahead volume forecasts, with forecasts to be updated annually
- Volume forecast should also be explicit regarding products (e.g., defining what they need per product and any new products that may be required);
- Volume forecasts should set out locational volume requirements, as well as all-island volume;
- Seasonal requirements should be highlighted;
- The methodology used to calculate the forecast volumes should also be transparent and publicly available so that market participants have clarity of understanding in relation to the inputs used in formulating each of the forecasts;

- Forecasts should not allow for any withheld volumes (e.g., anything in the forecast volumes should be total and absolute and include what is mandated under the grid code).

Shorter-term operational data

Respondents believe the TSOs should publish a full set of volume forecasts by product, along with parameters and assumptions for their calculations a week ahead and update them for each day up to the trading day, and within the trading day.

Some respondents suggested that the current level of information provided in other jurisdictions – particularly the UK, can be seen as a positive example of the type, granularity and frequency of the information provided.

5.1.2 SEM Committee Response

The SEM Committee notes the strong consensus among respondents that the information available to investors is insufficient to facilitate investment decisions. This consensus extends to the need for information on locational requirements.

The SEM Committee notes that the TSOs have taken recent steps to increase the level of information on future System Services volume requirements available publicly. However, there are a number of areas where the SEM Committee considers there to be a need to improve on the information available:

- The data is for 2030 requirements only. It does not provide estimates of requirements for 2024 onwards;
- The data provides estimates of capacity and availability, by System Service, under three different assumptions about the 2030 portfolio, but does not provide full estimates of requirements (i.e. how much will need to be procured through competitive arrangements) on a service by service basis.
- The publicly available volumes have only been estimated for the peak of a windy day, which is insufficient to give investors an understanding for amounts procured over the course of a year, taking into account variations in wind, demand and other relevant volume drivers.
- The data does not provide information on locational requirements, or indicate which services are locational and which services are system-wide;

The SEM Committee sees value in formalising the requirement on the TSOs to publish methodologies and volumes data, as specified in the decision below.

The SEM Committee acknowledges the recent work carried out by the TSOs in this area, and considers it important and welcome analysis. However, a clear framework is required in order to

ensure regular updates on volumes requirements over multiple time horizons are made available to stakeholders.

5.1.3 SEM Committee Decision

The SEM Committee has decided that the TSOs shall be required to publish forecast and historic System Services requirements by service, and where relevant, by location.

The TSOs shall:

- Develop and consult on a methodology for determining system services volume requirements and the volumes to be procured across all timeframes;
- Annually publish a ten-year forecast of system service requirements by relevant location, and shall invite comments from stakeholders on the form of this report at least annually;
- Regularly publish short-term forecasts and volume information following public consultation on the form, frequency, and granularity of these reports; and
- Publish the volumes to be procured by auction on a daily basis.

5.2 Question 14: Secondary Trading

The SEM Committee sought views on whether a framework for secondary trading should be developed. The advantage of secondary trading would be to allow for providers to adjust their System Service market positions in response to changes in the energy market.

This should facilitate greater efficiency and alignment between the energy and system services markets. It would also facilitate providers who rely on closer to real time forecasts participating in the market. However, it may introduce additional complexity, and given that it would depend on the primary auction design decision, this may be more appropriate to consider as part of the Detailed Design.

5.2.1 Summary of Consultation Responses

14 respondents saw value in implementing or supported the notion of secondary trading, if the SEM Committee ends up deciding to proceed with a Day-Ahead auction for System Services, with many seeing secondary trading as an important tool to manage risk associated with taking on Commitment Obligations at Day Ahead stage. Some respondents also saw secondary trading as more important if market participants do not have firm access to the System Services market. One other respondent, saw secondary trading as being more important if the auction takes a non-combinatorial format, as the combinatorial format could allow market participants greater facility to manage the risk of being exposed to infeasible combinations of commitments.

Whilst many saw merit in secondary trading, seven respondents doubted the ability of the industry to deliver for Day 1, and cited the experience of the CRM, where the central platform has not yet been delivered, 3 years after go-live. Others saw delivery of a secondary trading platform as “Day 2” issue, rather than Day 1 critical.

Some market participants who did not see delivery of a centralised platform as realistic in the timeframe, wanted bilateral off-market (also known as Over-The-Counter, OTC) reallocation of Obligations to be allowed.

Representatives of the wind industry argued that secondary trading would be helpful in managing unpredictable intermittency risk. However, representatives of the demand side argued that even with secondary trading, this would not address the need for close to real time auctions for their units.

The TSOs argued that secondary trading is neither necessary nor helpful, as it doesn't reflect what they will do in real time to manage constraints. Auction losers who end up providing services should be paid instead.

The DSO/DNOs were concerned how locational issues would be managed if secondary trading was permitted.

5.2.2 SEM Committee Response

The SEM Committee notes that a number of stakeholders saw value in secondary trading, but did not see it as the high priority, and questioned the deliverability of a centralised platform for secondary trading for Day 1 of the new System Services Future Arrangements.

While resources and time constraints may not allow the development of a centralised platform for secondary trading of contracts, it may be possible to specify settlement systems in such a way as to accommodate bi-lateral secondary trading of System Services contracts, at relatively little incremental cost. Providing this facility in settlement systems means a market participant which finds itself with a commitment which it is subsequently unable to honour (e.g. due to forced outage) would be able to avoid performance penalties where it was able to organise its own bi-lateral secondary trade. The participant would need to notify the TSOs via the appropriate mechanism by an appropriate deadline. Such secondary trades would need to be subject to consideration of locational constraints.

5.2.3 SEM Committee Decision

A platform for secondary trading will not be developed as part of the initial design of the SSFA. However, given the potential benefits of secondary trading, the TSOs shall ensure that their systems are developed with the potential to allow for any necessary system modifications, to

enable the operation of a secondary trading platform and/or bilateral trading. Following 18 months operation of the new market arrangements the SEM Committee requires that the TSOs issue a consultation on whether or not a secondary trading platform should be implemented, and how this would be implemented. Based on this consultation, the SEM Committee will determine if a secondary trading platform should be implemented. If it is determined that it should then the TSOs will be required to implement a suitable platform within a reasonable timeframe agreed by the SEM Committee.

5.3 Question 15: Commitment Obligations

In the Consultation Paper the SEM Committee proposed that where an auction winner does not make its contracted⁸ volumes available, if called upon, a penalty should apply. In the case of auction design Options 1 and 2, i.e. those auctions that take place before the Balancing Market, the Consultation Paper suggested that the obligation would be for the provider to make the services they have been contracted for available to the TSO at their FPN.

It was proposed that this penalty would be made up of two parts, a fixed element and a scalar. The purpose of the fixed element is to disincentivise the provider from breaking its commitment and also to compensate the customer for the provider's failure which is likely to require the procurement of additional services by the TSO in the Balancing Market.

The purpose of the scalar element is to disincentivise the provider from repeatedly breaking its commitment and to ensure the reduced reliability of the provider's service is reflected in the price the customer pays. The SEM Committee anticipated that this would decrease the competitiveness of unreliable providers, and lead to greater reliability from the auction winners.

The SEM Committee sought stakeholders' views on how commitment obligations should be enforced, and the proposals set out above.

5.3.1 Summary of Consultation Responses

There was general recognition that Commitment Obligations are required if there is to be a meaningful ex ante market for System Services.

However, there were a number of issues raised by respondents:

- It was pointed out that under current rules, not all potential providers submit Physical Notification, so how would Commitment Obligations apply to them? For instance, the storage industry also questioned how PNs/FPNs would apply to them.

⁸ In the event that secondary trading arrangements are progressed, contracted volumes would be based on the position at the conclusion of the secondary trading market.

- How will Commitment Obligations relate to the SEM Committee decisions on CEP Article 12 and Article 13 (priority dispatch/non-priority dispatch)? Currently priority dispatch units are not required to submit FPNs, but are already actively involved in the provision of reserve services. Whilst non-priority dispatch renewables may be required to submit FPNs, this has not yet been defined.
- How would Commitment Obligations apply to providers awarded longer term contracts under layered procurement, given that such providers will necessarily have outages that they need to manage?
- ESB Networks argued that consideration would also need to be given for longer notice reserves (replacement reserve and ramping products) which span multiple trading periods and how Commitment Obligations for these products are treated. Holding Commitment Obligations for these products while concurrently allocating capacity for products delivered within a trading period may reduce volumes available and the information exchange between TSO, DSO and participants will need to be considered in this instance.

5.3.2 SEM Committee Response

The SEM Committee believes that Commitment Obligations are a necessary accompaniment to ex ante auctions, and if there is no Commitment Obligations:

- There may be threats to security of supply; and
- The auctions may be subject to gaming.

The SEM Committee notes that for at least some technologies, PNs may not be sufficient to measure whether an auction winner has met its auction commitment. A PN is a notification of a unit's expected position in the energy market. For some units, such as a gas turbine, it may be a good indicator of its ability to be able to provide some System Services, such as reserve services, although other data on availability and ramp rates will also need to be known to fully know that the unit is able to honour its auction commitment. Accordingly, the SEM Committee notes that supplementary data to a PN would be required to adequately measure the availability of services from all market participants.

Additionally, stakeholder responses have demonstrated that a number of technologies do not currently provide PNs, and may face a range of impediments to submitting PNs. Whilst the SEM Committee is committed to the principle of a Commitment Obligations, it recognised that the RAs need to work with the TSOs, DSO/DNOs and market participants during the Detailed Design / Implementation Phase to define the nature of Commitment Obligations that work for all relevant technologies and all relevant System Services. The obligations need to be practical and implementable. Where impediments exist, particularly with respect to new technologies the Regulatory Authorities will work with the industry and TSOs to remove barriers and ensure a level playing field for all market participants.

5.3.3 SEM Committee Decision

The SEM Committee is committed to the principle of a Commitment Obligation. They will be an important element in incentivising market auction winners to be in a position to deliver contracted capacity, and thus in ensuring that market outcomes accurately reflect the value of System Services insofar as possible. The RAs will work with the TSOs, DSO/DNOs and market participants during the Detailed Design and Implementation Phase to define the nature of Commitment Obligations that work for all relevant technologies and all relevant System Services.

5.4 Scalars

The consultation paper requested views on the future treatment of System Service scalars. Under the current Regulated arrangements, the following scalars are in place: a performance scalar; a product scalar; a locational scarcity scalar; and a temporal scarcity scalar. It was proposed to retain each of these scalars with the exception of the temporal scarcity scalar.

5.4.1 Summary of Consultation Responses

There was more support for performance scalar than other scalars. However, there were questions as to how penalties (i.e. performance scalars) would apply where a unit was constrained-off, or otherwise unavailable to provide committed services due to the TSOs' balancing actions.

A number of respondents suggested that scalars are not really consistent with market-based solutions. For instance, it was suggested that locational auctions (e.g. with nested zones) be employed to give a market-based locational price, rather than using administrative scalars.

The TSOs argued that the product scalar would not be appropriate in future, and that there may be a need to introduce new products for enhanced services.

There were also concerns about complexity in market/secondary market if scalars were applied, and how the scalars would or would not be transferred with secondary trades.

5.4.2 SEM Committee Response

The SEM Committee recognises that, where feasible, there are advantages in using market-based solutions rather than administratively-based scalars. Market-based solutions can, in theory result in better performance against the following criteria:

- System needs;
- Accuracy; and
- Consumer value.

During the Detailed Design phase, the SEM Committee will work with the TSOs, the DSO/DNOs and other stakeholders to determine the extent to which it is feasible and economic to implement market-based solutions to replace temporal, locational and product scalars. Market-based solutions potentially mean more granular auctions with respect to time periods, location and products notably:

- **Temporal:** the temporal value of each System Services can be recognised by the relevant service being procured through separate auctions for the relevant time period. There may also be benefits in aligning the temporal specification of services with those in EU markets that are electrically adjacent. Ireland is likely to be connected to France via the Celtic interconnector, which is expected to be commissioned in 2026 and available to the market from 2027. The reserve product suite for France's trade with its existing electrical neighbours is based on 4-hour time blocks; however, the French auctions for some system services work at 15-minute granularity;
- **Location:** the variation in the value of System Service with location can be recognised through locational auctions, or products. The extent to which they address the need will depend on the specific zones, and whether they can be granular or whether there are remaining locational issues within those zones;
- **Product:** The factors currently managed through product scalars may be better managed by splitting the relevant product into two or more products, and allowing the market to reveal the price for the each. This has typically applied to response services – with a premium paid to those that are able to respond faster than the base requirement for the relevant service. Splitting products into a number of sub-products may impact the level of competition facing each such product; and

However, the SEM Committee will need to consider the benefits of a move away from scalars in more depth as part of the detailed design. There may be benefits in maintaining some scalars such as the locational scalar – as a more targeted price signal may be required in some locations from time to time.

5.4.3 SEM Committee Decision

The SEM Committee has decided to consider the inclusion of scalars further as part of the detailed design. A potential approach may be to maintain scalars initially and assess whether they continue to have an impact through real time experience.

5.5 Question 16: Imperfections and Firm Access

The SEM Committee sought views on whether it is appropriate to apply a firm access like approach to system services, reflective of the principle of usability. Providers with firm access to the system services market would be able to fully participate in the auctions and (if they met their commitments) would be paid even where network conditions on the day meant that the TSOs

could not have activated those services. Non-firm providers would have restrictions placed on them whereby they may not be eligible to participate in the auction under certain system conditions. It was also proposed that where the TSOs were required to constrain on units, including for system services reasons, that were not successful in the auction, that this would be done through the Balancing Market.

This approach would ensure that units were held whole but that the auction would continue to send the appropriate economic signals. Additionally, this approach would facilitate the transparent identification of constraints on the system. However, it is worth noting that this approach may lead to providers with firm access bidding into the System Services market despite knowing that they will not be called upon to provide services (but still paid).

An alternative approach would be to consider that all providers have non-firm access to the market for the provision of System Services. This would prevent consumers paying for services that could not be dispatched due to network constraints. Investors and bidders would need to consider this risk and would consequently be likely to avoid seeking to connect to constrained areas of the network.

It was further noted that the proposed High-Level Design has several elements, including locational scalars and layered procurement, that should assist the TSOs in developing market solutions to constraints until the necessary network reinforcements had been made.

5.5.1 Summary of Consultation Responses

The majority (23) of market participants argued against the concept of “non-firmness” in the System Services market. They argued that “non-firmness” would be detrimental to investment, would increase complexity and that the risk of constraints / reduced SNSP should be allocated to those that can manage it, i.e. the TSOs. Some respondents argued the TSO should be incentivised on constraints / curtailment costs.

The TSOs argued that the issue of firmness should instead be viewed in terms of the concept of “usability” which covers not just transmission congestion, but also curtailment (which could limit wind’s ability to provide System Services) and distribution issues.

A number of respondents questioned how the concept of firmness would apply to distribution connected consumers. Both the DSO/DNOs argued that it was difficult to see how the proposed approach would work for distribution connected providers without either disadvantaging smaller distribution connected providers, or being costly to consumers.

Locational auctions were proposed as alternative approach to managing constraints.

One respondent argued that Firm Access is discriminatory in providing certain providers – particularly the incumbents/older providers – with payments when they bid even knowing they

can't fulfil, then punishing others when the DSO takes them out of the market without the provider's prior knowledge.

Another respondent argued that non-firm access distorts incentives to bid cost-reflectively, may pollute market prices with congestion rent (depending on how prices are set) and exposes all plant to non-transparent decision making by the TSO about the form and extent of constraints

A number of respondents argued that introducing the concept of firm and non-firm access introduced additional complexity to the System Services market.

5.5.2 SEM Committee Response

The SEM Committee recognise many of the points raised by respondents to the consultation paper. These are discussed further below under the following headings:

- Investment signals to locate where needed;
- Treatment of DSO/DNO connected providers; and
- Appropriate allocation of risks and incentives

Firm access and other locational investment signals for investors

Investors should have an incentive to build plant in locations where it is most likely to be useful. In the absence of such risk, investors may build in the lowest cost locations, rather than where needed – with customers picking up the costs of these “stranded investments”.

In addition to introducing the concept of non-firm access, there are two other potential options for providing locational incentives for investors:

- **Locational Scalars:** Locational scalars are used to increase prices in some areas relative to others. These are set administratively, and are a feature of some existing System Services; or
- **Zonal markets:** The price for a service varies by geographical area, reflecting the actual marginal costs to meet the need for that service in that area. These geographical areas are called zones, with boundaries between zones formed based on the location of real physical limitations on the ability to transport a service from one location to another.

Of the above two options, the latter (zonal markets) scores significantly stronger against the Assessment Criteria, and there is further discussion of these two options in the discussion of locational scalars (in section 5.4.2) and in the discussion of locational issues (in section 5.7.2). However, whilst zonal markets may provide a significant degree of incentive to invest in optimal locations, they may still not provide adequate incentives, unless markets are highly granular- in which case they may be so granular as to inhibit competition and/or have a similar risk impact on investors. For instance, if a new asset may be in an area in which a given System Service would

be useful, but require significant investment in network reinforcement, in a location where planning permission is difficult to obtain.

There is a question as to whether consumers or the investor should bear the risk of delays to the completion of the reinforcement (bearing in mind that it is not feasible for the TSOs to bear all of the risk). The SEM Committee is of the view that the investor should bear some proportion of this risk, so that it will factor in planning permission risks into its locational decisions, something it will not necessarily do, if all risks are passed through to the consumer.

Under zonal market arrangements, if planning permission is quite hard to obtain, it is reasonable to expect services to be generally under-supplied and zonal prices to be quite high. So, if an investor is given firm access to the zone, even before the network reinforcement is complete, there is no incentive on the investor to reflect appropriate risks in its locational decision. For this reason, there are significant advantages in apportioning the risk of structural issues (the completion of networks reinforcement) to the investor, by introducing the concept of non-firmness.

Treatment of DSO/DNO Connected providers

A number of respondents have suggested that firm access should extend to distribution connected providers, and that to do otherwise would discriminate against those providers. The SEM Committee agrees with this view provided that firm access right is based on the DNO's operational envelope, as determined close to real time. To do otherwise would not support efficient locational signals for investment in System Service provision.

Appropriate allocation of risks and incentives

The SEM Committee is seeking to achieve an appropriate balance which supports efficient investment in the provision of System Services:

- Ensuring that those investments are directed at locations where the services are most likely to be of use to the system; whilst
- Establishing an environment in which those investors can appropriately manage the risk of low revenue arising from not being deployed by the TSOs.

The above objectives cannot be met if all System Service providers have firm access to the market – regardless of where they are located.

As discussed above, the SEM Committee believes that it is important to introduce the concept of non-firmness to ensure that investors are appropriately incentivised to locate where structural issues (network reinforcement) are relatively solvable, by placing the risk of delays on investors.

However, once the network reinforcement is complete, it is reasonable for the risk associated with transitory issues (such as transmission outages) to be taken away from investors, and placed on the TSOs, or consumers - given the relative limits on the ability of the TSOs to bear risk.

5.5.3 SEM Committee Decision

Transmission connected System Services providers will be granted Firm Access to System Services markets once structural issues related to their connection have been resolved to the satisfaction of the TSOs and the SEM Committee.

Once granted Firm Access, transmission connected providers will be able to bid into a System Services auction and be paid, even if they are constrained out of a position to be able to provide the service by transitory constraints.

Where markets are zonal/locational, Firm Access will be to zone/location only.

Firm Access to System Services markets may be on a product-by-product basis, hence it may (for instance) be possible for a provider to be granted Firm Access to a reactive market, before it is granted Firm Access to reserve markets.

Firm Access to System Services markets will be decoupled from Firm Access to the energy market, so in principle, it will be possible to have Firm Access to one or all System Services markets by non-Firm Access to the energy market, or vice-versa.

Market access for distribution connected providers will be determined through the operational envelope to be agreed by the TSOs and DSO/DNO.

5.6 Question 17: Products and Layered Procurement

The SEM Committee noted that the necessary market conditions may not be fully in place for all services in May 2024. This may be due to the nature of the service itself, the need for new technology, locational issues or a lack of competition.

In the Consultation Paper, the SEM Committee set out that procurement over a longer timeframe than daily may be needed to provide clarity for investors. A short-term approach on its own could result in an inability to deliver any required investment and a failure to accommodate increasing levels of SNSP and government RES-E targets.

On that basis, the SEM Committee proposed a layered approach to the development of the Future Arrangements, which would allow for fixed contracts, longer-term procurement and daily auctions to be used in combination to procure System Services. This approach should offer a balance between stimulating investment in service provision, where this is required, and enabling competition to drive down the price of servicing provision where the market is competitive.

It was proposed that longer-term procurement could be covered under the fixed contract process established by SEM-21-021, which sets out that each fixed contract procurement process will be tailored to products required by the System Operators. With regard to mid-term procurement, the

SEM Committee considered that this may require elements of the Fixed Contract approach and elements of the daily auction approach. The detailed design will need to consider these processes further and some form of price caps may need to be introduced should there be limited competition in the procurement of System Services for any service.

The SEM Committee sought stakeholders' views on layered procurement of System Services and what approach could be taken to support this.

5.6.1 Summary of Consultation Responses

There was significant support for longer-term contracts alongside short-term auctions, as part of a layered procurement process. A number of respondents argued that longer-term contracts were required to attract investment, and noted that whilst some providers can get longer term contracts via the CRM or RESS contracts, longer term contract certainty was not available to all types of investors that the SEM will be seeking to attract. Generally, a number of respondents sought greater clarity over volumes and timeframes for longer-term contract procurement.

One respondent argued that longer-term contracts should be available to existing providers as well as new providers, which is not the case in the capacity market. This respondent also provided proposals for longer-term contract auctions, and how longer-term obligations could be integrated with shorter-term auctions in a form of layered procurement. Another market participant also provided their own proposals for integrating long and short-term contracts.

Some market participants expressed concerns that there may be a lack of transparency with regard to longer-term contracts, and in the procurement of longer-term contracts, including where there are constraints on competition due to locational constraints. Some respondents, whilst generally supportive of some longer-term contracts wanted to see a process for these services to progress from fixed term to a clear competitive process under a market-based model.

Some argued that longer-term contracts should only be employed where it could be demonstrated that competitive daily auctions could not be delivered, and should only be employed until competitive daily auctions were feasible, and some considered that the case was not proven.

One respondent sought clarity on whether expenditure caps would apply to layered procurement, and another sought clarity as to whether longer-term contracts were to be only a transitional solution or part of an enduring solution.

The TSOs stated that they saw longer-term contracts as part of their enduring (Phase 2) solution. ESB Networks stated that the SEM Committee would need to consider how the "operational envelope" would be taken into account for longer term contracts. They argued that where the DSO/DNOs were required to allocate distribution capacity for longer-term System Services contracts significantly ahead of delivery, they would have to take a conservative approach to

allocating capacity, which would have a significant impact on the potential contribution of embedded providers at long-term contract award stage.

Demand-side representatives expressed concerns at their ability to compete for longer-term contracts.

5.6.2 SEM Committee Response

The SEM Committee notes the general support for the introduction of longer-term contracts. The SEM Committee envisages that there will be a layered approach to procurement which will comply with European Regulations and will be open to both existing and new providers of System Services. In line with this, the SEM Committee has decided to introduce a framework that will enable procurement through contracts of up to 12 months should the RAs or TSOs consider such contracts to be necessary, subject to SEM Committee approval. Further detail on this decision is included below.

5.6.3 SEM Committee Decision

5.6.3.1 Layered Procurement

In SEM-21-021 the SEM Committee decided to put in place a Fixed Contract Arrangement Framework. The intention of that framework was to incentivise entry of new technologies by providing a fixed contract term and a degree of revenue certainty, while enabling provision of services from the most cost-effective technologies able to meet the availability.

Additional to this existing framework, the SEM Committee has decided to implement a Layered Procurement Framework from the date of this decision. The intention of this framework is to provide a means of procuring system services ahead of the short term energy and balancing capacity markets, as provided for under Directive (EU) 2019/944 and Regulation (EU) 2019/943. This will facilitate additional certainty for providers and for the TSO. It will also ensure that services can be procured where procuring a portion of the volume requirement ahead of the short-term markets or for a longer duration would improve economic efficiency or ensure security of supply.

The Layered Procurement Framework will apply to the procurement of system services for periods greater than one day ahead, up to 12 months ahead of provision of the capacity. Beyond 12 months in advance the Fixed Contracts framework applies, and the daily auction will apply to day-ahead procurement.

The TSOs will regularly assess, and at least annually, the need for procurement under the layered procurement framework. The TSOs will prepare, on their own initiative or at the request of the SEM Committee, a proposal for the approval of the SEM Committee where:

- Such procurement is appropriate in the context of ensuring security of supply;
- Such procurement will improve economic efficiency including:
 - Minimising non-market actions by the TSO;
 - Reducing dispatch balancing costs;
 - Improving competitive conditions in the daily auctions; or
- The full volume requirement for a system service is not being procured in the daily auctions.

The TSOs proposal for products to be procured will cover the following:

- The maximum duration of the contracts for this product;
- The maximum period in advance of provision of capacity the product will be contracted;
- The technical definition of the product, which will be technology neutral to the extent possible;
- The procurement process for the product; and
- And other parameters the TSOs consider appropriate.

Following SEM Committee approval, the TSOs may continue to run procurement processes for the product in accordance with that approval until either the TSOs consider that the product is no longer required or following a request by the SEM Committee to review the relevant procurement process. The TSOs shall ensure the volumes procured through this framework are not greater than those set out in Article 6(9) of Regulation (EU) 2019/943. Where the TSOs consider a contract duration of greater than a month the TSO proposal will shall comply with Article 6(10) of Regulation (EU) 2019/943, where applicable.⁹

5.6.3.2 Products

The SEM Committee has decided that there is a need for ongoing monitoring of the suite of System Services products. The TSOs are directed to carry out periodic reviews of the appropriateness of the existing suite of products in the context of expected future technical or policy changes, for example: European requirements for both Upward and Downward frequency products, and to publicly consult on its findings and proposals. The first such review should be carried out by the TSOs in the Detailed Design Phase.

Following the Consultation period, the TSOs will make any recommendations to the SEM Committee on changes to the suite of products for approval, if required.

⁹ It is noted that not all system services require derogations under Article 6

5.7 Question 18: Additional Market Design Considerations

The SEM Committee noted that further considerations in designing the System Services Market include market power considerations. Market power considerations will be a focus following the decision on the High-Level Design, when the approach to auction design will be determined.

The SEM Committee sought views from stakeholders on whether there any further considerations in terms of Market Design that should be taken into account.

5.7.1 Summary of Consultation Responses

Generally, many of the stakeholders have stated that there is insufficient detail for them to be able to comment on the market design arrangements in an informed way, and sought more detail.

Respondents raised a number of “additional considerations” related to the High-Level Design. Key considerations raised were:

- Guidance related to whether there would be expenditure caps/price caps post 2024. A number of market participants argued that expenditure/price caps were not appropriate (other than technical caps) as the SSFA moved to becoming a competitive market, and drew analogies to the energy market, where prices can rise to VoLL. Some respondents, such as the TSOs argued that market power issues needed to be addressed as part of the High-Level Design and the TSOs proposed a solution based on CfDs;
- Greater certainty around products to be auctioned, as well as volumes. There were some specific suggestions for product design/re-design which will need to be considered during the detailed design phase;
- A desire for greater certainty around implementation timescales, and an implementation roadmap and a focus on transitional path for investors;
- Greater certainty around the treatment of locational issues. The TSOs noted that, in both the enduring and transitional timeframes for services, there are multiple potential means through which location-specific procurement or potential exercise of locational market power can be managed. Some of this could come through considering locational constraints in the auction algorithm, or by having separate auctions to procure locational requirements, while other aspects of this could come through using the layered procurement approach;
- Some participants argued that it would be helpful if the TSOs published more information about constraints and their impact on System Services, including more detailed on operational forecasts and locational requirements;
- Greater clarity on how dispatch and scheduling work, and flow from the auction results;
- Greater clarity on payments to those units who provide system services in real-time including under their Grid Code Obligations;

- How will the SEM Committee reflect the emerging decision on the CEP Article 12&13, which could, for instance, influence the High-Level Decision for the System Service Market and auction sequencing with the DAM?
- Certain technologies had specific concerns including:
 - Not all investments in system services will be active energy market participants, and the market has to be able to facilitate multiple types of investors, including mechanisms for “zero MW” units (which are not eligible for capacity contracts) to get revenue certainty;
 - Will upward and downward regulation products be split, better facilitating participation by intermittent renewables. Moreover, are distribution connected providers likely to have asymmetric access to provide upward and downward services (due to distribution connected constraints);
- How the System Services market will interact with other SEM markets. In particular, there were concerns as to how the Net CONE and Unit Specific Price Cap treatment of System Service revenue could lead to perverse incentives not to investment in System Service capability.

There were a number of other points of design detail raised, which are more appropriately re-visited during the detailed design phase.

5.7.2 SEM Committee Response

Lack of detail to inform design

The SEM Committee recognises that many of the stakeholders have stated that there is insufficient detail for them to be able to comment on the market design arrangements in an informed way. The SEM Committee has adopted a consultative approach to the development of the System Services Future Arrangements in response to comments received from stakeholders in relation to Scoping Paper (consultation SEM-20-044), where the clear response was that time should be taken to design the arrangements in an appropriate manner. Consequently, the SEM Committee has sought to put in place the key structural building blocks of the arrangements in the High Level Design and allow for detailed consideration of key areas such as auction design in the Detailed Design Phase, thus facilitating greater consultation with market participants on the detail.

The SEM Committee had consulted in SEM-20-044 on whether a transition period should be adopted as part of the HLD. Reflecting the responses received to that consultation, the SEM Committee did not propose to introduce a transition period. However, based on responses to the HLD Consultation Paper, there now appears to be industry support for such a transition.

Therefore, taking into account the complexity of the project and that there is now support from industry, the SEM Committee has decided to implement a transition period and phase the introduction of the full set of System Services Future Arrangements. As indicated in the Auction Design Section, the intention of the SEM Committee is that reserve services, and possibly ramping services, will be procured through daily auctions from Go-Live. As part of the Detailed Design Phase the SEM Committee will develop options for the transitional phase, including the means by which the remaining products are procured.

Market Power Mitigation Measures

During the Detailed Design phase, the SEM Committee will consult on the form of market power mitigation measures to be employed, which might include, *inter alia*:

- Reserve prices (i.e. Auction Price Caps). At minimum, the price of a System Service should never rise above the Value of Lost Load (VoLL, currently estimated at around €12,500/MWh for 2024/25)¹⁰, justifying some form of price cap. In some cases, lack of sufficient volume of that service will not necessarily result in loss of load, it could result in some other consequence, such as having to have more fossil-fuel fired capacity running, with higher energy prices and carbon output. Whilst these consequences are also undesirable, the opportunity cost of the alternative consequences may be significantly less than VoLL, which would suggest that significantly lower price caps should be applied;
- Controlling System Service revenues with some form of regulated SS CfD, as applies with Directed Contracts in the energy market. CfD contracts, where the Strike Price has been competitively determined¹¹, could also serve to mitigate market power in Day-Ahead auctions. The CfDs could be structured in a number of ways, with difference payments based on revenues earned in a single settlement period, or averaged over a much longer period, such as applied under REFIT arrangements in Ireland;
- Mandatory bidding in competitive auctions. There could be requirements for units which are technically in position to provide services (e.g. given their position in the LTS) are required to bid into System Services auctions, to prevent economic withholding to drive the auction price up.

Treatment of locational issues

The SEM Committee agrees with those respondents who noted the importance of locational issues in procuring system services. The SSFA design should send the right locational signals to investors to situate capability in the appropriate locations, and reward those who do so.

¹⁰ Recognising that for certain service such as SSRP and SIR the units of the service in question are not €/MWh

¹¹ as opposed to regulatory determined

The SEM Committee will work with the TSOs and the DSO/DNOs and other stakeholders to evaluate the appropriate implementation of locational approaches, during the Detailed Design phase.

Transparency on network & portfolio changes

The SEM Committee acknowledges comments relating to transparency of network developments as well as the planned commissioning and decommissioning of existing providers. While the Regulatory Authorities may individually progress work on network developments in their respective jurisdictions, the matter does not fall within the remit of this workstream.

Relationship to Scheduling and Dispatch, including priority dispatch

Some respondents have asked how scheduling and dispatch will follow from the auctions. This will be explored further during the detailed design phase as the auction design is further developed.

Payment for real-time providers

The detailed design of the auction should seek to ensure that those System Service providers which are required to provide services in real-time are able and incentivised/required to participate in the auction. However, there will inevitably be events which occur that mean auction winners become unavailable (e.g. because late forced outages now mean that they are required to provide energy rather than reserve), and providers who did not win in the auction are required to make themselves available and are required to provide services.

It is the SEM Committee's intention that settlement rules for payment of the provision of available system service capacity and utilisation will be developed during the Detailed Design. However, for the avoidance of doubt, the SEM Committee does not consider it appropriate to ensure that service provision which is surplus to the TSOs volume requirements is remunerated.

Interactions with other markets

Some respondents have urged the SEM Committee to consider how future System Services arrangements interact with other markets, and are seeking to ensure that increases in System Services revenues do not result in reduction in other revenues. For instance, some respondents have cited the treatment of ancillary service income within Net CONE and in Unit Specific Price Caps, and set out concerns that potential increases in System Services revenues will result in decreases in capacity revenue.

The SEM Committee notes that if System Services revenues increase as a result of the move to market-based arrangements they would impact the capacity market via the following mechanisms.

Increases in system services revenue will have a consequential downward impact on the CRM Auction Price Cap and Existing Capacity Price Cap. However, a key point to note is that the CRM still largely preserves the incentive to build more flexible capacity. If system services revenues increase for all units, we would expect competitive pressure to result in lower CRM offers, and it is only right and proper that consumers should benefit from that competitive effect. However, the capacity market is a predominantly¹² pay-as-clear market. Therefore, if a unit is more flexible, and earns more system services revenue than the marginal CRM unit which sets the clearing price its net revenue will increase, if system services revenues increase. If it is less flexible, and earns less system services revenue than the marginal CRM unit, its net revenue will decrease.

¹² With the exception of offers selected out-of-merit to meet Local Capacity Constraint Area requirements

6 HIGH LEVEL DESIGN DECISIONS

This section sets out each of the SEM Committee Decisions, covering each of:

- Qualification and registration arrangements;
- Qualification trial process;
- Governance of rule changes;
- Funding arrangements;
- DSO interactions;
- Auction design;
- Volumes;
- Secondary trading;
- Commitment obligations and scalars;
- Imperfections and firm access;
- Products; and
- Layered Procurement.

6.1 Qualification/Registration Arrangements

SEM Committee Decision: The SEM Committee has decided on a rolling application process for all services being procured through the System Services Future Arrangements. Under this rolling application process potential providers will be able to submit an application to the relevant TSO at any time.

These arrangements will be developed by the TSOs in consultation with stakeholders. The TSO will be responsible for the administration of these arrangements. In developing these arrangements, the TSOs are required to ensure the process and time scales for the processing of applications consistent with the requirements arising from European legislation. Consistent with these requirements the SEM Committee requires that the TSOs endeavour to complete the process 90 days from receipt of a valid application.

6.2 Qualification Trial Process

SEM Committee Decision:

The SEM Committee has decided that the TSOs shall carry out a Qualification Trials process on at least an annual basis. This process will include the following steps:

- The TSOs shall issue a call for evidence to allow for industry, new entrants, and new technologies to input into the design of the trial.
- Based on the response to the call for evidence, the TSOs may then design a trial and publicly consult on the proposed trial design. Where the TSOs decide not to run a trial they will notify the SEM Committee setting out their rationale. In such cases the SEM Committee may direct the TSOs to design a trial in accordance with guidance included in the SEM Committee's direction.
- Taking the output of the consultation process into account the TSOs will notify the SEM Committee of the TSOs' intended approach. This notification shall include:
 - the objectives of the trial;
 - the technologies and services to be included;
 - the cost of the trial; and
 - the period¹³ for which the trial would run, including the dates of key milestones.
- The TSOs shall publish update reports at each key milestone of a trial and a full report when the trial has been completed. The final report shall include sufficient technical detail, and clear conclusions and recommendations.

6.3 Governance of Rules Changes

SEM Committee Decision:

System Services Code:

- All arrangements relating to the governance, qualification, and procurement of System Services will be set out in a System Services Code.
- It is envisaged that the System Services Code will be in place by the go-live of the Future Arrangements, however, it is acknowledged that a transition period may be required.
- The TSOs shall develop the System Services Code and, following public consultation, submit it to the SEM Committee for approval. The TSOs shall ensure that the Code reflects all relevant SEM Committee decisions and relevant legislative requirements.
- The TSOs shall develop a transition plan for the governance arrangements and the incorporation of all relevant documentation into the System Services Code.

¹³ It is noted that while the process proposed in this paper is an annual process, it may be appropriate for any given trial to be of a longer or shorter duration than a year. Therefore, the conclusion of one trial may not line up with the start of the next trial.

- To facilitate this process and to provide transparency for stakeholders, by the end of 2022, the TSOs will ensure that all currently applicable System Services documentation is easily accessible and made available at all times in a defined area on each of the TSOs' websites, with that area being accessible directly from the relevant home page.

System Services Panel:

- A System Services Panel will be established.
- The System Services Panel will be consulted on any changes to the System Services Code or other documentation relating to the procurement of System Services.
- Membership of the Panel will comprise representatives from industry. The selection process for the Panel members is not within the scope of this paper, however, it is noted that the selection of members based on technology type may not be appropriate for system services.
- Attendance of Panel meetings will include the Regulatory Authorities, TSOs, Distribution Operators, Panel Members and other attendees as may be provided for in the terms of reference for the Panel.
- The TSOs will be responsible for chairing the meetings and the secretariat functions.
- The Modifications process will be defined as part of the detailed design phase of this project; however, it will provide for the following:
 - Any proposed modification to the System Services Code or other documentation relating to the procurement of System Services must be discussed at the Panel.
 - The TSOs will be responsible for drafting and submitting modification recommendations to the Regulatory Authorities, and will ensure the views expressed by the Panel are clearly set out. For the avoidance of doubt this includes modifications where the TSOs' recommendation is for the Regulatory Authorities not to approve the proposed modification.
 - Where a modification is initiated by the Regulatory Authorities, the Regulatory Authorities will present the proposals to the Panel for discussion and may also consult publicly before presenting to the SEM Committee for decision.

6.4 Funding Arrangements

SEM Committee Decision:

A supplier-based MWh charge in line with option 2 in the consultation paper will be implemented initially. As market behaviours become better understood and the relationship between energy costs and system services costs becomes clearer the SEM Committee may move to Option 3, i.e. a trading period based charge. This decision will be provided for in the

systemisation that will be undertaken by the TSOs following the publication of this decision paper.

The SEM Committee has therefore decided that initially the cost of System Services will be estimated by the TSOs on an annual basis and approved by the Regulatory Authorities. This will be then charged to suppliers based on demand in each trading period. This will be revisited upon any review of the granularity of the charge.

6.5 Distribution System Interactions

SEM Committee Decision:

The distribution system interactions will be agreed by the relevant TSOs and distribution operators in accordance with the principles set out below:

- The process will be TSO-led, in relation to the qualification of providers and the procurement of services from those providers;
- The TSOs will ensure that any limitations on a distribution-connected provider considered necessary by the relevant distribution operator for the secure and safe operation of its system are adequately reflected in the TSOs' operation of the system services arrangements; and
- All network operators should work co-operatively to safely maximise access to the system services arrangements by distribution connected providers.

6.6 Auction Design

SEM Committee Decision:

The SEM Committee has decided to proceed on the basis of a daily market auction to take place at some point after the closure of the DAM, with a physical auction, based on the TSOs physical dispatch of the system, to take place if required in order to ensure sufficient volumes of deliverable System Services. Initially the daily auction would apply to reserve products (POR, SOR, TOR1, TOR2, RRD and RRS), and possibly ramping products (RM1, RM3, RM8) and Fast Frequency Response (FFR) with the aim that all products will eventually be procured through the daily auction framework. The specific timing and operation of the auction will need to be determined through a further consultation in the Detailed Design Phase.

Additionally, the arrangements to be developed in the Detailed Design Phase will ensure the primacy of the market auction, with measures to be put in place to ensure the TSOs seek to dispatch the system as closely as is feasible in line with energy and System Service market

results. The detailed design will also consider TSO proposals for a forward contracting approach.

6.7 Volumes

SEM Committee Decisions:

The SEM Committee has decided that the TSOs shall be required to publish forecast and historic System Services volume requirements by service, and where relevant, by location.

The TSOs shall:

- Develop and consult on a methodology for determining system services volume requirements and the volumes to be procured across all timeframes;
- Annually publish a ten-year forecast of system service requirements by relevant location, and shall invite comments from stakeholders on the form of this report at least annually;
- Regularly publish short-term forecasts and volume information following public consultation on the form, frequency, and granularity of these reports; and
- Publish the volumes to be procured by auction on a daily basis.

6.8 Secondary Trading

SEM Committee Decisions:

A platform for secondary trading will not be developed as part of the initial design of the SSFA. However, given the potential benefits of secondary trading, the TSOs shall ensure that their systems are developed with the potential to allow for any necessary system modifications, to enable the operation of a secondary trading platform. Following 18 months operation of the new market arrangements the SEM Committee requires that the TSOs issue a consultation on whether or not a secondary trading platform should be implemented, and how such a mechanism would be implemented. Based on this consultation, if the SEM Committee opt for a secondary trading platform to be implemented, then the TSOs will be required to develop and implement the platform within a reasonable timeframe agreed by the SEM Committee.

6.9 Commitment Obligations

SEM Committee Decisions:

The SEM Committee is committed to the principle of a Commitment Obligation. The RAs will work with the TSOs, DSO/DNOs and market participants during the Detailed Design and Implementation Phases to define the nature of Commitment Obligations that work for all relevant technologies and all relevant System Services

6.10 Scalars

SEM Committee Decisions:

The SEM Committee has decided to consider the inclusion of scalars further as part of the detailed design.

6.11 Imperfections & Firm Access

SEM Committee Decisions:

Transmission connected System Services providers will be granted Firm Access to System Services markets once structural issues related to their connection have been resolved to the satisfaction of the TSOs and the SEM Committee.

Once granted Firm Access, transmission connected providers will be able to bid into a System Services auction and be paid, even if they are constrained out of a position to be able to provide the service by transitory constraints.

Firm Access to System Services markets may be on a product-by-product basis, hence it may (for instance) be possible for a provider to be granted Firm Access to a reactive market, before it is granted Firm Access to reserve markets.

Firm Access to System Services markets will be decoupled from Firm Access to the energy market, so in principle, it will be possible to have Firm Access to one or all of the System Services markets but non-Firm Access to the energy market, or vice-versa.

Market access for distribution connected providers will be determined through the operational envelope to be agreed by the TSOs and DSO/DNO.

6.12 Products & Layered Procurement

SEM Committee Decisions:

Products: The SEM Committee has decided that there is a need for ongoing monitoring of the suite of System Services products. The TSOs shall carry out periodic reviews of the appropriateness of the existing suite of products in the context of expected future technical or policy changes, for example: European requirements for both Upward and Downward frequency products, and to publicly consult on its findings and proposals.

Following the Consultation period, the TSOs will make any recommendations to the SEM Committee on changes to the suite of products for approval, if required.

Layered Procurement:

In SEM-21-021 the SEM Committee decided to put in place a Fixed Contract Arrangement Framework. The intention of that framework was to incentivise entry of new technologies by providing a fixed contract term and a degree of revenue certainty, while enabling provision of services from the most cost-effective technologies able to meet the availability.

Additional to this existing framework, the SEM Committee has decided to implement a Layered Procurement Framework from the date of this decision. The intention of this framework is to provide a means of procuring system services ahead of the short term energy and balancing capacity markets, as provided for under Directive (EU) 2019/944 and Regulation (EU) 2019/943. This will facilitate additional revenue certainty for providers and volume certainty for the TSO. It will also ensure that services can be procured where procuring a portion of the volume requirement ahead of the short-term markets or for a longer duration would improve economic efficiency or ensure security of supply.

The Layered Procurement Framework will apply to the procurement of system services for periods greater than one day ahead, up to 12 months ahead of provision of the capacity. Beyond 12 months in advance the Fixed Contract framework will apply, and the daily auction will apply to day-ahead procurement.

The TSOs will regularly assess, at least annually, the need for procurement under the layered procurement framework. The TSOs will prepare, on their own initiative or at the request of the SEM Committee, a proposal for the approval of the SEM Committee where:

- Such procurement is appropriate in the context of ensuring security of supply;
- Such procurement will improve economic efficiency including:
 - Minimising non-market actions by the TSO;
 - Reducing dispatch balancing costs;
 - Improving competitive conditions in the daily auctions; or
- The full volume requirement for a system service is not being procured in the daily auctions.

The TSOs proposal for products to be procured will cover the following:

- The maximum duration of the contracts for this product;
- The maximum period in advance of provision of capacity the product will be contacted;
- The technical definition of the product, which will be technology neutral to the extent possible;
- The procurement process for the product; and
- Other parameters the TSOs consider appropriate.

Following SEM Committee approval, the TSOs may continue to run procurement processes for the product in accordance with that approval until either the TSOs consider that the product is no longer required or following a request by the SEM Committee to review the relevant procurement process. The TSOs shall ensure the volumes procured through this framework are not greater than those set out in Article 6(9) of Regulation (EU) 2019/943. Where the TSOs consider a contract duration of greater than a month the TSO proposal will shall comply with Article 6(10) of Regulation (EU) 2019/943, where applicable.¹⁴

6.13 Other market design issues

SEM Committee Decisions:

Locational issues: The SEM Committee has decided that system services should be procured locationally where there are locational requirements. With reference to the methodology to determine the volume requirements, the TSOs will develop a methodology to determine the appropriate locational zones for system services procurement. During the

¹⁴ It is noted that not all system services require derogations under Article 6

detailed design phase, the Regulatory Authorities will work with the TSOs and other stakeholders to determine the appropriate locational framework.

Transitional path: The SEM Committee had consulted in SEM-20-044 on whether a transition period should be adopted as part of the HLD. Reflecting the responses received to that consultation the SEM Committee did not propose to introduce a transition period. However, based on responses to consultation paper SEM-21-069, there now appears to be industry support for such a transition.

Therefore, taking into account the complexity of the project and that there is now support from industry, the SEM Committee has decided to implement a transition period and phase the introduction of the full set of System Services Future Arrangements. As part of the Detailed Design Phase the SEM Committee will develop options for this transition.

7 NEXT STEPS

The publication of this High-Level Design Decision Paper sets out the SEM Committee's decisions on the development of the System Service Future Arrangements. Following publication of this paper, the SEM Committee will work with the TSOs and commence the Detailed Design and Implementation Phase of the project (Phase III).

This work will clarify the roles and responsibilities of both organisations and will include, but not be limited to, the following areas;

- **Qualification Arrangements.** Development of system requirements to accommodate a rolling qualification process for entry to the System Services Market.
- **System Services Code.** Development and preparation of a Code in line with section 6 of this paper.
- **Panel Terms of Reference.** A terms of reference for the System Services Review Panel will be developed.
- **Funding Arrangements.** Development of a public consultation on the introduction of a standalone supplier based System Services Charge. This will require SEM Committee approval.
- **Governance Transition Plan.** Development of a plan for the transition from the existing governance arrangements to the governance arrangements set out in this decision paper. The transition phase will include details on the movement from the existing suite of documentation to a System Services Code, and the timelines for the introduction of all governance decisions.
- **TSOs/DSO/DNO working arrangements.** TSOs and the distribution operators will commence engagement on development of a framework for distribution connected interactions, in line with the principles set out in this decision paper. The companies will return to the SEM Committee with detailed proposals on how this interaction will operate, including development of an Operational Envelope.
- **Auction Design and Commitment Obligations.** Further consultation will be carried out on detailed auction design decisions. This will also include any commitment obligations associated with the design. The TSOs will also be required to commence scoping work on the necessary systems developments. This work will likely begin following this decision, however the TSOs are to ensure that they are in a position to commence development of systems as soon as is reasonably practical.
- **System Service Volumes.** TSOs will commence work on ensuring capability to monitor and report on System Services Volumes, in line with the decisions made in Section 6.7 of this paper.
- **Transition Arrangements.** A consultation will be developed on the transitional means of procurement for the services not to be procured through daily auctions from Go-Live. The TSOs will also be required to develop an implementation plan, which should include

timelines for the delivery of a daily auction framework for reserve, and possibly ramping, services, and timelines for the introduction of daily auctions for the remainder of the services.

- **Consumer Cost.** The SEM Committee will consider the overall cost of provision of system services to ensure that consumers are protected. As part of this work the SEM Committee will consider what cost control measures would be appropriate and will develop proposals as part of the detailed design.

7.2 Next Steps

Following the conclusion of phase II with the publication of this Decision Paper, Phase III, Detailed Design and Implementation will now commence with the workstreams set out in Section 7.1.

Should stakeholders have any queries or comments please contact Dylan Ashe (dashe@cru.ie) or Owen Kearns (owen.kearns@uregni.gov.uk).

8 Appendix: Steps for Market and Physical approach

As set out above the SEM Committee has decided that the auction be comprised of a “market auction”, and a “physical auction” for residual volumes i.e. those volumes provided by units that did not already have a market volume.

We will consult on the detailed design of the market and physical auctions, including timings as part of the detailed design. However, in this Appendix we set out two examples of how the logical steps could work:

- Model A: the Commitment Obligation for the market auction is based entirely on a market participant’s market position at energy market Gate Closure; and
- Model B: the Commitment Obligation is based on a combination of the LTS and its energy market position at Gate Closure.

Both models assume both a “market” and a “physical” auction.

8.1 Model A

Under Model A, the Commitment Obligation is based on a unit’s ex ante market position, so could happen as soon as the DAM energy results are published, but could happen later in the day. There will be consultation on the detailed “day-in-the-life” timings during the detailed design phase, with key considerations including:

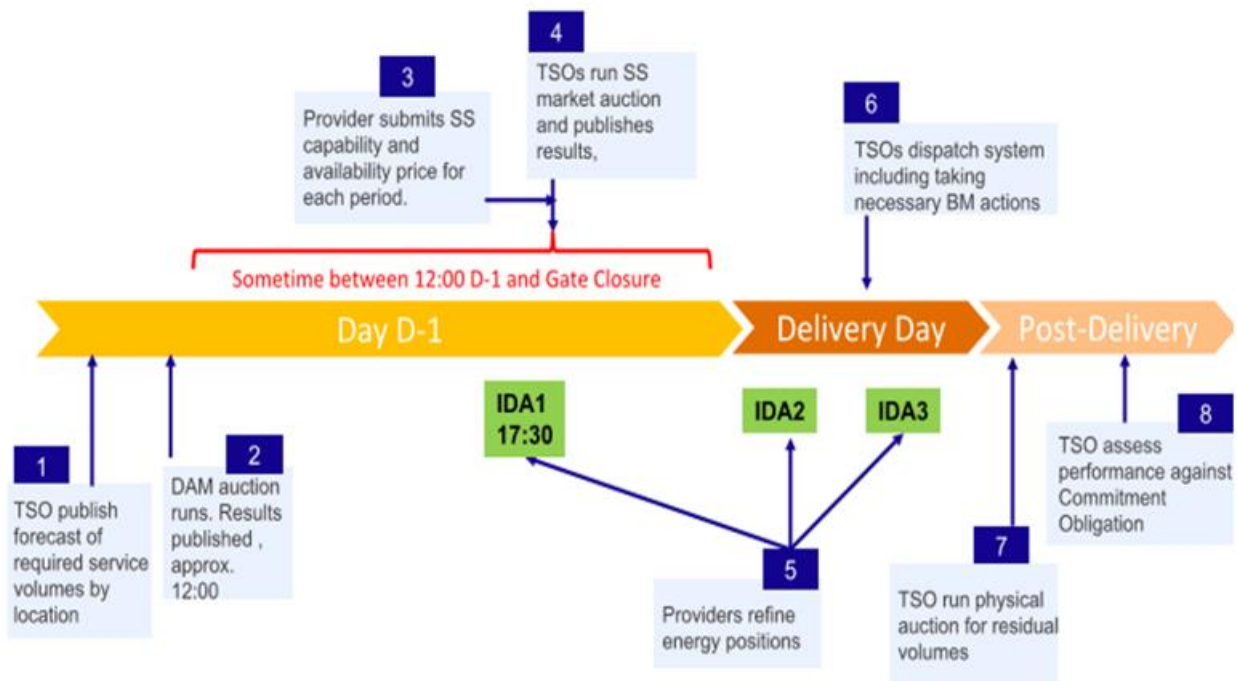
- How long it will take to run the system service auctions;
- How and when the DSO/DNO envelope will be incorporated into the process; and
- How much impact holding the auctions closer to real-time will impact the participation of certain technologies such as DSUs, intermittent renewables, interconnectors and batteries.

However, we can set out how the key steps in the process would work, as follows:

- Daily DAM auction results are published;
- The TSOs publish daily auction volume requirements for each service for each zonal location. The timing of the publication would be established as part of the detailed design, and it may be before or after the DAM results are published;
- Market participants assess their ability to provide ancillary services based on their DAM positions, plus a judgment of how they may be able to adjust their market position via Intra-Day Markets, and submit offers into the Daily System Services;
- The TSOs run the daily System Services “market auction” and check whether it clears (which may vary by service and zone) and publish volumes of accepted offers and prices. The precise timings of the auction start, and finish are to be determined, including whether it is feasible for the auction to be complete prior to IDA1;
- Market participants have a chance to adjust their energy positions as necessary in ex ante markets;

- In real-time, the TSOs dispatch the system taking necessary balancing actions to ensure system security, including ensuring adequacy of system services. This action includes taking such BM actions, including early balancing actions as are necessary to ensure adequate system services are available;
- Post-delivery, the TSOs, assess whether market auction winners complied with their Commitment Obligation, based on ex-ante market positions taking appropriate account of any TSO instructed deviations from ex-ante market positions;
- Post-delivery, the TSOs, by service and zone, where the “market auction” did not procure the required volume, run the “physical auction” for residual volumes not purchased in the “market auction”. The TSOs will determine how much volume each participant was able to provide, based on real-time data, and determine physical volumes and prices. Only the residual volume requirement will be procured through the top-up auction.

These steps are indicated below, with the potential uncertainty around timings (to be defined in detailed design) indicated by the brackets.



8.2 Model B

Under Model B, the Commitment Obligation is based on a combination of a unit’s ex ante market position, and its LTS schedule. The daily system services market auction cannot happen until after the LTS results have been published each day, but could happen at any time between the completion of the LTS and energy market Gate Closure.

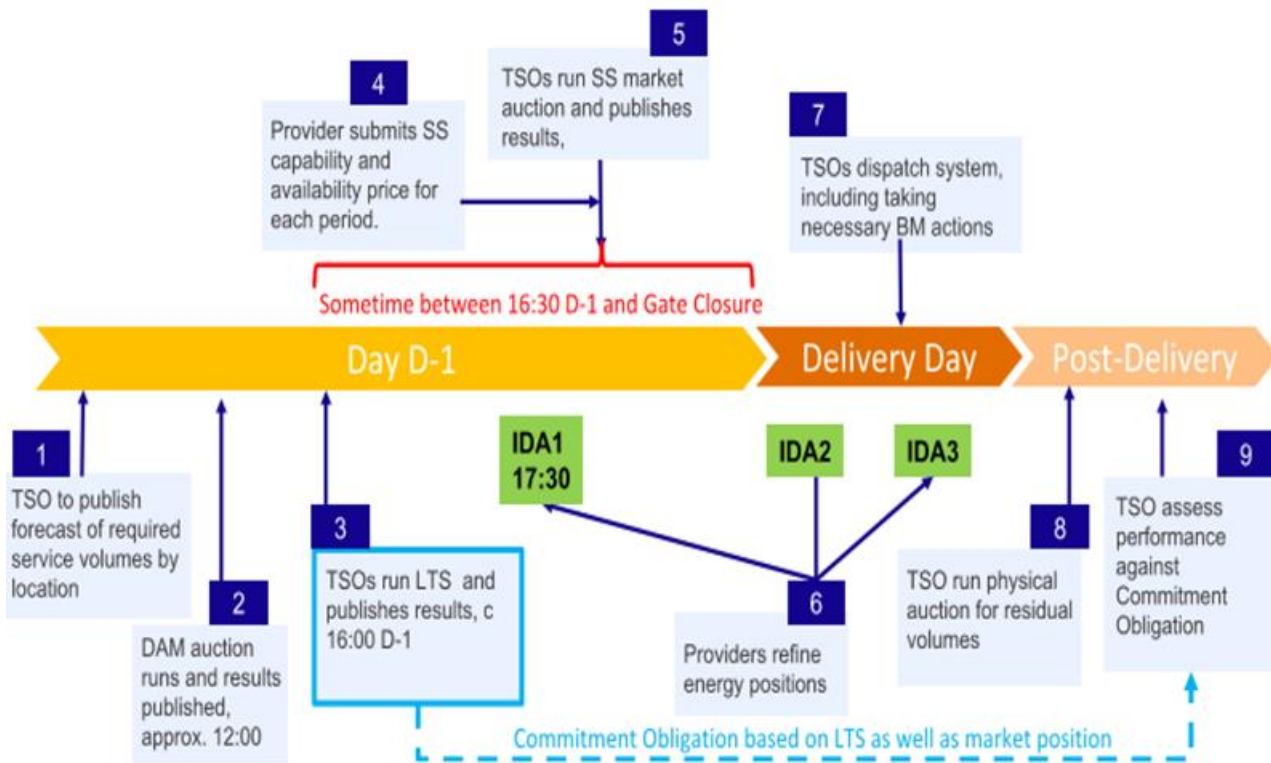
A unit will be deemed to have met its Commitment Obligation based upon either:

- Its ex-ante market position, taking account of any IDM trades as well as DAM trades, provided it delivers on those ex-ante positions (but with a carve-out for TSO instructed deviations); or
- The LTS is consistent with the unit being in a position to provide that service.

The key steps in the process could work as follows:

1. Daily DAM auction results are published;
2. The TSOs publish daily auction volume requirements for each service for each zonal location. The timing of the publication would be established as part of the detailed design, and it may be before or after the DAM results are published;
3. The TSOs run and publish the LTS;
4. Market participants assess their ability to provide ancillary services and submit offers into the Daily System Services auctions considering their:
 - DAM positions, and a judgment of how they may be able to adjust their market position via Intra-Day Markets; and
 - LTS position;
5. The TSOs run the daily System Services “market auction” and check whether it clears (which may vary by service and zone) and publish volumes of accepted offers and prices. As part of the detailed design work, we would need to assess feasible auction start and finish times, but it may not be feasible for results to be published prior to IDA1;
6. Market participants have a chance to adjust their energy positions as necessary in ex ante markets;
7. In real-time, the TSOs dispatch the system taking necessary balancing actions to ensure system security, including ensuring adequacy of system services. This action includes taking such BM actions, including early balancing actions as are necessary to ensure adequate system services are available;
8. Post-delivery, the TSOs assess whether market auction winners complied with their Commitment Obligations, based on both ex-ante market positions and their LTS positions.
9. Post-delivery, the TSOs by service and zone, where the “market auction” did not procure the required volume, and run the “physical auction” for residual volumes not purchased in the “market auction”. The TSOs will determine how much volume each participant was able to provide, based on real-time data, and determine physical volumes and prices

These steps are indicated below, with the potential uncertainty around timings (to be defined in detailed design) indicated by the brackets.



9 Appendix: Commitment Obligations under Model A and B

The commitment obligation model is a key element of an auction design and determines the price a bidder must bid to cover the cost of meeting that obligation. In essence it is what the bidder promises to do in exchange for money if they win the auction.

In the HLD consultation document we proposed that the Commitment Obligation should be based on the Physical Notifications (PN). We assumed that an ex-ante System Service auction winner would:

Be obligated to trade itself into a position to deliver on any accepted System Service auction offer via ex-ante energy markets; and

It would be measured on whether it had complied with its obligation using its Final Physical Notification (FPN), which has to be submitted prior to Gate Closure, 90 minutes before the start of the delivery hour.

In the current draft of the HLD paper it is proposed to adopt an ex-ante “market auction” and an ex-post top-up “physical auction”.

Whilst we remain committed to having a Commitment Obligation for the ex-ante “market auction”¹⁵, we received feedback that using PNs or FPNs – at least as they are currently designed – would not be a good measure of whether a System Services provider was in a position to be able to provide the service. A PN or FPN only captures an energy market participant’s ex-ante energy market position. For some conventional technologies and for some services, the ex-ante energy market position is a reasonable guide to whether the unit is in a position to provide the System Service, but the PN/FPN solution is not a “one-size fits all” solution¹⁶. Therefore, additional information may need to be submitted by providers with their PNs to reflect their system services availability and their energy availability. The key point being that their ex-ante energy commitments and their ex-ante system services commitments should be compatible. The interaction between energy position and system services availability will be different for different technologies and services.

¹⁵ There would not be a Commitment Obligation in respect of the “physical auction” as it is ex-post, so cannot impose commitments in respect of events that have already happened

¹⁶ For instance:

- Batteries do not currently submit PNs. If a battery had an energy position of zero, it may still be able to provide reserve services provided its charged.
- A CCGT may or may not be able to provide some ramping services such as RM1 or RM3, even if has an energy position of zero. Whether a CCGT is able to provide those services depends on other factors not captured in its FPN for that hour, such as whether it is expected to be cold, warm or hot prior to the hour in question, and how flexible the CCGT is.

Additionally, in response to the TSOs’ concern about the “volume insufficiency” of an “ex ante” auction, we have developed a model (Model B) for the ex-ante “market auction” in which the Commitment Obligation reflects both ex-ante market positions and the TSOs’ LTS run.

We describe below, how the Commitment Obligation could work in:

- Model A: Based off ex-ante market positions; and
- Model B: Based off both ex-ante market positions and LTS positions.

| Obligations under market auction | Winner | Loser |
|----------------------------------|--|----------------------------------|
| Model A | Maintain/Get an ex-ante position consistent with SS contracted volume (plus, Grid Code obligation to follow TSO dispatch instructions) | Follow TSO dispatch instructions |
| Model B | Follow TSO dispatch instructions or Maintain/Get an ex-ante position consistent with SS contracted volume if successful in the market auction | Follow TSO dispatch instructions |

9.1 Model A

In Model A, the onus is on System Services providers entering the market auction to ensure that their ex-ante market position is consistent with being able to provide the service. A unit’s ex-ante market position is the cumulation of its sells and buys in the DAM and Intra-Day Markets (the IDA1, IDA2 and IDA3 auctions, and the continuous Intra-Day Market). Based on Q4 2021 data from the MMU, approximately 86% of volume is traded in the DAM, with around 12% traded in the IDA1 auction, which occurs at about 17:30 on Day D-1. About 2% of volume is traded in the IDA2 and IDA3 auction, and less than 0.1% is currently traded in the continuous Intra-Day market. Effectively this means that a System Service provider would likely to have to use the DAM and

IDA1 auctions to trade themselves into a position consistent with providing the System Service, unless there is a significant change to liquidity patterns over the next few years.

Precisely how a market participant will ensure that their ex-ante market position is consistent with being able to provide the service will of course vary depending on the technology and the service, and cannot be judged solely against its FPN. Supplemental information will therefore be required.

Therefore, a provider's cost of meeting its commitment obligation will be the cost of adjusting its ex-ante market position to be consistent with its system services bid. That is, it's foregone infra-marginal rent or fuel costs not covered by the energy market. Accordingly, units with lower minimum generation levels, more flexible operation, and lower fuel costs will tend to be more competitive than less flexible or high-carbon units.

For instance, consider the following cases:

- OCGTs: an OCGT probably has to be synchronised and generating in order to provide faster reserve services such as POR, but can probably provide RM3 even if it is not generating, and is completely cold. Therefore, if the OCGT submitted an FPN of zero, in Model A, it would be deemed to have failed to meet any Commitment Obligation, because an FPN of zero implies it is not generating, which is incompatible with providing POR. By contrast, assuming the OCGT can start and be in a position to provide ramping services within 3 hours, an FPN of zero is still compatible taking on an obligation to provide RM3 in the ex-ante auction.
- Batteries: which can probably provide POR even if is not releasing energy to the system prior to being called to provide POR, provided that it is sufficiently charged. So, in the case of a battery, an FPN of zero is not a complete indicator of whether it is or is not in a position to provide POR.

In the example above it can be seen that where the OCGT and Battery were out-of-merit in the energy market the OCGT would be an expensive provider of POR relative to the battery. But would be able to bid competitively for RM3 relative to an in-merit CCGT that would need to bid it's forgone IMR.

Under Model A, the ex-ante energy market position and system services availability consistent with that position would determine whether the provider had met its commitment in the auction.

9.2 Model B

Under Model B, the onus is not necessarily on the System Services provider entering the market auction to ensure that their ex-ante market position is consistent with being able to provide the service.

There are two ways in which a System Service provider can be judged to have met its Commitment Obligation:

- If their ex-ante market-position is consistent with being able to provide the service; or

- If the TSOs' LTS run is consistent with the unit being able to provide the service.

In both (a) and (b) above, the provider may also have to meet some other technology/service specific criteria as well- e.g. the state of charge of a battery.

The TSOs run the LTS after Initial PNs have been submitted between (about 13:30 on D-1), and the software takes a number of hours to run, and typically completes about 16:00 on D-1.

In Model B, a unit would also be deemed to meet its Commitment Obligation if the TSOs' LTS forecasts that the TSOs' non-energy balancing action will bring it into position to be able to provide the service. Suppose that, for instance, the TSOs' LTS implies that whilst OCGT X has a zero position in the DAM, the TSOs will need to bring it on at Minimum Stable Generation (MSG) via non-energy balancing actions to manage constraints.

An OCGT generating zero MW, will not be able to provide POR. Under Model A, it would be judged to have failed to meet a Commitment Obligation¹⁷. However, under Model B, it could enter the ex-ante auction and be judged to have met its Commitment Obligation, because the LTS implies that the TSOs will bring it on at MSG before the start of the delivery period, which means that it would be in a position to provide POR by the start of the delivery period. OCGT X would be absolved of the risk that it would be penalised for failing to meet its Commitment Obligation, if the TSOs did not subsequently undertake non-energy balancing actions to bring it in position to provide the POR service.

In this case there is no cost to the provider in meeting its obligation and it does not need to make a commitment when bidding in the auction. In other words, the costs and obligations faced by a provider are no different whether or not it is successful in the auction. This is because the providers have no input into the LTS, this is carried out independently by the TSO and the costs of moving a provider into position are covered by imperfections costs. Therefore, units in the LTS will face a marginal cost of zero and there will be limited competitive advantage to more flexible or lower cost units.

¹⁷ assuming it does no trades in the Intra-Day Markets

10 Appendix: Ancillary Services Procurement in other States

France has recently introduced an ex-ante market for secondary reserve, based on the EU definition of automated Frequency Reserve Response (aFRR). Key features of the market are:

- There are separate products for “upward” and “downward” response
- Offers can be submitted from 7 days to 1 day ahead of the delivery period, with all Reserve Managers obliged to submit an offer for all certified volumes by the day ahead.
- The auctions provide a result for each 15-minute period
- Offers can be revised up to 25 minutes before the start of a period.
- Initially, this is a stand-alone French market. It is envisaged that the offers into this market will be used to form offers into the European aFRR market;
- There are fall-back arrangements:
 - The TSO, RTE, can “fall back” to the mandatory arrangements, including in the event of cyber-attack, emergency situations and failure of relevant computer systems.
 - The rules for the mandatory arrangements also imply a fall back if there are insufficient volumes offered on 4 occasions in any 52-week period.

Germany is a Member State with multiple TSO areas. Germany now holds primary auctions for each of the following ancillary service capacity markets:

- Frequency Containment Reserve (FCR);
- aFRR; and
- manual Frequency Reserve Response (mFRR).

Key features of the market are:

- All 3 auctions are daily, procuring reserve capability over six four-hour blocks daily;
- The FCR auction tender opens for offers 14 days ahead of delivery (D-14), and closes at 8am on the day before delivery (D-1).
- The aFRR tender opens for offers 7 days ahead of delivery (D-7), and closes at 9:00 am on the day before delivery (D-1). Results published to those that have made offers no later than 09:30 D-1
- The mFRR tender opens for offers 7 days ahead of delivery (D-7), and closes at 10:00 am on the day before delivery (D-1). Results are published to those that have made offers no later than 11:00 D-1
- In each auction, if there is insufficient offer volume to cover requirements, the TSOs can subsequently conduct a subsequent tender/auction
- The primary auction is an optimisation algorithm (similar to Euphemia) aiming to minimise the total cost of capacity procured, subject to meeting certain constraints

Generally, the EU is making moves to standardise trading in ancillary services, based on its standard product definitions such as FCR, aFRR and mFRR. Results are available for selected countries via the ENTSO-E transparency platform¹⁸.

GB is the only market to which the SEM is currently interconnected. Whilst no longer part of the EU, it appears that GB is seeking to harmonise itself with the direction of travel in the EU. Key features of the GB market are:

- A large quantity of operating reserve services is bought via the Balancing Mechanism, in real time, with the TSO (NGESO) using BM bids and offers to position assets such that they can provide response. This approach excludes non-BM providers and has higher price risk for the NGESO;
- Short-term Operating Reserve (STOR) is the primary reserve product currently procured in advance of real-time. Providers must respond to an instruction within a maximum of 20 minutes, sustain the response for a minimum of two hours, and respond again with a recovery period of not more than 1200 minutes.
- 1700 MW in total of STOR is secured near demand peaks for SQSS¹⁹ largest loss compliance. There is in the region of 400MW of long term STOR contracted, which will expire in March 2025. The aim is to procure the remaining requirement at day ahead.
- In line with the CEP, NGESO procures some balancing services in day-ahead auctions. Currently Dynamic Containment²⁰ and STOR are procured using day-ahead, pay-as clear auctions.

Dynamic Containment: A new, day-ahead, pay-as-clear auction was launched on Wednesday 15th September 2021, replacing a daily, pay-as-bid assessment process for Dynamic Containment which began in October 2020. Procurement is day-ahead for 6 EFA periods, delivered the next day;

STOR: A new, day-ahead, pay-as-clear auction for STOR was launched in April 2021. Day-ahead STOR is procured across STOR Windows, which are pre-defined windows of delivery in a single

¹⁸ See:

<https://transparency.entsoe.eu/balancing/r2/balancingVolumesReservation/show>

<https://transparency.entsoe.eu/balancing/r2/balancingVolumesReservationPrice/show>

<https://transparency.entsoe.eu/balancing/r2/activationAndActivatedBalancingReserves/show>

¹⁹ Security and Quality of Supply Standard

²⁰ Dynamic Containment is delivered post-fault (i.e. beyond a frequency trigger point), and requires the response to be fully deployed within 1 second. Currently only Low Frequency service applies. A separate High Frequency service is to begin October 1st 2021

operational day (05:00 to 05:00). The STOR Windows vary depending on the time of year (season) and working/non-working days, and their definition is reviewed and updated by NGENSO on an annual basis

Looking forward, NGENSO has begun a process to procure a bespoke auction clearing algorithm on which all frequency response and reserve services will be procured. NGENSO will launch two additional services, Dynamic Moderation (DM) and Dynamic Regulation (DR) in March 2022. Their frequency response services (DC, DM, and DR) and the STOR service will migrate to the new platform. A key requirement of the new platform is co-optimisation, i.e. automatic allocation of participating units to the ancillary service that creates the highest overall market welfare. Procurement prior to day-ahead will be phased out and all services (except intra-day) will be procured in the single, day-ahead market.

11 Appendix: Numerical Worked Examples to Support Auction Design Analysis

11.1 Auction Option 1 example

Volume insufficiency

The following worked example shows how “volume insufficiency” could occur in an ex-ante auction (as per Auction Option 1), under certain assumptions about:

- Low volumes of available batteries, DSUs and DC interconnectors (technologies that can provide POR even if they are scheduled at zero volume in the DAM); and
- The behaviour of thermal generators, who are not scheduled in the DAM.

Consider the following worked example for a POR²¹ auction:

- The all-island POR requirement is 375MW (75% of current Largest Single Infeed²²);
- Transmission constraints mean there are two constrained areas, with in a given hour demand being 4000MW in Zone 1 and 2000MW in Zone 2, and for system security reasons the maximum transfers between zones are 100MW in either direction;
- The maximum SNSP is 75%;
- In the given hour, there is forecast to be 2,500MW of wind output in each zone, prior to any requirement to curtail wind to meet SNSP limits, and we assume that the wind is not in a position to provide POR in this hour²³;
- There are 10 x 400MW CCGTs split equally between zones as illustrated in **Error! Not a valid bookmark self-reference.**, each with a 160MW Minimum Stable Generation (MSG). **Error! Not a valid bookmark self-reference.** also shows the short-run marginal cost which each unit bids into the DAM for that day, which is reflected in DAM offers. CCGTs must be synchronised and generating at least at MSG to provide POR, and ramp rates limit the maximum POR from any single CCGT to 100MW;
- There is a 50MW battery and 50MW of DSU each capable of providing 50MW POR without needing to be in the energy schedule.

²¹ For simplicity in this example, we only consider upward POR

²² Currently EWIC, at 500MW. The largest single infeed is expected to increase to 700MW in 2026/27, when the Celtic Interconnector is expected to be completed.

²³ it will be producing energy up to maximum availability or curtailed for SNSP reasons, which will prevent it being ramped up to higher levels

Table 2: Portfolio in worked example

| Provider | Zone | MW | Min Stable Gen | SRMC based DAM offer, €/MWh | POR rate capability, MWh | Need to be generating to provide POR |
|-----------|------|------|----------------|-----------------------------|--------------------------|--------------------------------------|
| Wind A | 1 | 2500 | 0 | 0 | 0 | n.a. |
| Wind B | 2 | 2500 | 0 | 0 | 0 | n.a. |
| Gen C | 1 | 400 | 160 | 50 | 100 | Y |
| Gen D | 2 | 400 | 160 | 55 | 100 | Y |
| Gen E | 1 | 400 | 160 | 60 | 100 | Y |
| Gen F | 2 | 400 | 160 | 65 | 100 | Y |
| Gen G | 1 | 400 | 160 | 70 | 100 | Y |
| Gen H | 2 | 400 | 160 | 75 | 100 | Y |
| Gen I | 1 | 400 | 160 | 80 | 100 | Y |
| Gen J | 2 | 400 | 160 | 85 | 100 | Y |
| Gen K | 1 | 400 | 160 | 90 | 100 | Y |
| Gen L | 2 | 400 | 160 | 95 | 100 | Y |
| Battery M | 1 | 50 | 0 | 200 | 50 | N |
| DSU N | 2 | 50 | 0 | 400 | 50 | N |
| Total | | 9100 | | | 1100 | |

Table 3: Worked example DAM and LTS

| | Zone | MW | SRMC | Unconstrained DAM results | POR capability based on DAM | LTS results | POR capability based on LTS |
|-----------------------------|------|------|------|---------------------------|-----------------------------|-------------|-----------------------------|
| Wind A | 1 | 2500 | 0 | 2500 | | 2500 | |
| Wind B | 2 | 2500 | 0 | 2500 | | 1780 | |
| Gen C | 1 | 400 | 50 | 400 | 0 | 400 | 0 |
| Gen D | 2 | 400 | 55 | 400 | 0 | 160 | 100 |
| Gen E | 1 | 400 | 60 | 200 | 100 | 400 | 0 |
| Gen F | 2 | 400 | 65 | | 0 | 160 | 100 |
| Gen G | 1 | 400 | 70 | | 0 | 400 | 0 |
| Gen H | 2 | 400 | 75 | | 0 | 0 | 0 |
| Gen I | 1 | 400 | 80 | | 0 | 200 | 100 |
| Battery M | 1 | 50 | 95 | | 50 | | 50 |
| DSU N | 2 | 50 | 200 | | 50 | | 50 |
| Total | | 7800 | | 6000 | 200 | 6000 | 400 |
| Zone 1 total | | 4100 | | 3100 | | 3900 | |
| Zone 2 total | | 3700 | | 2900 | | 2100 | |
| Transfer required to Zone 1 | | | | 900 | | 100 | |
| SNSP% | | | | 83% | | 71% | |

constrained down/on
constrained up/on

As illustrated in *Table 3*, the DAM schedules all 5,000MW of wind, Gen C and Gen D at 400MW each, and Gen E at 200MW. However, the DAM schedule infringes transmission constraints (requires 900MW of flows into zone 1), infringes SNSP limits (83% instead of maximum 75%) and delivers only 200MW of POR, less than the required 375MW. Battery M and DSU N can deliver 100MW of POR without being in the DAM schedule, but only Gen E is expected to be able to deliver POR. Although it has 200MW of headroom (i.e. nameplate capacity minus DAM scheduled volume), the ramp rate constraint means it can only technically deliver 100MW. In this example, if the only market participants which were allowed to/willing to bid into the POR auction were Gen E, battery M and DSU N, the POR auction would be volume insufficient, which is the TSOs' concern.

Note that this volume insufficiency occurs for POR because in this example we have ignored DC interconnectors, and have low volumes of batteries and DSUs, whereas normally they would be available for quite a large volume of POR in a way which means this insufficiency issue is not quite as much of a concern for the POR service in particular. However, since these technologies cannot provide services such as inertia and reactive power, the assumption of ignoring the contribution of these unit types helps illustrate how this insufficiency could arise in those services which are of greater concern for insufficiency because they rely more heavily on the synchronous thermal generators considered, and how insufficiency could arise in other instances such as where the level of non-synchronous renewable generation availability exceeds a 100% SNSP level where none of the conventional generators would be likely to clear a market position in the unconstrained DAM.

This assumes that the other conventional generators are either unwilling or unable to bid into the POR auction, if it is inconsistent with their DAM scheduled volume. Alternatively, in the above example, Gen D may take the view that it could bid 100MW into the POR auction. If it wins in the POR auction, it could then go into the intra-day market (IDM) and sell back 100MW of energy to honour its obligation to provide 100MW of POR. Gen D would need to reflect the opportunity cost of providing POR instead of energy in its POR auction offer, as well as a profit margin/risk premium. In the above example, the DAM clearing price is €60/MWh, and Gen D's infra-marginal rent is €5/MWh, so its opportunity cost would be at least €5/MWh. It may have to pay more than €60/MWh to buy-back 100MW in the IDM, e.g. to entice Gen E to increase its output from 200MW to 300MW, and it would probably need to reflect some risk premium into its POR offer as it has to commit to the POR auction before it knows IDM prices, and the premium will depend, inter alia on its judgment of IDM liquidity. This type of activity is likely to be easier for a portfolio player which may be secure in the knowledge that it can do an internal trade in the IDM with another part of its portfolio.

Similarly, one of the generators which are not scheduled in the DAM could take the view that it could go into POR auction and trade itself to MSG. If it wins the POR auction it can then trade its way into the energy schedule in the IDM, so that by the time it comes to FPN, its FPN is consistent

with being able to provide POR (assuming the commitment obligation is related to FPN, not initial PNs).

Liquidity may be limited in circumstances where the key difference between the unconstrained DAM schedule and the constrained LTS is the curtailment of intermittent renewables, subject to renewables support schemes. If the only potential seller in the IDM is wind, a thermal generator knowing that it is required for System Services may find itself unable to trade itself into position in the IDM, because renewables generators are unwilling to buy-back their own output in the IDM, and wait for the TSOs to curtail them. The general low levels of volume liquidity in the IDM timeframe possibly not being enough to allow for the large blocks of energy to get one or more conventional units to Minimum Stable Generation, and the likely low prevailing IDM prices given the high level of renewables as being the main opposite party to such trades and therefore not likely to have prices which can allow for a recovery of the costs to start up and run the conventional unit to that level, lead to the TSOs' concerns that these conventional units would not be able to gain an FPN sufficient to meet their commitment obligations if they cleared in the day-ahead services auction, assuming the FPN is the obligation. Because of this, the assumption is that these units would not be willing to take on the risk of reducing their ongoing services payments through the impact of not meeting their commitment obligation would have on their performance scalars or other performance incentives, and therefore they would not bid into the services auction in order to avoid this risk, leading to the insufficiency concern for those services which do rely on those unit types.

A generator may need to include incorporating a start-cost in its POR offer, on the basis that it will not be able to recover this start cost when it trades itself to MSG in the IDM. This could lead to quite large opportunity costs being reflected in System Service auctions, where units have to be started purely for the purpose of System Service volume adequacy. It can be argued that this merely makes transparent costs which are borne by the TSOs anyway (and passed on to consumers in the form of Imperfections Charges) when it brings more generators on to ensure POR adequacy via balancing actions. However, depending on the design of the auctions, the impact on consumers from moving a cost from the BM to the System Service auction may not be neutral, if the BM is pay-as-bid (for constraints) but pay-as-clear for System Services.

These examples illustrate that the likely materiality of concerns about volume sufficiency:

- Depend on expectations about the availability of different technologies. In the case of reserve services this is likely to include batteries, DSUs and DC interconnectors, both today and in the future to 2030. In the case of inertia and reactive power, this is likely to include low carbon inertia sources in the future to 2030, but today it relies largely on conventional generators;
- IDM liquidity may also be important in determining whether an Option 1 auction will be volume sufficient (at least for certain services).

Whilst the above analysis may indicate that the ex-ante auction may be volume sufficient by 2030 depending on the development of capability to provide those services at times of high SNSP, we have insufficient evidence on which to estimate the frequency / materiality of volume insufficiency on Day 1 of the SSFA. If volume insufficiency is a relatively infrequent event, that would not necessarily preclude ex-ante auctions.

Mis-match between real-time providers and auction winners

Following the publication of the DAM results, the TSO then run the LTS each day at around 13:30. In the above worked example, the LTS suggests that the optimum solution is to reduce inflows into Zone 1 by curtailing wind in Zone 2 (which also brings SNSP below 75%), and bringing on Gen G and Gen I in Zone 1, as well as taking Gen E up to full output. In Zone 2, Gen D is taken down to MSG and Gen F brought on at MSG, partly to manage transmission constraints, but also to ensure there is enough POR available.

Typically, the LTS results are completed around 16:30. If the post DAM System Services auction is held after the LTS result are published (but still ex-ante), it may be that generators who are scheduled in the LTS but not the DAM, will use the knowledge of the LTS to trade themselves via the IDM, into a market position where they are synchronised and therefore able to offer POR. However, this is considered unlikely. Rather, it may be that market participants will leave it to the TSOs to take appropriate balancing actions to make sure that the LTS is delivered, including taking early (pre-gate closure) balancing actions. Pre-gate closure balancing actions may be required where it is necessary to bring on a CCGT to achieve POR sufficiency, since it may not be possible to start a CCGT and bring it to a position to be able to provide POR, if it is not already started at Gate Closure²⁴. If FPNs²⁵ are the basis of the Commitment Obligations there may still be POR insufficiency at FPN stage, since FPNs are meant to take into account DAM and IDM results, but not the TSOs' balancing action, even if chronologically, they occur before Gate Closure. Even holding an ex-ante auction quite close to Gate Closure may not guarantee POR auction volume sufficiency, if compliance with obligations is measured before the impact of the TSOs' balancing actions.

In the above example, if market participants do not take action to position themselves via the IDM, the TSO will take action to bring the LTS into being via balancing actions. The TSOs will pick up all the associated costs via the BM, which will appear in Imperfections Charges, where the cost of backing-off some units and bringing-on others to ensure POR adequacy is bundled in with other imperfections costs. In the above example, assuming no forced outage or demand shocks, there are 400MW of POR provided in real-time.

²⁴ 90 minutes before the start of the energy settlement period. The System Service settlement period could be different from the energy settlement period (e.g. 4 hour blocks for System Services, 1 hour for energy)

²⁵ or augmented FPNs, which contain additional information required in respect of batteries, DSUs etc

A key point to note is that in this worked example, of the 300MW which eventually ends up providing POR in real time, only 100MW (the battery and the DSU) were in a position to do so, based purely on the DAM schedule. The worked example illustrates the risk that Option 1 ends up paying providers who are subsequently taken out of position to provide POR (100MW of Gen E in this example), and does not pay the real-time providers (100MW of each of Gen D, Gen F and Gen I in this example). Clearly, the auction design would be inefficient, sending an inappropriate investment signal and not deliver consumer value if it systematically resulted in paying significant volumes to “ex-ante” auction winners who could not provide services in real-time.

11.2 Top-up Physical Auction example

In the above worked example, the POR “market auction” would fail if only those market participants whose DAM schedules are consistent with provision of POR, or who had a view that they could gain a position in IDM trading consistent with the provision of POR (in this example these are the same amounts), decided to enter the auction by submitting a bid volume. In this example, only Gen E, battery M and DSU N would have decided to enter the auction by submitting a bid volume, with the other units deciding not to take the risk of not being able to meet their commitment obligation and therefore not submit a bid volume, meaning that only 200MW of bid volumes would have been submitted by participants to enter the auction, short of the 375MW requirement. If other market participants decided to take a risk on being able to trade themselves into position in the IDM, and submit a bid volume for the POR auction, the “market auction” could clear, but then when that unit was unable to meet its commitment obligation by not being able to gain that IDM position to provide the service, the TSOs would need to source the service from elsewhere, that unit would not be paid for the service it couldn’t provide, and the performance monitoring and performance incentives would impact that unit depending on the design of those aspects, for example where its ongoing revenue in other periods where it can successfully provide the service would be reduced.

Where the HLD auction design differs from Option 1 set out in the consultation paper, is that the market auction is complemented by a “physical auction” which pays physical auction winners which have not already been paid in the market auction. the top-up “physical auction” would take place where the primary “market auction” does not have sufficient cleared volumes.

The top-up physical auction is only intended to procure the additional volume of service provision not provided by those who cleared in the market auction, up to the physical required volume. In periods where the market auction cleared, this would not be the entire physical volume requirement for the service, depending on the volume of market-cleared units. If the market auction fails to clear entirely, then the entire physical volume requirement would need to be procured through the physical auction.

There would also be periods where there is no volume required to be procured in the physical auction, because all of the volumes procured in the market auction are physically providing their cleared service volume, and these also cover the total physical required volumes. If the amount of the service physically provided from volumes procured in the market auction exceeds the physical requirement for the service in real-time, then there is no need for the physical auction to procure any additional volumes for that period. In that case the market procurement will be the only payment for services for that period.

Units which are providing the amount of service they have already cleared for in the market procurement would not be considered for this volume in the top-up physical auction, as they are already paid for this volume in the market auction. Units could only be paid for additional volumes they are physically providing on top of their market-procured volume, if those additional volumes clear in the physical auction. If a unit which cleared in the market auction fails to provide the service through their commitment obligation, or physically through their own “fault”, then they would not be paid for the service they did not provide. If a unit which cleared in the market auction provides their service through their commitment obligation but fails to provide it physically for reasons which are not their own “fault” (e.g. being redispatched by the TSOs despite being available to provide the service), then they would be paid for their cleared volume in the market auction at the clearing price of that auction with imperfections costs covering the cost of the TSO moving away from the economically efficient dispatch.

How the volumes in the physical auction would be determined is driven by shortfalls where the amounts cleared in the market auction falls short of the physical requirement for the service or the real-time required volume of service being greater than the amount procured in the markets ex-ante, or a combination of the two. The following examples outline how the physical volume would be calculated in different scenarios:

- In the market auction, a required volume of 300MW is procured for a given service. The real-time requirement for the service is the same, 300MW. All of the units which cleared in the market auction are physically providing the service and an additional number of constrained-on units are also providing the service, meaning the total physically provided volume of service is 500MW. Therefore, the physical auction does not need to procure any additional volumes;
- In the market auction, a required volume of 300MW is procured for a given service. The real-time requirement for the service is higher, 350MW. All of the units which cleared in the market auction are physically providing the service, and an additional number of constrained-on units are also providing the service, meaning the total physically provided volume of service is 500MW. Therefore, the top-up physical auction needs to procure an additional 50MW from those who physically provided the service but have not already cleared in the market auction;

- In the market auction, a required volume of 300MW is procured for a given service. The real-time requirement for the service is lower, 240MW. Of the units who cleared in the market procurement, only 250MW are physically providing the service (an additional 200MW), and an additional number of constrained-on units are also providing the service, meaning the total physically provided amount is 450MW. Despite the volumes being physically provided by those who cleared in the market auction being below the required volume procured in that auction, they are greater than the physically required volume. Therefore, the physical auction does not need to procure any additional volumes.

In the worked example described in Section 8.1, since this is an instance of market auction failure such that there were no auction winners or cleared required volume, then the entire 375MW real-time requirement for the service would be included in the top-up physical auction. The 400MW of real-time providers (Gen D, F, I at 100MW each, battery M at 50MW and DSU N at 50MW) would compete for 375MW of “physical auction” payment, and the 375MW of physical auction payment would be provided to the lowest priced bidders, when they made their ex-ante price bids.

The inclusion of a top-up auction ensures:

- That the auction clears and there is nearly always a result for payments for system services, because even if the “market auction” fails, the “physical auction” will clear after the TSO have intervened via balancing actions / curtailment²⁶;
- A match between those who actually provided the service and those who were paid for it in the “physical auction” in the instance where the market auction does not clear;
- Payments are made to providers for all of the required volume of a service, whether provided through a market position or a physical position, creating additional value for the physical provision of the service, in a way which ensures that the cost of non-provision of a service rest with those best placed to manage it according to the reason for non-provision, which helps incentivise the investment required in services;
- Acts as a mechanism for the TSOs to try and align the physical providers of the services with those who cleared in the market auction, as they are tasked with minimising the costs which arise due to variances between the two, this could be done by removing or reducing the impact of constraints which cause this variance, which would be aligned with the improvements required for operating at higher levels of non-synchronous variable renewables.

However, there are some issues to be further considered.

²⁶ Except in the event of a significant security of supply event where the TSOs unable to bring forward sufficient capability via balancing actions

The competitive mechanism does not ensure that price bids (which apply to both the “market” and “physical” auctions) are based on true resource/opportunity cost. In the above worked example, Gen D, F, I, the battery and DSU are selected to be operated in the suggested way for numerous overlapping reasons, including providing POR in real-time, based on expected²⁷/actual costs of balancing actions, and no account of POR auction offer prices is taken in the balancing market scheduling and dispatch process deciding which providers to select to provide POR. Once the balancing market determines which units are physically providing the required POR based on the balancing market commercial offer data in the scheduling and dispatch process and the numerous overlapping requirements to maintain system security including energy balance, network congestion, other service requirements, technical limitations, system constraints, etc., then the physical auction determines which of those volumes should be cleared and paid based on the POR offer prices, i.e. while the balancing market determines who provides the POR, the POR offer prices determines who gets paid for the provision based on whose POR bid prices are most economically in-merit to meet the additional requirement being procured in the physical auction.

The fact that the units which are physically providing POR are selected primarily based on expected/actual BM offers, rather than also considering the POR auction bid prices, despite “physical auction” winners being selected based on the POR bid prices, would appear to create gaming opportunities, which would have to be investigated further. In any normal procurement auction, the volume of service provision across service providers is selected based on the price they offer for the provision of that service, and competitive pressure would lead them to offer a price which reflects their true resource cost/ opportunity cost in their offer price. However, under the physical auction, their offer has limited effect in determining whether they are selected for the service provision. It only determines which of the providers which have been positioned by the TSOs to provide the service via balancing actions, then actually get paid for the service. It would need to be investigated further in detailed design what impact this could have on the relationship between their balancing market bid prices and system service bid prices.

The use of a physical top-up auction may predominantly reward System Service providers which expect to be in positioned by the TSO to provide service in real-time, if units which clear in the “market auction” regularly cannot provide the service either through their commitment obligation or physically, and for other participants who would find themselves unable to physically provide the service they would otherwise have been available to provide if it were not for TSO constraints preventing them from providing it. This could serve to drive investment in technologies that do not need to be in the energy schedule to provide the service, e.g. batteries, and can better guarantee to be available at key times, while providing certainty of process for other participants who could have provided the service but were unable to due to no fault of their own, which provides a fair

²⁷ The TSOs may or may not know what the BM offer prices are, at the time it needs to start making scheduling decisions depending on the flexibility of the provider in question

outcome from both sides while also ensuring that there will be payments for at least the total required volume of a service.

Further work would need to be done to determine how these proposals interact with Firm Access provisions.

12 Appendix: 2030 VOLUME PROJECTIONS

The TSOs have also published some projections for 2030, by which time, significant amount of low carbon inertia solutions are assumed to be on the system, permitting it to be operated at higher SNSP levels. The TSOs projections are for the peak of a windy day in 2030, based on three different portfolio scenarios. The peak of a windy day is the time at which System Service requirements are expected to be greatest. For the purposes of this analysis, we have used the TSOs' gas-led portfolio (Portfolio 1), which relies most on conventional technologies, which generally need to be scheduled to be in a position to provide System Services.

Table 1: Analysis of 2030 availability volumes

| Type | Sub-type | Availability volume: Gas-led Portfolio | | | | | | | | | | | |
|-------------------------|------------------|--|--------------|--------------|--------------|--------------|-----------|--------------|---------------|----------------|--------------|--------------|--------------|
| | | FFR MW | POR MW | SOR MW | TOR1 MW | TOR2 MW | RRS MW | RRD MW | SSRP MVAR | SIR MWs2 | RM1 MW | RM3 MW | RM8 MW |
| GT | OCGT | | | | | | | 3,255 | | | 3,431 | 3,431 | 3,431 |
| GT | CCGT | | | | | | | 782 | | | | | 4,118 |
| Hydro | | | | | | | | 201 | | | 205 | 207 | 207 |
| ST | Small | | | | | | | | | | | | |
| ST | Large | | | | | | | | | | | | |
| Pumped Storage | | | | | | | | 146 | | | 275 | 275 | 275 |
| GT | 1500h limit | | | | | | | | | | | | |
| DC interconnector | | 430 | 430 | 430 | 430 | 430 | | | 754 | | | | |
| Demand response | Residential | | | | | | | | | | | | |
| Demand response | Industrial | 135 | 136 | 140 | 159 | 115 | | 199 | | | 325 | 26 | 25 |
| Demand response | LEDU | | | | | | | | | | | | |
| BES | Energy & Reserve | 598 | 603 | 603 | 603 | 592 | | 456 | 397 | | 452 | - | - |
| BES | Reserve only | 218 | 218 | 218 | 218 | | | | 144 | | | | |
| BES | Long duration | | | | | | | 305 | 201 | | 305 | 305 | - |
| VRES | | 704 | 783 | 794 | 791 | | | | 5,105 | | | | |
| Low Carbon Inertia | | | | | | | | | 10,973 | 498,750 | | | |
| Total | | 2,084 | 2,170 | 2,185 | 2,201 | 1,136 | - | 5,344 | 17,574 | 498,750 | 4,993 | 4,244 | 8,056 |
| Requirement 2030 | | 525 | 525 | 525 | 700 | 700 | | 700 | | | 1,900 | 2,800 | 4,700 |

The TSOs' have also provided us with an estimate of the 2030 required volumes of services for reserve services²⁸ and ramping service²⁹ at this time. Comparing availability volumes for the windy day peak against requirements (where available) shows that:

- A large proportion of the faster reserve services will be provided by interconnectors, demand response and batteries. In total, the volume of services available from these technologies is significantly in excess of the requirements for FFR, POR, SOR and TOR1 and TOR2. DSUs and batteries may not need to be scheduled in the DAM to be in a position to provide reserve. Interconnectors are quite likely to be scheduled in one direction or the other in the DAM, and can still provide reserve if scheduled at zero MW. On a windy

²⁸ FFR, POR, SOR, TOR1, TOR2 and RRD. No specific requirement for RRS, which are potential substitutable by RRD

²⁹ RM1, RM3, RM8

day, they are quite likely to be scheduled to export, and may be able to provide reserve by reducing the flow of exports.

- Faster ramping services, such as RM1 and RM3 are predominantly provided by OCGTs, hydro and pumped storage. Some or all of these units are likely to be able to start and be in a position to ramp within one hour, even if not market scheduled;
- The slowest ramping service, RM8 can probably be provided by CCGTs from cold- i.e. even if they have not been running for a while;
- Inertia (SIR) and reactive (SSRP) are expected to be provided by low carbon inertia technologies, which do not necessarily provide energy, and may not be scheduled in the DAM as a result.