SINGLE ELECTRICITY MARKET COMMITTEE

Future Arrangements for System Services

Volume Forecasting Methodology

Decision Paper

SEM-25-011

24 March 2025

EXECUTIVE SUMMARY

The Day Ahead System Services Auction (DASSA) Volumes Forecasting Methodology Recommendation paper was submitted by the TSOs on 31 January 2025. Twelve detailed responses were received to the consultation. Following a period of engagement with the Regulatory Authorities (RAs), the TSOs formally submitted their Recommendations Paper to the SEM Committee. This decision should be read in conjunction with the TSOs' Recommendations Paper, which is published alongside it.

The SEM Committee has considered the TSOs' Recommendation Paper, alongside consultation responses in publishing this decision. The SEM Committee welcomes the analysis carried out by the TSOs. The High Level Design (HLD) Decision (SEM-22-012) requires the TSOs to publish forecast and historic System Services volume requirements by service, and where relevant, by location.

The TSOs deliverables as per the HLD are to:

- Develop and consult on a methodology for determining system services volume requirements and the volumes to be procured across all time frames;
- 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.

The TSOs recommendation in terms of defining future system needs, the process for creating a forecast for Y+10 and Y+1 and dimensioning of the proposed products is reasonable and in line with the High Level Design (HLD) decision and the SOGL. The SEM Committee welcomes the TSOs proposal to forecast separately for both static and dynamic volume requirements for all products acquired under DASSA.
The SEM Committee considers that the TSO proposal to consistently set the volume requirement equal to the largest possible single infeed or outfeed plus an allowance for CL is an appropriately conservative approach for the initial operations of the DASSA. However, it is important that the TSOs take necessary steps to improve the accuracy of volume forecasts based on experience and improved understanding of system needs.

To address the need for improved granularity and to support greater understanding of the volume requirements the SEM Committee has decided that the TSOs should report on the volumes procured and the actual volume requirements based on the LSI/LSO and potential CL for each trading period on a monthly and quarterly basis. The SEM Committee also requires the TSOs to commence a review of the methodology used to forecast volume requirements one year post DASSA go-live when 12 months of data is available. The review will be completed and any necessary updates to the methodology updated ahead of production of the subsequent annual forecast report. This will allow the volume requirements to be fine-tuned to suit system

needs. The SEM Committee also requires the TSOs to provide further detail on the methodology for the calculation of Consequential Losses (CL) and to publicly consult on this.

Additionally, the SEM Committee considers that the TSOs' proposal to procure volumes to maintain system frequency band range within 49.9 – 50.1 Hz for 98% of the time as per the CRU's PR5 Incentives and Reporting framework is not the appropriate reference for setting the volumes. The appropriate reference is the SOGL in setting the volumes The SOGL defines the frequency standards for the island of Ireland as ± 200 mHz.

As per the SEM Committee decision on Product Review and the Locational Methodology, implicit bundles are only to be used to address a system need and the TSOs were required to set up a separate workstream to explore options for explicit bundling. The SEM Committee considers that implicit bundles could reduce liquidity in the secondary market and could introduce inefficiencies into DASSA bidding. Therefore, where implicit bundles are used, the TSOs should create definitions for an equivalent explicit bundle to remove the need for that implicit bundle as quickly as is practical. The TSOs should report on instances where products were bundled implicitly for system needs.

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1. Introduction & Background

The Future Arrangements for System Services (FASS) 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 FASS 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 the consultation on that paper closing on 21 October 2021. The SEM Committee subsequently published its decision on the High Level Design on 14 April 2022. The decision paper set out a range of decisions that form the FASS High Level Design. It also closed Phase II of the project and commenced Phase III, Detailed Design and Implementation.

On 8 December 2023 the SEM Committee published its decision on Phase III: Phased Implementation Roadmap (SEM-23-103). This paper set out a proposed Phased Implementation Roadmap (PIR) to support timely delivery of the project. The draft PIR set out responsibilities for the TSOs and RAs for deliverables across the different workstreams of the project and directed the TSOs to revise the draft PIR and publish a more detailed final PIR, subject to SEM Committee approval.

The High-Level Design has three broad pillars. Firstly, the needs analysis which includes the volumes methodology, product design and locational methodology. In essence, setting out what needs to be procured, where and in what volume. In this implementation phase, the establishment of the underlying methodologies for these analyses are important; and on an enduring basis analysis within the methodologies will ensure that system needs are clearly identified and provide transparency for market participants. Secondly, there is market design which includes the DASSA, LPF and Fixed Contract Framework. In essence, establishing the mechanisms for how the identified system needs will be procured and on what timeframe. Lastly, there is governance which includes the qualification process, the System Services Code and supplier tariff. These collectively set out the rules and procedures for the arrangements established by the High-Level design and the processes for making changes.

Following on from the SEM Committee's decision, the TSOs subsequently published the final PIR and committed to reviewing the workstreams and publishing an updated PIR every six months. The PIR specified that the TSOs would develop a consultation paper on the DASSA Volume Forecasting Methodology by October 2024. This consultation was published in October 2024. Following a consultation period which included a workshop, the TSOs commenced a period of engagement with the Regulatory Authorities during the development and subsequent submission of the recommendation paper. This paper sets out the SEM Committee's decisions with respect to the DASSA Volume Forecasting Methodology.

1.1. Objectives 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 (NI) 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.

1.2. Paper Structure

The decision paper is structured as follows:

- Reserve Volume Requirements
- Definition of Reference Incidence (RI)
- SOGL Requirements for Reserve Dimensioning
- Volume Forecasting Methodology
- Implicit Bundles
- Additional Considerations
- Summary of decisions
- Next Steps

2. Reserve Volumes requirements

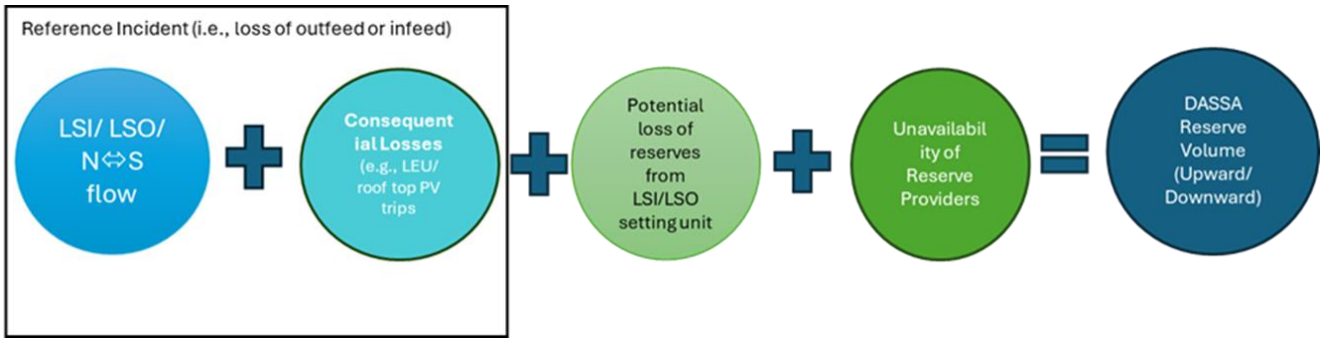
TSO Considerations: The TSOs recommend that the required all Island Volume requirement for FFR, POR, SOR, TOR1, TOR2 and RR are based on TSOs' target to maintain system frequency within 49.9 – 50.1 Hz 98% of the time, measured over a year and mitigate any large disturbances of frequency following from the loss of the largest power in-feed or the largest out-feed (LSI / LSO), or the loss of interconnectors or tie lines, including the loss of both circuits of the North-South interconnector. Additionally, RoCoF should not vary any larger than ± 1 Hz/s measured over a rolling 500 milliseconds period. As per the System Operator Guidelines (SOGL) and Synchronous Area Operational Agreement (SAOA), the frequency range should be maintained within is 49.8 to 50.2 Hz and should not deviate for more than 15,000 minutes/year (2.9% of minutes/year). As per the TSOs' Operating Security Standards (OSS), SAOA, Load Frequency Control Block Operational Agreement (LFCBOA), and the SOGL any instantaneous frequency deviation larger than a maximum of 1000 mHz from the nominal 50 Hz should be avoided.

To meet the first objective above, the TSOs will annually review the frequency quality trend of the previous five years and assess the need for adapting the minimum volume requirements for dynamic reserves. To meet the second objective above, the TSOs will dimension reserve volumes to ensure that the relevant Reference Incident (RI) is secured against.

The TSOs recommend that the volume requirement to maintain the frequency quality target would be reported on an annual basis in the All-Island Transmission Performance report. This report would be both at an all -Island and zonal level. The volume recommended would be based on a set of Reference Incidents (RIs) for each level (i.e., all-island and zonal), which are the "maximum positive or negative power deviation occurring instantaneously".

By 10:00 each day, the TSOs will publish the required reserves volumes that will be procured in the DASSA on that day D-1 for the following day D. The TSOs will specify volume requirements for all upward and downward reserves products (FFR, POR, SOR, TOR1, TOR2, RR) separately and will specify for each product minimum volumes per jurisdiction and minimum volumes of dynamic response.

Currently, for POR and SOR the TSOs dimension reserve requirements to ensure that sufficient reserves to cover 75% of the loss of LSI are secured. To meet the second objective above in the future, and in accordance with the requirements in the SOGL, the TSOs propose that for the DASSA, the required downward and upward POR, SOR, TOR1, TOR2 and RR volumes shall be dimensioned to ensure sufficient reserves to secure against 100% of the RI for outfeed and infeed losses. In addition, the TSOs consider it important to account for potential loss of reserve provision from the units setting the LSI and LSO, and will add a component to the DASSA reserve volume determination to cover this risk. Also, the TSOs need to consider in the DASSA reserve volume determination, the potential unavailability of reserve providing units, for example, one or more reserve providing units becoming unavailable due to a forced outage or a transmission restriction/fault which limits the provision of their service.



SEMC Commentary: The SEM Committee welcomes the work done by the TSOs in this area. The SEM Committee notes that the TSOs propose to procure upward and downward reserve in each settlement period according to the requirement set out in the annual forecast. The annual forecast will be based on the maximum possible LSI or LSO and the potential consequential losses. In addition, the TSOs propose to update the reference incidence once the second North – South Interconnector goes live as per SONI's operational requirements.

The consequential loss would be calculated as a percentage of a share of a certain infeed/outfeed category that could consequentially trip (e.g., X% of LEU, or Y% of DER). Where appropriate the TSOs will have a time varying approach to calculate the consequential loss. However, the detailed methodology as to how this percentage would be calculated and what constraints would be considered in choosing the LEU/DER has not been shared publicly. The TSOs propose to determine the CL for each category (e.g. DER, LEU) at the day ahead stage. The TSOs are also working with the DSOs on determining the Fault Ride Through (FRT) capabilities of the DERs and LEUs and progress the proposed LEU FRT grid code requirements. The TSOs will need to publish a detailed methodology for a mechanised approach to calculating

consequential losses, which expands on the high level approach set out in the TSOs' VFM consultation paper.

The SEM Committee notes that the TSOs will also take into account any loss of reserve following a fault in the unit setting the LSI/LSO, where this unit is contracted to provide reserves. The loss of volumes from the loss of the LSI/LSO/N-S flow and the potential loss of reserves of the LSI/LSO should not at any stage be greater than the Maximum Export Capacity (MEC) of the LSI in cases where the LSI setting unit is a generator and the Maximum Import Capacity (MIC) in cases where the LSI setting unit is an Interconnector (IC). In terms of the LSO, the potential loss of reserves should be no greater than the forecast operating capacity of the LSO setting unit. In cases where the N-S flow sets the reference incident, the potential loss of reserve of the LSI/LSO should be set to zero.

The TSOs have also taken into account the unavailability of reserve providers. Following the decision of the SEM Committee to not proceed with the Final Assignment Mechanism (FAM) the RAs and TSOs conducted a piece of work to identify options to address the potential for unavailable reserve provision. The SEM Committee understands that the TSOs will be launching a consultation on this imminently where a revised proposal termed the Residual Availability Deficiency (RAD) will be proposed. If the SEM Committee ultimately decides to proceed with the proposed RAD and it is fully implemented prior to Go-Live the volume requirement for the Unavailability of reserves will be set to zero. The TSOs should be able to procure the additional volume requirements from the secondary market and the RAD.

SEMC Decision: The SEM Committee has decided that the volume requirement to procure upward and downward reserve from DASSA Go-Live is to be based on the forecast of the reference incident in each settlement period plus the potential loss of reserves due to the loss of the LSI/LSO. The SEM Committee requires the TSOs to develop a monthly and quarterly reporting framework which compares the forecast reference incident against the actual LSI/LSO plus consequential losses for each trading day. The TSOs will commence a detailed review of the forecasting methodology one year post DASSA go live, when 12 months of market data is available. The review is to be completed and any changes to be implemented ahead of the following annual forecast publication, and should look to improve the accuracy and granularity of volume forecasting, to ensure accurate reflection of real time requirements.

The TSOs are required to provide details on the methodology and process for the calculation of the consequential losses based on the LSI/LSO and the products that would be procured across the different timeframes ahead of DASSA go-live. In situations where the defined RI is based on the trip of the N⇔S tie-line while operating at full capacity, the volume associated with the "potential loss of reserves from loss of LSI/LSO" should be set at zero. In other scenarios, the combined forecast volumes of the LSI/LSO and the potential loss of reserves of the LSI/LSO may not exceed the maximum capacity of the LSI/LSO. Volume requirements associated with potential unavailability of reserves will be set to zero if the RAD mechanism is approved by the SEM Committee ahead of DASSA go-live.

3. Definition of Reference Incidence (RI)

TSO Considerations: As per Article 153(2)(b)(ii) of the SOGL, the reference incident is identified as the 'largest imbalance that may result from an instantaneous change of active power …'. In order to facilitate all possible market outcomes and in the advance of certainty of dedicated opportunities for the TSOs to procure reserve volumes after DASSA, the TSOs will take a prudent approach and assume that all system infeeds that could be in service on the next day D may feed in at their maximum capacity (i.e., RI will include the impact of the maximum LSI loss) during all trading periods of the following day. Similarly, all system outfeeds that could be in service on the next day D may feed out at their maximum capacity (i.e., RI will include the impact of the maximum LSO loss). The RI will also need to account for potential consequential losses of e.g. trips of generation or reduction of demand from demand units (as seen from the grid) triggered by the same incident. Consequential losses are typically inadvertent (from a system perspective) and caused by e.g. lack of Fault Ride Through (FRT) capability of the concerned demand/generation. Additionally, the TSOs propose to consider in the DASSA reserve volume determination the potential unavailability of reserve providing units, for example, one or more reserve providing units becoming unavailable due to a forced outage or a transmission restriction/fault which limits the provision of their service.

The TSOs consider that, at least initially, given the lack of foresight of day ahead and intra-day energy market outcomes, and in particular interconnector schedules, it will not be feasible to forecast the RIs (All Island or jurisdictional) with a reasonable accuracy before the DASSA takes place.

The TSOs propose the following formula for determining the reference incident for infeed and outfeed losses, which align with the TSOs' OSS:

$$RII^{AI} = LSI^{AI} + CLI^{AI} \quad [1]$$

$$RIO^{AI} = LSO^{AI} + CLO^{AI} \quad [2]$$

In which:

$$RII^{AI} = All\ Island\ Reference\ Incident\ for\ loss\ of\ Infeeds$$

$$RIO^{AI} = All\ Island\ Reference\ Incident\ for\ loss\ of\ Outfeeds$$

$$CLI^{AI} = All\ Island\ Consequential\ Loss\ of\ Infeed$$

$$CLO^{AI} = All\ Island\ Consequential\ Loss\ of\ Outfeed$$

$$LSI^{AI} = All\ Island\ Largest\ Single\ Infeed$$

$$LSO^{AI} = All\ Island\ Largest\ Single\ Outfeed$$

The All Island RI will be determined separately for outfeed and infeed losses and will be the sum of the LSI or LSO and potential consequential losses. In addition to the All Island RI, the TSOs will define jurisdictional RIs for both IE and NI. These jurisdictional RIs are set by the imbalance in each jurisdiction after a system separation caused by a trip of both circuits of the existing North-South (N-S) Tie-line. Consequently, the jurisdictional RIs are driven by the flow on the

N⇔S tie-line. It is expected that post completion of the second N-S tie-line the RI would be set by the capacity of the N⇔S tie-line.

SEMC Commentary: The SEM Committee welcomes the work done by the TSOs in this area. The SEM Committee notes that the TSOs have proposed to increase the volume requirement beyond the level of the LSI/LSO to account for three risks if loss of the LSI/LSO were to occur. The first two apply at all forecasting stages, while the third applies at the daily stage only. The three risks are:

• Loss of the LSI/LSO will likely result in a Consequential Loss (CL) of load through other units tripping. The TSOs therefore calculate the positive RI as a sum of the LSI and any CL and negative RI for each category as the sum of the LSO and the associated CL.

• Units that have a contract to provide reserves may be unexpectedly unavailable. The TSOs propose to provide an allowance for additional volumes to cover this.

• Where units that are lost as part of the RI hold reserve contracts, those reserves will become unavailable. The TSOs provide an allowance for replacement of those reserves (at the daily stage only).

The SEM Committee notes that the TSOs' propose to set LSI/LSO for both the all-island and the jurisdictional levels by the Interconnectors (ICs) or a trip in the N⇔S tie-line. Jurisdictional reserve requirements for both Ireland and NI when it is flowing at maximum capacity from North to South (450 MW), or South to North (450 MW) would be 900MW. Setting the jurisdictional minimum volume requirements based on maximum N⇔S tie-line flows will exceed all-island volume requirements for all LSI/LSOs that exist or are in development. Hence, the SEM Committee considers that by setting the N⇔S tie-line as the LSI/LSO would result in over procurement of reserves on a regular basis. As per the HLD it was required that the TSOs should provide closer to real time prediction volume requirement. By setting the N⇔S tie-line as the reference point for volume procurement would result in the loss of the degree of variability of reserve requirements and result in constant procurement of an almost fixed volume of reserves. Additionally, if the N⇔S tie-line is considered as the LSI/LSO then the volume associated with the "potential loss of reserves from loss of LSI/LSO" should be set at zero.

The SEM Committee welcomes the TSOs proposal for development of a day-ahead prediction tool which will assist the day-ahead reserve volume forecasts. This tool would allow for more accurate day ahead volume forecasts and the possibility to differentiate the volume needs per trading interval. However, the development of such a tool will require time to mature and will also need to account for changing market dynamics i.e., SEM-EU market integration.

SEMC Decision: The SEM Committee has decided to approve the definition of the Reference Incidence (RI) as detailed in the formula above. In publication of the weekly or daily volumes forecast updates a range of potential volume requirements should be included alongside the determined forecast. The TSOs are also required to publish a more detailed methodology for

the calculation of the Consequential losses. The SEM Committee requires the TSOs to consult on this methodology ahead of DASSA go-live.

4. SOGL Requirements for Reserve Dimensioning

TSO Consideration: An important aspect of both the System Operation Guideline (Articles, 153 (FCR), 157(FRR), 160 (RR)) and the Clean Energy package Internal Electricity Market Regulation (Article 6 of Regulation 2019/943) is the requirements on TSOs to separately determine the volumes for upward and downward reserves for FCR, FRR and RR, and to procure these separately.

The TSOs consider that in this definition the interpretation of the individual components shall be:

- 'Largest imbalance that may result from an instantaneous change of active power': The imbalance resulting from the event, which includes not only the direct loss, but also the consequential losses triggered by the same event.

- Instantaneous change of active power such as that of a single power generating module, single demand facility, or single HVDC interconnector or from a tripping of an AC line, or it shall be the maximum instantaneous loss of active power consumption due to the tripping of one or two connection points: This shall be interpreted as the credible events that result in a sudden change in generation/demand.

Under the current arrangements POR and SOR the TSOs dimension reserve requirements to ensure that sufficient reserves to cover 75% of the loss of LSI are secured. In accordance with the requirements in the SOGL, the TSOs propose that for DASSA the required downward and upward POR, SOR, TOR1, TOR2 and RR volumes shall be dimensioned to ensure sufficient reserves to secure against 100% of the RI for outfeed and infeed losses.

SEMC Commentary: The SEM Committee welcomes the work done by the TSOs in this area. The SEM Committee notes that the products proposed by the TSOs for DASSA are specific products and hence deviate from the standard EU products. In the consultation paper the TSOs have mapped the products proposed by them for DASSA against the standard EU products. Annex 1 includes Table 1 that sets out the dimensioning requirements as per SOGL of standard EU products and Table 2 includes the EU standard products mapped across the products for DASSA.

To summarise, the SOGL sets separate dimensioning requirements for three categories of reserve products:

1. Frequency Containment Reserves (FCR) are fast acting sources of active power that mitigate system frequency deviations immediately after an imbalance occurs. The TSOs map their Primary Operating Reserve (POR) and Secondary Operating Reserve (SOR) products to the SOGL definition of FCR.

2. Frequency Restoration Reserves (FRR) are sources of active power available to restore system frequency to the nominal level. The TSOs map Tertiary Operating Reserve (TOR) 1 and TOR 2 to the SOGL definition of FRR.

3. Replacement Reserves (RR) are active power reserves available to restore the level of FCR and FRR capacity back to a state where it is available to respond to additional system imbalances. The TSOs map their RR product to the SOGL definition of RR.

The SOGL sets minimum requirements for dimensioning each of the three types of frequency reserve products such that TSOs can maintain these frequency quality targets following a large disruption in the system. The standard frequency quality target is 49.8 to 50.2 Hz, however, the TSOs propose to introduce a more stringent frequency target of 49.9 – 50.1 Hz. The required FCR (POR and SOR) capacity should be sufficient to cover at least the largest possible imbalance after the most onerous single contingency event (the reference incident). Additionally, the imbalance related to the reference incident will take into account the immediate response of the system to the trip, by e.g. response of demand/generation to a frequency and/or voltage deviation.

Currently the TSOs procure these products to cover 75% of the loss of the LSI for upward POR and SOR products only. For DASSA the TSOs propose to procure downward and upward POR, SOR, TOR1, TOR2 and RR volumes to be dimensioned to consider volumes required to meet 100% of the RIs for both outfeed and infeed losses. The TSOs propose to update the requirements for POR, SOR, TOR1, TOR2 and RR volumes annually which would result in over procurement of reserve volumes. The TSOs should take into account the Day ahead system needs while forecasting volumes for the products to be procured under DASSA.

SEMC Decision: The SEM Committee has decided not to approve the TSOs' recommendation to procure reserve volumes to maintain the frequency quality requirement of 49.9 and 50.1 for 98% of the time in a year. The SEM Committee understand that this requirement was introduced as part of the EirGrid PR5 Incentives and Reporting framework. The SEM Committee considers that this requirement should be fulfilled through operational efficiency and not via additional procurement of volumes of reserve services. The SEM Committee approved a set of product definitions, through the recent SEM Committee decision on the System Services product review, which are designed to maintain the frequency at ± 100 mHz. The TSOs therefore should not be procuring any additional volumes to maintain the frequency at this level. The SOGL defines the frequency standards for the island of Ireland as ± 200 mHz, therefore this should be the standard by which the TSOs set the forecast volume requirements.

The SEM Committee considers that the dimensioning requirement as proposed by the TSOs for the procurement of both downward and upward POR, SOR, TOR1, TOR2 and RR volumes would result in higher procurement of reserves. The TSOs should commence a detailed review of the proposed methodology one year post go-live using data from the first 12 months of market operations, and review the dimensioning requirements of the proposed products.

5. Volume Forecasting Methodology

TSO Considerations: The TSOs proposals include Annual, Weekly and Daily Forecasting proposals, which will ultimately result in the publication of the required volumes to be procured in each DASSA auction at D-1. At the annual stage the volume forecast would address two main purposes of reserves separately:

- maintaining the system frequency within the 49.9 – 50.1 Hz range for at least 98% of time
- prevent an instantaneous frequency deviation of more than 1000 mHz, or a RoCoF of larger than +/- 1 Hz/s after the occurrence of the RI

To achieve the required volumes the TSOs propose to carry out a detailed simulation process at the annual stage based on defined RIs. The methodology recommended will enable the provision of a detailed forecast of requirements for Y+1, and a more indicative forecast of potential future reserve volumes for Y+2- to Y+10. The forecast for Y+1, will be informed by detailed assessments and supported by power system simulations and shall include detailed DASSA reserve volume requirements, including the characteristics (e.g., FFR FAT, dynamic) and location (IE, NI) for the next year. These forecasts will also provide necessary input to the subsequent weekly and daily volume determination methodologies. The TSOs recommend that the Y+2 to Y+10 forecasts should be updated annually to provide an overview of indicative required reserve volumes, including the characteristics (e.g., FFR FAT, dynamic) and location (IE, NI). Such an overview would include a high-level review of the reserve requirements for the next 10 years, taking into consideration anticipated changes in the transmission system and connected systems (e.g. new interconnectors). The implementation of the methodology will need to be formalised through the development of the system services code, the grid code review and the licencing and governance workstream, and the necessary funding and resources provided for.

On a weekly basis, the TSOs will review the applicability of the results of the annual assessments and publish the guidelines, and parameters to be used for the day-ahead volume determination. The TSOs will aim to align this publication with the current Weekly Constraint Update.

On a daily basis, the TSOs will utilise the information from the weekly forecast and update as required e.g. to account for new planned or forced outages, changing constraints on N-S tie-line flow, specific adverse weather situations e.g. storms, etc, enabling the publication of required DASSA volumes by 10:00 on D-1.

SEMC Commentary: The SEM Committee welcomes the work done by the TSOs in this area. The TSOs propose a three-stage volume forecasting methodology (VFM), where each stage collects and processes information at a different timeframe. At the annual stage the TSOs propose to calculate the level of upward and downward reserve they need to maintain frequency quality targets (both at the all-island and zonal level) based on RIs for each level (i.e., all-island and zonal), which are the “maximum positive or negative power deviation occurring instantaneously”. In addition, the TSOs will simulate the level of FFR they require to maintain

frequency quality within SOGL targets if the RI takes place. The TSOs will set reserve requirements for services POR and RR at 100 per cent of the RI capacity. The TSOs will also set minimum targets for dynamic reserve across all reserve categories according to historical procurement volumes and outturn frequency quality. At the weekly stage the TSOs will set minimum upward and downward reserve requirements in each settlement period of the week ahead according to the Annual Report. The TSOs advise that they may deviate from the requirements in the Annual Report if system circumstances so dictate (e.g., if frequency quality deteriorates). At the daily stage, the TSOs will normally apply the reserve requirement from the weekly process but allow that they may deviate from the requirements set in the weekly process, if system conditions change.

The TSOs propose to undertake most of the analysis in the forecasting process at the annual stage. By setting all-island and zonal RI at the theoretical maximum LSI/LSO for all settlement periods in the year-ahead, the TSOs are likely to procure a sufficient level of reserve capacity to maintain frequency quality targets. However, there are likely to be periods throughout the year where the actual LSI/LSO, both at the all-island and zonal level, is below the theoretical maximum. During these periods, the TSOs' methodology might lead to over-procurement of reserve in the DASSA. The TSOs' haven't taken into consideration some (low) level of error that they would be willing to tolerate, perhaps linked to the allowed loss of load expectation (LOLE) in their annual simulation of volume requirement. The TSOs have also accounted for unavailability of reserves procured through DASSA ex-post procurement of reserves at the annual stage. If the RAD is approved by the SEM Committee, the additional reserves would be procured much closer to real time. To account for the unavailability of reserve at the annual stage would lead to over procurement of reserves resulting in higher costs to the customer.

SEMC Decision: The SEM Committee has decided that the TSOs will publish an annual report which includes the detailed Y+1 volumes requirement forecast alongside the Y+2 to Y+10 requirements. The TSOs will also publish updated forecasts on a weekly and daily basis. The SEM Committee welcomes the TSOs proposal to forecast separately for both static and dynamic volume requirements for all products acquired under DASSA.

The SEM Committee considers that the TSO proposal to consistently set the volume requirement equal to the largest possible single infeed or outfeed plus an allowance for CL is an appropriately conservative approach for the initial operations of the DASSA. However, it is important that the TSOs take necessary steps to improve the accuracy of volume forecasts based on experience and improved understanding of system needs. It is important that the longer term forecasts send accurate investment signals to developers to ensure appropriate levels of service provision for the changing needs of the system.

6. Implicit Bundles

TSO Recommendations: the TSOs will be implementing functionality that allows for implicit bundles of services for DASSA go-live in December 2026. The TSOs consider that this is consistent with SEMC decisions to date. As noted above, the volume requirement for implicit bundles will be in scope for the TSOs' upcoming DASSA Parameters and Scalars Consultation. Other categories of bundles, such as explicit bundles or those arising from linked bids, are not in scope for DASSA go-live; these will be addressed in a separate workstream as directed by the SEMC, the schedule for which will be captured in future versions of the PIR (from March 2025 onwards).

The TSOs consider that any changes to the bundling arrangements for DASSA go-live will impact the go-live date of December 2026; in addition, the TSOs are concerned that other bundling activities may divert resources from the DASSA implementation, potentially impacting the go-live date.

SEMC Commentary: SEMC acknowledges the work done by the TSOs in this area. In the DASSA Design Decision paper the SEM Committee welcomed the commitment from the TSOs to enable the addition of explicit bundle service products and decided that services will initially be procured both on an individual service basis and for any explicit bundle of services that may be defined as an individual product in the auction.

As per the SEM Committee Decision on the Product Review and Locational Methodology, implicit bundles can only be used if there is a defined system need. In the Volume Forecasting Methodology consultation and recommendation papers the TSOs have not identified any system need for bundling. The main reason that the TSOs give to implicitly bundle products, is to address market inefficiencies and the SEM Committee is of the opinion that market inefficiencies can be addressed by providing clarity on volume requirements and by defining explicit bundles.

The use of implicit bundles could reduce liquidity in the secondary market and could introduce inefficiencies into DASSA bidding. Therefore, if the TSOs identify a system need for an implicit bundle this will need to be clearly defined so that providers are aware of the potential to be implicitly bundled ahead of submitting bids. The TSOs should also create definitions for an equivalent explicit bundle to remove the need for that implicit bundle as quickly as is practical. It is noted that an enduring solution for bundling may not be implemented for Go-Live, in which case the framework of implicit and explicit bundling will remain in place.

SEMC Decision: As per the Product Review and Locational Methodology Decision paper the TSOs are required to establish a workstream exploring options for explicit bundling. It was directed that the timing of this consultation will be set out in the next version of the PIR. The SEM Committee also decided that the TSOs should allow for IT capabilities for procurement of explicit bundles prior to go-Live so that explicit bundles can be defined and made operational as quickly as practical without the need to go for further consultation or updating the IT system.

The TSOs can use implicit bundles only to account for system needs (for example for continuous service provision, similar to current operational constraints). The TSOs should report on instances where products were bundled implicitly.

7. Additional Considerations

This section provides a summary of the SEM Committee's considerations on further topics raised by respondents in response to the TSOs' questions regarding additional aspects that the respondents think that the TSOs should consider with regards to product definitions. The main issues raised by respondents are summarised below.

7.1. Greater TSO/DSO interaction and demand flexibility requirement:

The SEM Committee notes that some respondents requested greater clarity on the TSO/DSO interaction and the collaboration with the DSOs. The SEM Committee welcomes the work being done by the TSOs and the DSOs on the development of the Joint System Operator TSO-DSO Future Operating Model.

7.2. EU standard products

The SEM Committee notes the concern raised by the respondents on the deviation of the proposed reserve products for DASSA from the standard EU products. As part of the Product Review and Locational Methodology Decision Paper, the SEM Committee decided that the TSOs should undertake further analysis of the extent to which standard products can meet system needs, and on the need to deviate from or supplement those products. The SEM Committee welcomes the TSOs commitment to undertake further analysis of the alignment with EU standard products as part of the next product review.

7.3. FFR Minimum Full activation time (FAT) reduction

The SEM Committee notes the concerns raised by respondents on the minimum FAT for FFR. The SEM Committee welcomes the TSOs commitment to provide transparency in the design aspects of the products.

7.4. SEMC Decision on Product Review and Locational methodology paper

The SEM Committee notes that concerns were raised by respondents on the SEM Committee decision on Product Review and Locational and Locational Methodology. The SEM Committee

acknowledges the concerns and welcome the commitment of the TSOs to carry out further work in response to the SEM Committee decision.

7.5. Interactions between LPF, Fixed Contracts and DASSA, and Grid code alignment

The SEM Committee notes that respondents raised concerns around insufficient details on the interaction of the Layered Procurement Framework, Fixed contracts and the DASSA auctions for the procurement of volumes for system services. In addition, clarity has been requested on the interaction of grid code requirements with volume based procurement.

7.6. Interactions with energy markets and dispatch

The SEM Committee notes the concerns raised by the respondents on the interactions between the energy markets and dispatch. The SEM Committee also notes previous points raised around the potential for EU policy to move towards co-optimisation of markets, this will need to remain under consideration as the market is developed and reviewed. The SEM Committee acknowledges the TSOs' commitment to ensure transparency to market participants. The RAs and the TSOs are currently working on the FAM alternative workstream which will ensure market-based procurement of reserves.

7.7. Replacement reserve procurement – volume determination and activation considerations

The SEM Committee notes the concern raised by one respondent on Replacement Reserve (RR) procurement and bid selection. The SEM Committee acknowledges the TSOs response to this comment and considers that it provides sufficient clarity to the concerns raised by the respondent.

7.8. Interaction with non-reserve services

The SEM Committee notes the concerns raised by the respondents on the interaction with the non-reserve services. The SEM Committee considers that some of these concerns would be addressed in the consultation for the non-reserve products and volume requirements.

8. Summary of Decisions

Having considered the TSOs' position, alongside industry feedback, the SEM Committee has made a number of decisions on the proposals set out the TSOs' recommendations:

Reserve Volume Requirements:

The SEM Committee has decided that the volume requirement to procure upward and downward reserve from DASSA Go-Live is to be based on the forecast of the reference incident in each settlement period plus the potential loss of reserves due to the loss of the LSI/LSO. The SEM Committee requires the TSOs to develop a monthly and quarterly reporting framework which compares the forecast reference incident against the actual LSI/LSO plus consequential losses for each trading day. The TSOs will commence a detailed review of the forecasting methodology one year post DASSA go live, when 12 months of market data is available. The review is to be completed and any changes to be implemented ahead of the following annual forecast publication, and should look to improve the accuracy and granularity of volume forecasting, to ensure accurate reflection of real time requirements.

The TSOs are required to provide details on the methodology and process for the calculation of the consequential losses based on the LSI/LSO and the products that would be procured across the different timeframes ahead of DASSA go-live. In situations where the defined RI is based on the trip of the N⇔S tie-line while operating at full capacity, the volume associated with the "potential loss of reserves from loss of LSI/LSO" should be set at zero. In other scenarios, the combined forecast volumes of the LSI/LSO and the potential loss of reserves of the LSI/LSO may not exceed the maximum capacity of the LSI/LSO. Volume requirements associated with potential unavailability of reserves will be set to zero if the RAD mechanism is approved by the SEM Committee ahead of DASSA go-live.

Definition of Reference Incidence

The SEM Committee has decided to approve the definition of the Reference Incidence (RI) as detailed in the formula above. In publication of the weekly or daily volumes forecast updates a range of potential volume requirements should be included alongside the determined forecast. The TSOs are also required to publish a more detailed methodology for the calculation of the Consequential losses. The SEM Committee requires the TSOs to consult on this methodology ahead of DASSA go-live.

SOGL Requirements for Reserve Dimensioning

The SEM Committee has decided not to approve the TSOs' recommendation to procure reserve volumes to maintain the frequency quality requirement of 49.9 and 50.1 for 98% of the time in a year. The SEM Committee understand that this requirement was introduced as part of the EirGrid PR5 Incentives and Reporting framework. The SEM Committee considers that this

requirement should be fulfilled through operational efficiency and not via additional procurement of volumes of reserve services. The SEM Committee approved a set of product definitions, through the recent SEM Committee decision on the System Services product review, which are designed to maintain the frequency at + 100 mHz. The TSOs therefore should not be procuring any additional volumes to maintain the frequency at this level. The SOGL defines the frequency standards for the island of Ireland as + 200 mHz, therefore this should be the standard by which the TSOs set the forecast volume requirements.

The SEM Committee considers that the dimensioning requirement as proposed by the TSOs for the procurement of both downward and upward POR, SOR, TOR1, TOR2 and RR volumes would result in higher procurement of reserves. The TSOs should commence a detailed review of the proposed methodology one year post go-live using data from the first 12 months of market operations, and review the dimensioning requirements of the proposed products.

Volume Forecasting Methodology

The SEM Committee has decided that the TSOs will publish an annual report which includes the detailed Y+1 volumes requirement forecast alongside the Y+2 to Y+10 requirements. The TSOs will also publish updated forecasts on a weekly and daily basis. The SEM Committee welcomes the TSOs proposal to forecast separately for both static and dynamic volume requirements for all products acquired under DASSA.

The SEM Committee considers that the TSO proposal to consistently set the volume requirement equal to the largest possible single infeed or outfeed plus an allowance for CL is an appropriately conservative approach for the initial operations of the DASSA. However, it is important that the TSOs take necessary steps to improve the accuracy of volume forecasts based on experience and improved understanding of system needs. It is important that the longer term forecasts send accurate investment signals to developers to ensure appropriate levels of service provision for the changing needs of the system.

Implicit Bundles

As per the Product Review and Locational Methodology Decision paper the TSOs are required to establish a workstream exploring options for explicit bundling. It was directed that the timing of this consultation will be set out in the next version of the PIR. The SEM Committee also decided that the TSOs should allow for IT capabilities for procurement of explicit bundles prior to go-Live so that explicit bundles can be defined and made operational as quickly as practical without the need to go for further consultation or updating the IT system. The TSOs can use implicit bundles only to account for system needs (for example for continuous service provision, similar to current operational constraints). The TSOs should report on instances where products were bundled implicitly.

9. Next Steps

The TSOs are to progress a review of the Grid Code as work is continuing on the system services code and licence. In addition, the TSOs should update the PIR based on the additional consultation and workstream requirement as per this Decision. The SEM Committee notes that the TSOs would carry out a separate Product Review and Locational Methodology consultation which is envisaged during 2025 to examine the required product design for the other (non-reserve) DS3 System services.

ANNEX 1

Table 1. Dimensioning Requirements as per SOGL

Reserve capacity product	**Dimensioning requirements outlined in SOGL**	**Upward and Downward dimensioning**
FCR	The reserve capacity for the synchronous area shall cover at least the reference incident – i.e. the largest imbalance that may result from an instantaneous change of active power such as; a single power generation module single demand facility single HVDC interconnector or tripping of an AC line, or, the maximum instantaneous loss of active power consumption due to the tripping of one or two connection points	Must be determined separately for upward and downward requirements.
FRR	The TSOs of an LFC Block shall determine the reference incident – i.e. the largest imbalance within the LFC Block that may result from an instantaneous change of active power such as; a single power generation module single demand facility single HVDC interconnector or tripping of an AC line,	The TSOs shall determine the upward FRR reserve capacity which shall not be less than the upward/positive dimensioning incident of the LFC block. The TSOs shall determine the downward FRR reserve capacity which shall not be less than the upward/positive dimensioning incident of the LFC Block.
RR	For the GB and IE/NI synchronous areas there shall be sufficient positive reserve capacity on RR to restore the required amount of positive FCR and positive FRR; For the GB and IE/NI synchronous areas, there shall be sufficient negative reserve capacity on RR to restore the required amount of negative FCR and negative FRR; there shall be sufficient reserve capacity on RR, where this is taken into account to dimension the reserve capacity on FRR in order to respect the Frequency Restoration Control Error (FRCE) quality target for the period of time concerned; and (d) compliance with the operational security within a LFC block to determine the reserve capacity on RR	

Table 2: EU standard products mapped across the products for DASSA

EU Product	**Mapping by TSOs**	**All-Island Product response timelines**
N/A	TSOs will simulate the dimensioning need for FFR based on the RI	Fast Frequency Response (FFR)
Frequency Containment Reserve (FCR) (active power reserve)	Shall include POR and SOR	POR- 5-15 seconds
		SOR 15-90 seconds
Frequency restoration reserves (manual FRR only applicable in SEM region)	Includes Tertiary Operating Reserve 1 (TOR1) and Tertiary Operating Reserve 2 (TOR2)	TOR1 90 sec– 5 mins
		TOR2 5 mins-20 mins
Replacement Reserves (RR)	Includes Replacement Reserve (RR) as defined in the EirGrid and SONI Grid Codes.	RRS 20 min - 60 mins
		RRD 20 min - 60 min