

**Recommendation on
DS3 System Services Volume
Capped Competitive Procurement**

DS3 System Services Implementation Project

6th September 2018

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Synopsis

In 2011, we established our 'Delivering a Secure Sustainable Electricity System (DS3)' programme. The objective of the DS3 Programme, of which System Services is a part, is to meet the challenges of operating the electricity system in a safe, secure and efficient manner while facilitating higher levels of renewable energy.

In their decision SEM-17-080¹, the SEM Committee decided that fixed term and fixed tariff contracts would be issued to providers for a sub-set of services. This mechanism was proposed by the TSOs in order to establish contractual arrangements which provide an element of revenue certainty which would be suitable for new System Service providers. This mechanism would be competitive in nature and is referred to as 'Volume Capped', meaning that an upper limit will be applied to the volume of relevant services which will be procured.

Consultation on Volume Capped Procurement Exercise

On March 29th 2018 EirGrid and SONI published a consultation² on the proposed Volume Capped procurement exercise. This consultation covered a range of design details for the Volume Capped competition process, including (and not limited to):

- General competition approach
- Applicant pre-requisites
- Format and assessment of bids
- Applications of tariff caps and scalars
- Market interactions

Options and proposals were given with respect to the above, based on the appropriate balance of considerations needed to meet the challenges and constraints associated with awarding fixed price and minimum length contracts, whilst respecting the investment need for certainty.

¹ 'DS3 System Services Tariffs and Scalars SEM Committee Decision SEM-17-080'
<https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-17-080%20DS3%20SS%20SEMC%20Decision%20Paper%20Regulated%20Arrangements%20Tariffs%20and%20Scalars%20Final%20version.pdf>

² 'Consultation on DS3 System Services Volume Capped Competitive Procurement'
<http://www.eirgridgroup.com/site-files/library/EirGrid/Consultation-on-DS3-System-Services-Volume-Capped-Competitive-Procurement.pdf>

Consultation Proposals

In the consultation, proposals were put forward for the Volume Capped procurement arrangements covering a wide range of competition aspects. These proposals were developed in line with the overarching SEM Committee direction and in particular, the linear increase in the DS3 System Services expenditure cap out to €235 million in 2020.

The TSOs proposed to:

- Carry out a procurement exercise via a staged approach, awarding 100 MW in Stage 1, with a maximum of 30 MW awarded per contract.
- Carry out future procurement stages to allocate up to a volume of 300 MW total, with an additional procurement round for 100 MW anticipated in 2019
- Apply a range of selection criteria to filter valid applicants, including (and not limited to) technical capability, size, connection arrangements.
- Sort applicants on the price per MW for the bundled service being procured

TSOs' Recommendations

The consultation on the Volume Capped procurement exercise closed on 11th May 2018. In total, 24 responses to the Volume Capped consultation were received. Parties who submitted non-confidential responses are listed in Section 2.

As well as reviewing these responses, the TSOs have undertaken extensive stakeholder engagement, with a view to forming final recommendations for the Volume Capped procurement exercise.

A table of these recommendations is shown below:

Table 1: Summary of TSO Recommendations

Section	Requirement	TSO Recommendations
3.2	Service bundling	Providing Units are required to provide 5 DS3 System Services (FFR, POR, SOR, TOR1 and TOR2) and all to the same contracted volume level.
3.3	Product Characteristics	<p>Technical requirements are laid out in this document which must be met by a providing unit. The provision of FFR must follow the associated dynamic FFR response curve³.</p> <p>TOR1 and TOR2 may be instructed by the TSOs independently of the response curve, subsequent to activation of FFR and within the timescales associated with the products, as well as in other limited instances.</p>
3.4	Over-Frequency Response Requirements	Over-frequency response will be required from applicants within the timescales analogous with provision of FFR to SOR, with over-frequency response volumes required to be at least 15% of the under-frequency service volume.
3.5	Availability Requirements	The service availability obligation will be 97%, excluding periods of planned maintenance. Providers with lower availabilities will receive lower payments, and TSOs have the option to review the contracts of providers that consistently underperform on availability (note: more detail will be provided in the contracts consultation).
3.6	Grid Connection	Applicants must provide a valid legally binding connection agreement/offer or be in receipt of a connection offer for each site in question suitable for a contract go-live date of 1st Sept 2021. Applicants who have confirmation that they will receive a

³ 'System Services Contracts for Regulated Arrangements Recommendations Paper'
http://www.eirgridgroup.com/site-files/library/EirGrid/DS3-System-Services-Contracts-Recommendations_final.pdf

		connection offer will also be eligible.
3.7	Network Limitations	No pre-requisite will exist with respect to suitability of connection location. Lack of availability due to network limitations will be reflected in remuneration to providers.
4.2	Procurement Approach	A staged approach will be undertaken. In the first phase approximately 100 MW will be procured.
4.3	Contract Start Date	Contracts should start no later than 1 st September 2021.
4.3	Bid Structure	Applicants will be required to submit a percentage discount factor against the tariffs, with this factor being the same for all 5 services. Bids will be assessed for the bundled service.
4.3	Tariff Cap	Bids should not exceed the tariff rates outlined in SEM-17-080 i.e. the discount factor applied to the bundle must be positive.
4.3	Price Determination	Pay-as-bid pricing will be used.
4.3	Acceptance of last tender	Whole bids only (to the nearest MW) will be accepted. Given a maximum contract volume of 30 MW, the next whole bid taking the total volume procured to above 90MW will be the last successful tenderer, with an overall minimum volume of 91MW, up to a maximum of 120MW.
4.4	Bonding	Performance bonding of €12,000 per MW (or equivalent GBP) of service provision will be required for all applicants ahead of contract execution.
4.5	Maximum Size	A maximum volume of 30 MW is proposed per separate grid connection point.
4.6.1	Product Scalar	Product scalars will apply for speed of response, but will not be considered as part of the assessment process other than in a tie-break situation. The Enhanced Delivery and Continuous Provision scalars will not apply.
4.6.2	Performance Scalars	A providers' adherence to the availability obligations will be managed via application

		of an Availability Performance scalar. Availability signals will need to be put in place in order to monitor each service. The post-event Performance scalar will also be applied.
4.6.3	Application of Scarcity Scalar	The Scarcity scalar will apply based on average modelled SNSP values.
4.6.3	Locational Scalar	Locational incentive/scalar will not apply for the first stage of procurement.
4.6.3	Jurisdictional Volumes	No minimum volume per jurisdiction will be set.
5.2	Licensing and Grid Code Requirements	Grid Code or Distribution Code requirements must be met, or derogated against as appropriate.
5.3	Network Charging	Relevant network charges will be applicable.
5.4	I-SEM Interactions – balancing market	Service providers will need to position themselves in order to meet their contracted availability and service provision.
5.4	I-SEM interaction – capacity market	Service providers will need to position themselves in order to meet their contracted availability and service provision.

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1 Introduction and Background

1.1 Background

EirGrid and SONI are the Transmission System Operators (TSOs) in Ireland and Northern Ireland. It is our job to manage the electricity supply and the flow of power from providers to consumers.

We have a responsibility to enable increased levels of renewable sources to generate on the power system while continuing to ensure that the system operates securely and efficiently. Our Delivering a Secure Sustainable Electricity System (DS3) programme seeks to address the challenges of increasing the allowable System Non-Synchronous Penetration (SNSP) up to 75% by 2020.

The results of the programme are now beginning to deliver benefits to the consumer. In recent months the maximum SNSP level allowable has increased to 65%. It is expected that similar trials will be conducted in the coming years with a view to achieving the DS3 programme's overall goal of a maximum 75% SNSP limit.

A key component of the DS3 programme is the System Services work stream. Its aim is to put in place the correct structure, level and type of services in order to ensure that the system can operate securely with these higher levels of non-synchronous generation.

1.2 Overview of System Services

EirGrid and SONI have licencing and statutory obligations to procure sufficient system services to enable efficient, reliable and secure power system operation. The contractual arrangements and payment rates in Ireland and Northern Ireland were harmonised following the introduction of the SEM, with 7 products (POR, SOR, TOR1, TOR2, SSRP, RRS, and RRD) procured under these Harmonised Ancillary Services (HAS) arrangements.

New services are required to support a move to higher levels of non-synchronous generation. Four services (SIR, RM1, RM3, and RM8) were introduced from 1 October 2016 following the commencement of the new DS3 System Services arrangements. A further 3 services (FFR, DRR, FPFAPR), are in the process of being introduced, with DRR and FPFAPR required only at SNSP above 70%. All services are required to maintain the resilience of the power system as the SNSP levels increase. Table 2 provides a high-level summary of the DS3 System Services products.

Table 2: Summary of DS3 System Services ⁴ Service Name	Abbreviation	Unit of Payment	Short Description
Synchronous Inertial Response	SIR	MWs ² h	(Stored kinetic energy)*(SIR Factor – 15)
Fast Frequency Response	FFR	MWh	MW delivered between 0.15 and 10 seconds
Primary Operating Reserve	POR	MWh	MW delivered between 5 and 15 seconds
Secondary Operating Reserve	SOR	MWh	MW delivered between 15 to 90 seconds
Tertiary Operating Reserve 1	TOR1	MWh	MW delivered between 90 seconds to 5 minutes
Tertiary Operating Reserve 2	TOR2	MWh	MW delivered between 5 minutes to 20 minutes
Replacement Reserve – Synchronised	RRS	MWh	MW delivered between 20 minutes to 1 hour
Replacement Reserve – Desynchronised	RRD	MWh	MW delivered between 20 minutes to 1 hour
Ramping Margin 1	RM1	MWh	The increased MW output that can be delivered with a good degree of certainty for the given time horizon.
Ramping Margin 3	RM3	MWh	
Ramping Margin 8	RM8	MWh	
Fast Post Fault Active Power Recovery	FPFAPR	MWh	Active power (MW) >90% within 250ms of voltage >90%
Steady State Reactive Power	SSRP	Mvarh	(Mvar capability)*(% of capacity that Mvar capability is achievable)
Dynamic Reactive Response	DRR	MWh	Mvar capability during large (>30%) voltage dips

⁴ Further detail on the DS3 System Services can be found at: <http://www.eirgridgroup.com/how-the-grid-works/ds3-programme/>

1.3 Volume Capped Arrangements

As outlined in the consultation on DS3 System Services Enduring Tariffs⁵, the TSOs sought to develop an enduring tariff design in a way which was robust against a number of risks which may result in over-expenditure beyond the “glide-path” expenditure set out by the SEM Committee for DS3 System Services.

These risks and mitigations were presented in the consultation, with Section 4.4.1 highlighting the risk that there may be an overinvestment in high availability technologies whose availability is not linked to energy dispatch, such as Demand Side Units and Non-Synchronous Technologies.

Possible mitigation options were presented in the paper, one of which was to place a limit on the volume of high availability technologies that can qualify to provide services, in order to encourage a phased approach in the introduction of the new technologies.

Based on further consideration of the most appropriate mitigation options, the TSOs proposed implementing a “Volume Capped” approach to address this risk of overinvestment. This proposal was consulted on with the results provided in the DS3 System Services Contracts for Regulated Arrangements Recommendation paper⁶ published in December 2017.

After consultation with industry in the DS3 System Services Regulated Agreements (hereafter also referred to as Volume Uncapped), the TSOs decided that high availability units should not be restricted from participating in these Volume Uncapped contracts.

As a result of feedback, it was also proposed that there will be different terms and requirements for Volume Capped which will be suitable for those parties looking to invest in new service providers. This means that contracts will need to provide a level of certainty on which new providing units can be built e.g. fixed length and certainty in remuneration.

1.4 Purpose of this paper

Further stakeholder engagement on these arrangements was required and as such, a [consultation](#) was carried out beginning March 29th 2018. This recommendation paper represents the results of that consultation and provides clarity for interested parties on the requirements which the TSOs recommend for the Volume Capped competitive procurement exercise. This recommendation paper should be read in on conjunction with the accompanying SEM Committee Decision Paper, which may or may not align with the TSOs’ recommendations.

The anticipated timelines for this procurement exercise are shown below. It should be noted that a separate contracts consultation will be conducted, starting in October 2018. This will provide stakeholders with the opportunity to provide feedback on the proposed contract for successful parties under this competition.

⁵ Consultation on DS3 System Services Enduring Tariffs <http://www.eirgridgroup.com/site-files/library/EirGrid/DS3-System-Services-Enduring-Tariffs-Consultation-Paper.pdf>

⁶ DS3 System Services Contracts for Regulated Arrangements Recommendation paper http://www.eirgridgroup.com/site-files/library/EirGrid/DS3-System-Services-Contracts-Recommendations_final.pdf



Figure 1: DS3 Volume Capped Procurement Timelines

1.5 Structure of this paper

This paper provides a high level overview of the stakeholder responses to the consultation on the various key elements. It also sets out our response to the issues raised by stakeholders and our final recommendation on the Volume Capped competition.

The remainder of the paper is structured as follows:

- Section 2 provides information on the number and type of responses received to the consultation.
- Section 3 sets out the consultation proposal and background for each topic contained within the ‘Product Definition and Service Provider Requirements’ section of the consultation, followed by stakeholder comments for each topic, the TSOs’ response to these comments and finally, the TSOs’ recommendations.
- Section 4 provides the same function as Section 3 but for the ‘Procurement design and contract payment’ section of the consultation.
- Section 5 provides the same function as Section 3 but for the ‘Relevant Industry Frameworks and Market Interactions’ section of the consultation.
- Section 6 provides the same function as Section 3 but for the ‘Mechanism for assessing applications’ section of the consultation.
- Section 7 describes the next steps, including the separate contracts consultation which will be conducted.

2 Responses to the Consultation

The consultation on the Volume Capped procurement exercise closed on 11th May 2018. In support of this consultation, EirGrid and SONI hosted a stakeholder event in Dundalk on 15th April 2018.

In total, 24 responses to the Volume Capped consultation were received. Parties who submitted non-confidential responses are listed below:

- Bord Gais
- Bord na Mona
- Brookfield
- Clean Tech
- Energia
- ESB GWM
- Innogy
- IWEA
- Power NI
- RES
- Scottish Power Renewables
- SSE
- Tynagh

In keeping with previous DS3 System Services consultation papers, all non-confidential responses have been published alongside this recommendations paper. In addition, all responses were shared with the Regulatory Authorities to inform their decision.

3 TSOs' Recommendations on Product Definition and Service Provider Requirements

3.1 Overview

Section 3 of the consultation proposed technical service characteristics which the TSOs will require from providers under the Volume Capped arrangements, the availability requirements for these providers, as well as pre-conditions necessary for prospective participants. These criteria were proposed to promote sufficient and effective delivery of the services by 2021, as well as ongoing availability through the lifespan of the contract.

3.2 Bundling of Services

3.2.1 Consultation Paper Background and Proposal

In the consultation, the TSOs outlined the services which they would look to require as part of a 'bundle' from successful service providers, with the TSOs proposing a bundle of FFR, POR, SOR, TOR1 and TOR2.

This proposal was based on concerns that by not requiring TOR2 in the bundle, a critical service required for major frequency events will not be provided. A provider which can react with fast FFR and maintain response out to TOR2 timescales will contribute significantly to the management of system stability, particularly as renewable energy levels grow. It was highlighted that incentivising such service capability, which will be increasingly needed with rising levels of non-synchronous renewables, is a significant objective of the Volume Capped procurement process.

The TSOs did note that events where the system frequency falls below the frequency trigger, and does not recover within the trigger point quickly after the event, are anticipated to be infrequent. This is particularly the case in the timescales of the TOR1 and TOR2 services. Therefore, it was proposed that the TOR1 and TOR2 services will be dispatchable in order to ensure their usefulness and effectiveness.

It was acknowledged that services such as TOR2 can be obtained elsewhere and as such, an alternative bundle of FFR-TOR1 could be procured instead. This was therefore provided as an alternative option.

The TSOs also proposed that the service provision procured under these Volume Capped arrangements should be at the same volume across all services (whether that be a bundle of 4 or 5 services).

The following options and proposal were therefore proposed in the consultation:

Option 1: System Services bundle includes FFR – TOR1

Option 2: System Services bundle includes FFR – TOR2

TSO Proposal: Providing Units are required to provide 5 DS3 System Services (FFR, POR, SOR, TOR1 and TOR2) and all to the same contracted volume level.

Respondents were asked the following question:

Question 1: Do you have any comments on the two options for service bundling proposed and the TSOs' preferred option?

3.2.2 Stakeholder Comments

A significant majority (at least 16 respondents) indicated agreement with the TSOs' proposal that a bundle of FFR-TOR2 be procured, with a further 2 indicating no objection. Where reasons were given, respondents who agreed with the TSOs' proposal did so generally for two reasons. First, a number of stakeholders indicated that they accepted the TSOs' rationale that the addition of TOR2 would provide greater support for system stability. In addition, several respondents provided comments specifically in relation to the development of battery storage providers. These respondents indicated that given challenges in cost-effectively procuring these types of units, a service provider offering services out to TOR2 would provide better value for money for the consumer, and would make better use of system connection capacity.

No respondents explicitly disagreed with the proposal, though one respondent suggested that a third bundle, POR-TOR2, should have been considered by the TSOs and that this bundle would be worthy of future consideration.

Several points of clarification were raised, the most notable being the need for certainty surrounding the possibility for the TSOs to dispatch TOR1 and TOR2. It was noted that lack of clarity on this topic could either lead to a providing unit being unable to fulfil the TSOs' instructions, or being oversized to manage this risk (with additional cost to the consumer). Clarity on this point was requested, with suggestions provided by some respondents as to how conditions could be set in which TSO dispatch would be allowable. At least one respondent also queried the mechanism for how this dispatch would take place, with a preference for automatic action given the infrequent nature and the inefficient resourcing associated with a manual process. Another queried how dispatch of TOR1 would be possible within the timescales associated with the service.

Of the respondents who indicated agreement with the proposed bundle, one raised concerns regarding the requirement for all to be provided at the same volume. The respondent proposed that this requirement was set for TSO simplicity (both in operation and procurement) rather than what was best to incentivise new investment, whilst another respondent, who agreed with the proposed bundle, suggested that should no tenderer be able to provide all services from a single Providing Unit, the competition could be opened up on an individual service basis.

3.2.3 TSOs' Response to Stakeholder Comments

The TSOs acknowledge that the majority of respondents indicated support for the bundle FFR-TOR2, all at the same volume, as proposed.

Predominantly, feedback received was in relation to the need for certainty around when and how often TOR1 and TOR2 would be dispatched. We note and accept that without some indication as to how often these services may be dispatched, development of specifications will be significantly more challenging for prospective providing units, with a risk of over-specification and higher costs.

As such, we welcome the suggestions provided by a number of respondents on potential pre-conditions for dispatch of these two services.

We also note some stakeholders' queries with respect to the mechanism of dispatch and the extent to which this will require automatic or manual action, and how this will be possible within the timescales for TOR1. Some stakeholders specifically noted that they would hope that this dispatch can be performed remotely by the TSOs, the rationale for which we appreciate.

3.2.4 Further development of dispatch conditions for TOR1 and TOR2

We have carefully considered suggestions from stakeholders on dispatch of TOR1 and TOR2, with a view to finding a solution which will provide an appropriate balance between enabling operational flexibility to the TSOs, whilst offering certainty of usage for providers. As a result, the TSOs have recommended conditions with respect to TOR1 and TOR2 dispatch below.

These can be split in two: frequency conditions and other system conditions.

Frequency Conditions for TOR1 and TOR2 dispatch

As noted in the consultation, circumstances where frequency falls outside of the proposed frequency threshold and remains outside of it for the full TOR2 delivery time (20 minutes) will be infrequent. The TSOs would therefore seek to utilise these services more often, specifically for frequency events where frequency recovers before activation of these TOR1 and TOR2 services.

The TSOs therefore recommend that the TSOs will be able to dispatch TOR1 and TOR2, subsequent to a frequency event below 49.8Hz, but will not require service provision to continue past the applicable service durations (5 minutes for TOR1 and 20 minutes for TOR2). This duration will be measured from the point at which frequency first falls through the trigger point.

A diagram is provided below to illustrate the recommended conditions for TOR1 and TOR2 dispatch, with a description of the 5 stages.

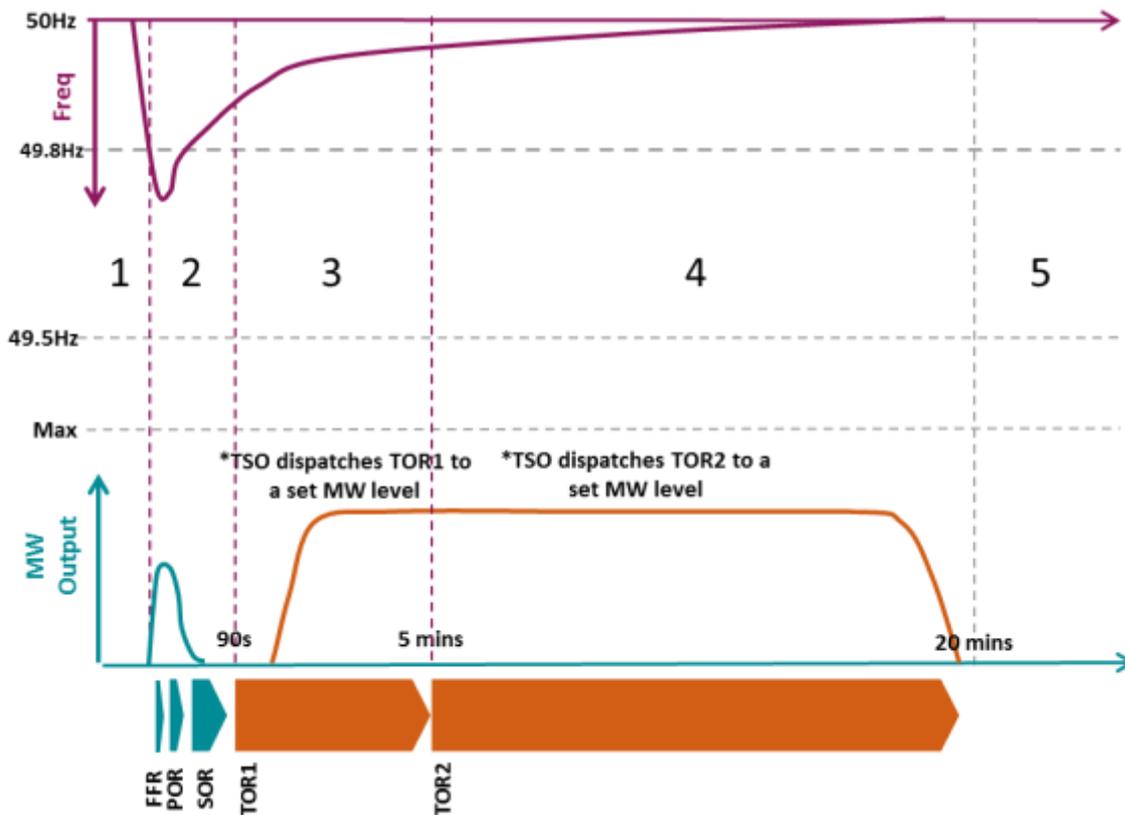


Figure 2: TOR1 and TOR2 dispatch limitations for Volume Capped providers

Stage 1: Pre-event. No automatic response and no TSO dispatch instruction.

Stage 2: Frequency falls below threshold and response is provided as per service requirements. Response time for all services begins when frequency falls below threshold (i.e. $t = 0$), with all providers following the frequency curve. In this example, output reduces to 0 MW due to frequency recovering to above 49.8 Hz. In addition, at any point after $t = 0$ and up to 5 minutes the TSOs can dispatch TOR1 to any output level, up to the provider's maximum. Provision of TOR1 will be required within the normal timescales for activation i.e. have reached the output required 90 seconds after dispatch

Stage 3: In the example above, the frequency during Stage 3 is above the trigger level so no automatic response is provided. The TSOs have the ability to dispatch TOR1 up to and not exceeding $t = 5$ minutes, which in this circumstance they do. For the avoidance of doubt, $t = 5$ minutes refers to 5 minutes after $t = 0$ i.e. the time at which the trigger frequency was reached.

Stage 4: The TSOs may also dispatch the unit to provide TOR2. This cannot be dispatched beyond $t = 20$ mins

Stage 5: Over 20 minutes since the frequency trigger reached. No dispatch of TOR1 and TOR2 is carried out.

At the end of dispatched TOR1 and TOR2 provision, the units should return to zero via a defined ramp-rate to avoid sudden changes in power, which could endanger the system. The TSOs will provide details of this ramp-down to providers at a later date.

Other System Conditions

In addition to circumstances outlined above, there may be additional instances where the TSO would wish to utilise the contracted services. The TSOs view that other system conditions may include circumstances such as voltage and/or thermal overload. The TSO do not expect this to be a common occurrence, and would endeavour to limit such usages to less than 10 times per unit per year. Further details with respect to this ability will be consulted on in the contracts consultation.

Mechanism for dispatch

It should be noted that Grid Code obligations are that providers should be able to respond to set point dispatch instructions sent by the TSOs, and also must have the capability to be controlled remotely by the TSOs (via AGC).

Recognising that instances in which a dispatch instruction will be sent are anticipated to be relatively infrequent, the TSOs intend that such dispatch will be possible remotely, via secure instruction from the TSOs. Further engagement will be needed with stakeholders on the detailed mechanism for this, with it anticipated that the AGC functionality may be used for units to be controlled remotely. However, the TSOs require that a 24/7 point of contact exists for each providing unit, though this may not necessarily be located on site. As outlined in Section 5.2, where appropriate and necessary, any Grid Code derogations may be sought in line with the applicable process.

3.2.5 TSOs' Recommendation for Bundling of Services

The TSOs are of the view that the bundle of FFR-TOR2 will offer an effective service delivery, which will be of benefit to the system with increasing levels of non-synchronous renewable provision on the system in Ireland and Northern Ireland. We view that the TOR1 and TOR2 dispatch pre-conditions we have set out provide an appropriate balance between enabling providers to size their providing units correctly, whilst providing reliable services to the TSOs subsequent to a system event or during other, infrequent, system conditions.

As such the TSOs' recommendations are as follows:

Recommendation: Providing units will be required to deliver FFR – TOR2 at the same volume level.

TOR1 and TOR2 may be dispatched by the TSOs as follows:

- in circumstances where the frequency has reached the trigger threshold, up to and not past 20 minutes after this point, or
- during other system circumstances, up to 10 times per year at the discretion of the TSOs.

3.3 Technical Requirements

3.3.1 Consultation Paper Background and Proposal

The consultation detailed further technical requirements in relation to the providing units and the manner in which they provide the services required.

Appendix I of the consultation detailed analysis performed in support of defining these characteristics. The characteristics proposed in the consultation are given below.

Table 3: Summary of Product Delivery Characteristics as proposed in consultation

Characteristic	Requirements proposed in consultation
Dynamic response	Dynamic capability in response to a Reserve Trigger
Required minimum speed of response	150-300 ms
Trajectory	0.3 Hz
Required reserve trigger capability	49.8 Hz
Recharge limitations	It was proposed in the consultation that trickle recharge would be allowed post-event provided frequency has returned to within ± 0.05 Hz and remained there for 5 minutes

For FFR, it was proposed that below the frequency trigger point, a providing unit would be expected to follow the FFR Dynamic Capability Curve which was first defined in the DS3 System Services Contracts for Regulated Arrangements Recommendations Paper⁷, and is provided below.

⁷ DS3 System Services Contracts for Regulated Arrangements Recommendations Paper
http://www.eirgridgroup.com/site-files/library/EirGrid/DS3-System-Services-Contracts-Recommendations_final.pdf

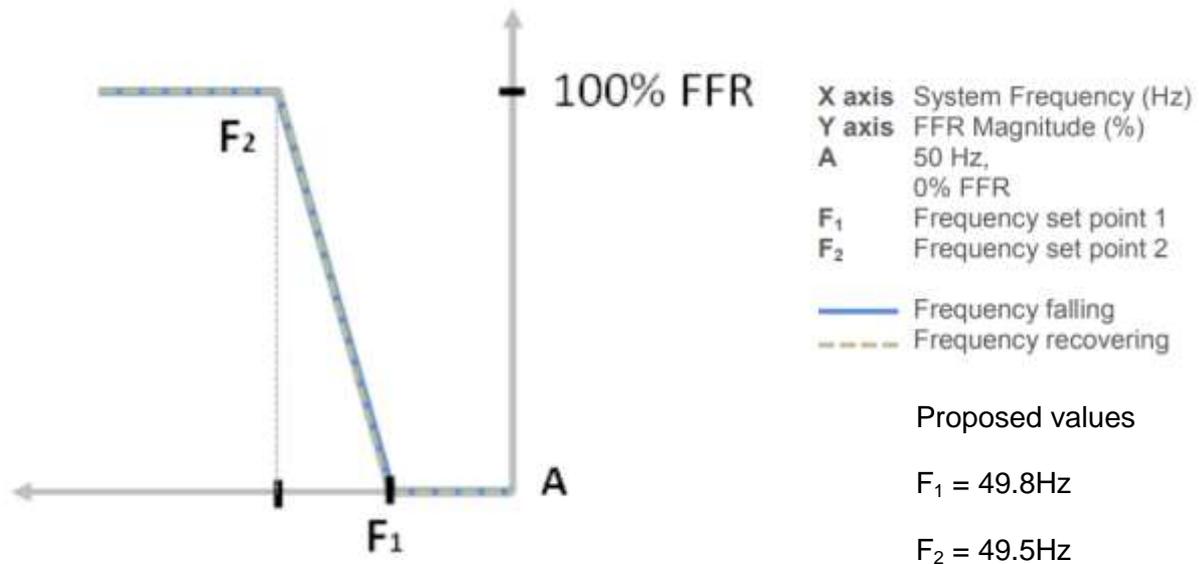


Figure 3: FFR Dynamic Capability Frequency Response Curve

Given the proposed values provided in Table 3, in the above diagram F₁ would be 49.8 Hz and F₂ 49.5 Hz. For the avoidance of doubt, a providing Unit's provision of POR-TOR2 must continue its FFR response characteristics during the required timescales. In effect, the providing unit must have the capability of continuing along the trajectory of the applicable frequency response curve for the extended timeframes obligated of POR-TOR2, as required by the TSOs in response to a Reserve Trigger. This is notwithstanding the ability of the TSOs to dispatch the TOR1 and TOR2 services as necessary.

The following proposal was given in the consultation:

TSO Proposal: The technical requirements laid out in this document must be met by a providing unit. The provision of the service must follow the FFR Dynamic Capability Frequency Response Curve laid out in the DS3 System Services Contracts for Regulated Arrangements Recommendations.

Respondents were asked the following question (please note, over-frequency requirements will be detailed in the following Section 3.5)

Question 2: Do you have any view on the technical requirements proposed, including the requirement for over-frequency response?

3.3.2 Stakeholder Comments

The majority of respondents indicated that the characteristics proposed by the TSOs can be delivered by their prospective providing units, and that there exists no major technical hurdles in achieving this. Comments therefore generally took two forms – requests for further clarification of some parameters, and queries with respect to whether alternative parameters may provide a more valuable service.

It should be noted however that some respondents did state that the requirements with respect to minimum speed of response were demanding and ambitious. Given this, clarification was sought on how this would be measured and, specifically for the purposes of measuring speed of response, where the frequency would be measured (either by the TSOs or at the providing unit site).

One stakeholder requested clarity as to whether output (in the case of an event) would be measured from 0 MW in all cases or whether, in the case where a unit is recharging, this could be measure from the level (or 'baseline') at which the unit was positioned for the purposes of recharging.

On the subject of trickle charge, a number of stakeholders requested further clarity as to how this would be defined and the rate at which such recharging would be allowable. One respondent suggested a similar approach to that undertaken in the Enhanced Frequency Response (EFR) competition conducted in Great Britain, this being that recharge is allowed at a rate representing an percentage (10%) of a unit's MEC.

One stakeholder did not agree with the use of the word trajectory, suggesting the terms droop and frequency trigger would outline the equivalent requirements.

On a more general level, a number of respondents queried whether the service proposed by the TSOs would provide the most benefit from providers, particularly with respect to the frequency trigger point of 49.8 Hz, meaning that instances of activation would be relatively infrequent. It was noted that in the Volume Uncapped arrangements a trigger threshold of 49.985 Hz was provided with a maximum enhanced delivery product scalar (and therefore higher remuneration). It was therefore queried as to why the TSOs were not rewarding this capability as part of the Volume Capped arrangements.

3.3.3 TSOs' Response to Stakeholder Comments

We welcome the confirmation from a number of respondents that the providing units they are developing could deliver the technical requirements outlined by the TSOs. We do recognise that the speed of response proposed represents an ambitious technical requirement. However we are confident from the feedback received and stakeholder engagement undertaken that such capabilities can be achieved.

We recognise that multiple respondents have drawn on, and provided helpful insight into, experiences in other jurisdictions as part of their responses. It should be stated that the system in Ireland and Northern Ireland does have its own characteristics – namely that it is a smaller synchronous area with very high levels of non-synchronous penetration (with levels due to increase further still). Whilst it is prudent and helpful to reflect on experiences in other jurisdictions, it is fundamental to the competition that the service is one which is appropriate for Ireland and Northern Ireland and delivers for consumers in both jurisdictions.

Significant analysis was provided in Appendix I of the consultation with respect to the proposed values for minimum speed of response and trajectory. Critical to this analysis was the objective to minimise any risk of system oscillations from the activation of the technology, this being of particular significance for a system with the characteristics of Ireland and Northern Ireland.

On the topic of frequency trigger threshold and disparity between the Volume Uncapped arrangements, the TSOs view these Volume Capped arrangements as seeking a fundamentally

different service to frequency regulation close to 50 Hz. Such frequency regulation is anticipated to be provided via a significant number of providing units on the system, including conventional generation and wind generation. It is therefore not currently necessary to run a competition for such a service, and we would expect such capability to be delivered via the uncapped arrangements. In addition, the TSOs have analysed the effect of having the speed of response and trajectory characteristics proposed and this analysis shows that, despite relatively smaller response times and moderate trajectory settings, oscillations are developed when the set point is closer to nominal. We therefore set the frequency trigger threshold to 49.8 Hz to reduce the risk of oscillatory interactions when trajectory and response time outcomes are considered.

We recognise that by setting such a frequency threshold, instances and duration for activation of providing units under Volume Capped will be lower than for providers with frequency thresholds closer to 50Hz. The table in Appendix I provides an overview of the number of instances during the past 3 years during which the system frequency dropped below 49.8 Hz. It can be seen that this was, on average, 39 times during each year.

We take note that some respondents viewed this as under-utilising capability of providers. The TSOs do not share this view given, as outlined above; frequency 'regulation' closer to 50 Hz is a capability which will be fulfilled via other mechanisms. The fast speed of response required under the Volume Capped arrangements, as well as the high levels of availability, will ensure that in instances where significant system frequency deviations do occur, fast and reliable providers will be available to contain and restore the frequency as quickly as possible. Should an alternative approach be taken, where providers under the Volume Capped were able to operate in a regulation-like manner, the likelihood of providers fully discharging would increase. In such circumstances, the full discharge of a unit which is providing frequency regulation may lead to sudden frequency deviations.

We do acknowledge that in the Volume Uncapped arrangements a frequency threshold of 49.985 Hz is incentivised, as is speed of response up to 150 ms. This design was primarily made to seek faster response times from conventional generation and wind generation. Should a fast-acting technology provider demonstrate the capability to deliver a low frequency trigger, low trajectory, and fast response time under the Volume Uncapped contracts, the TSOs would assess this and set their FFR set points prudently in order to limit any possibility of system oscillation events which may occur due to their settings.

As a general comment, it should be noted that all technology types are permissible under the Volume Uncapped arrangements. These arrangements are suitable for delivery of a regulation-type service and for the types of 'revenue stacking' which one respondent suggested would not be available to participants under the Volume Capped arrangements. The TSOs do not have any view as to what arrangements will work best for a particular providing unit, with the Volume Capped arrangements designed in such a way that certainty in contractual terms and conditions, as well as contract length, is provided for those parties which require it.

In addressing comments submitted with respect to the use of the word trajectory (as opposed to droop), this is a deliberate decision by the TSOs given the nature of the service which is required. Droop is commonly expressed in terms of a unit's maximum registered capacity and usually with respect to movement away from standard operating frequency. The service which will be delivered under the Volume Capped arrangements is defined as a straight line between

two frequency set-points. We therefore believe it is beneficial to use a different terms to avoid confusion.

With respect to the query on whether output (in the case of an event) would be measured from 0 MW in all cases or whether, in the case where a unit is recharging, this could be measure from the baseline at which a unit was positioned, we agree that such a baseline can be used as a starting point for both delivery and availability considerations.

Trickle Recharge

We acknowledge that stakeholders requested further detail on the trickle recharge function. However, further consideration on this mechanism has led us to remove this functionality as an option for special consideration. The results of this further consideration are given in Section 5.4, 'I-SEM interactions'.

3.3.4 TSOs' Recommendation for Technical Requirements

The TSOs' recommendations are as follows:

Recommendation: The technical requirements laid out in Table 3 must be met by a providing unit, though no 'trickle charge' feature will be possible. The provision of the service must follow the FFR Dynamic Capability Frequency Response Curve illustrated in Figure 3.

3.4 Over-frequency requirements

3.4.1 Consultation Paper Background and Proposal

The consultation outlined that it was anticipated that the need for over-frequency response will increase in coming years, as the system operates at lower inertia levels. This is particularly the case in the contract timescales for this procurement exercise, i.e. out to 2027. The TSOs therefore outlined that it may be prudent to avail of this opportunity to procure this service. By doing so, additional over-frequency response technical capability will be available at a point in the future where this system need is likely to exist.

It was noted that requiring such capability now adds potential additional complexity for applicants. We understand that the capability to provide full over-frequency response can increase the technical requirements for a service provider, dependent on technology type.

On balance, the TSOs' view, as outlined in the consultation, was that units providing the services being procured under this process are likely to be able to both import and export power. These characteristics could be symmetrical to the under-frequency requirements (i.e. with the same Maximum Export Capacity, MEC) or could be set at a certain lower percentage of the under-frequency requirements/MEC for the unit, with the TSOs welcoming feedback on this proposal.

The TSOs offered the following two options and proposal below:

Option 1: Technical ability to provide over-frequency response is required from applicants

Option 2: Ability to provide over-frequency response is not required from applicants

TSO Proposal: Technical ability to provide over-frequency response is required from applicants.

Respondents were asked the following question.

Question 2: Do you have any view on the technical requirements proposed, including the requirement for over-frequency response?

3.4.2 Stakeholder Comments

Overall, stakeholders were of the view that providing units under the Volume Capped arrangements could provide over-frequency response if required. Indeed, several respondents indicated that providing over-frequency would be beneficial to the degradation rate of the providing unit, with a unit at 50% charge degrading at a slower rate than one which sat at 100% charge at all times.

Concerns with providing such a service, generally, were with respect to financial impact – both in terms of charges payable for the required Maximum Import Capability (MIC), and on how such a service would be remunerated. Concerns were also raised with respect to the payable PSO levy.

3.4.3 TSOs' Response to Stakeholder Comments

The TSOs' note the predominant view from stakeholders that such a service is technically possible, and indeed, preferable in the view of some respondents (with respect to battery degradation). We understand that the duration of the over-frequency time frame will have an impact on the required storage volume. With this in mind, we recommend the requirement of over-frequency response during time frames analogous to FFR, POR and SOR only.

We take note of the concerns raised with respect to charges payable for MIC and PSO levy and consider this a significant rationale as to why over-frequency would not be required to the same volume as under-frequency services under this procurement exercise. It should be stated that MIC charges may not be an issue for some providers locating at existing connections. It is also true that in all cases we would expect a MIC to be required in order to allow the battery to recharge, even if over-frequency ability was not required.

With respect to MIC and PSO levy payments, whilst we acknowledge that these payments could represent significant cost to providers as per current arrangements, we do expect that a significant review of payments in both of these areas will take place within the timescales of this procurement exercise (i.e. before project delivery in September 2021). This is also discussed in Section 5.3 of this recommendation paper.

We recognise also that providers had queries with respect to payment for over-frequency. The TSOs acknowledge that the System Services definitions at present do not include over-frequency, with tariffs set only with under-frequency provision in mind. It is the TSOs' view that

the tariffs set will provide a sufficient overall incentive for providers to participate in this competition, providing the underfrequency services as well as the additional overfrequency service, and that no additional tariff is needed.

3.4.4 TSOs' Recommendation for over-frequency requirements

The TSOs recommend that over-frequency is required from providing units. We view this as an excellent opportunity for providers who have the capability to offer this service, to be able to do so, providing additional benefit for the future system out to at least 2027.

The TSOs view over-frequency technical capability as being something which will aid the system during potential severe system events, particularly within the initial timescales very soon after a frequency event. Should a dispatchable over-frequency product be required in the future (in the same manner as the dispatchable TOR1 and TOR2 under-frequency services are required in this competition) we envisage that such a service will be designed and procured separately. The TSO therefore recommends that Volume Capped providers should have over-frequency capability which can be activated with a speed of response of 300 ms and sustained for 90 secs, with activation of these services linked to frequency only (i.e. in line with the FFR-SOR services for underfrequency). A ramp-down rate at the end of this 90 seconds will be agreed with the TSOs. The service will be required with symmetrical characteristics compared to the underfrequency service. This being, a trigger frequency of 50.2Hz, with speed of response and trajectory the same as in Table 3.

Our recommendation is that over-frequency services should be provided at a minimum volume of 15% of the under-frequency volumes. To be clear, this would mean that a unit providing 30 MW of FFR-TOR2 would also need to provide 4.5 MW of over-frequency response in the 300ms – 90 seconds timeframe. The TSOs envisage that where a tie-break situation exists (where an equal bid is placed by two participants, but there is only enough volume to accept one), any additional over-frequency service provision should be considered in determining the successful applicants. Exact details with respect to this, including prioritisation against other tie-break characteristics, will be detailed as part of the procurement design.

Table 4: Summary of Overfrequency Product Delivery Characteristics

Characteristic	Requirements
Dynamic response	Dynamic capability in response to a Reserve Trigger
Required minimum speed of response	150-300 ms
Trajectory	0.3 Hz
Required reserve trigger capability	50.2 Hz
Delivery length	90 seconds

Recommendation: Over-frequency is required in line with the requirements in Table 4. Where a tie-break situation exists, any additional volume in over-frequency service provision should be considered in determining the successful participant.

3.5 Availability Obligations

3.5.1 Consultation Paper Background and Proposal

A critical characteristic of the services to be procured via the Volume Capped arrangements is the availability of providing units. Given the system conditions in which the providers will be required to deliver (i.e. times at which the frequency is outside certain boundaries and the response of System Services is critical in maintaining stability), it is imperative that the TSOs have access to the full capacity of the providing unit when needed. The consultation therefore set out that availability of providing units must be as close to 100% as possible, to indicate that units are obligated to maintain their capacity for the delivery of the contracted System Services.

It was recognised however that from time to time, there are likely to be instances in which the unit may be unavailable due to maintenance or other issues which may occur.

Within reason, if the TSOs are notified ahead of time, then they will be able to manage this unavailability. The TSOs therefore proposed to exclude any planned maintenance outages from any availability obligation, with a set number of days per year where they are able to declare themselves unavailable due to maintenance. It was acknowledged that further specification as to what would be accepted as 'planned maintenance' would be needed. Providers would not be settled during these periods, but would not have any 'Availability linked Performance Scalar' applied.

By excluding these reasonable maintenance periods from the availability obligation, a stringent availability requirement could be set, with 97% measured on a monthly basis proposed. This proposal took into account that short periods of unplanned unavailability are possible, but that these should total no more than 3%. It was proposed that assessment of this availability could be conducted in line with the scalar assessment frequency as indicated in the 'DS3 System Services Protocol – Regulated Arrangements'⁸ i.e. monthly. It was noted that on a monthly basis, 3% would represent approximately 1 day of unplanned unavailability.

The TSOs therefore set out the following proposal with respect to availability obligations.

TSO Proposal: The service availability obligation will be 97% for all providers and will be assessed on a monthly basis. This obligation will exclude planned periods of maintenance outage.

⁸ DS3 System Services Protocol – Regulated Arrangements http://www.eirgridgroup.com/site-files/library/EirGrid/DS3-System-Services-Protocol-Regulated-Arrangements_final.pdf

Stakeholders were asked the following question.

Question 3: Do you have any comments on the availability obligation proposed?

3.5.2 Stakeholder Comments

In general, approximately half (10 out of 19) of respondents answering this question agreed with or supported the 97% availability obligation, though with a number of clarifications sought.

These respondents agreed in principle with the 97% availability obligation, and that this requirement was needed due to the required certainty for a unit providing services for low probability high consequence events. A number of respondents queried how this obligation would be measured with several repeated questions asked:

- *Will availability obligations be measured as a percentage or as a binary consideration?*
- *Will the availability obligations be measured on a per service basis or for the bundle as a whole?*
- *How will periods of dispatch (whether automatically due to frequency or manually by the TSO) be measured with respect to the availability obligation?*

On the latter query, the respondents, in general, were of the view that they would like to see availability obligations set in such a way that they worked holistically for service provision, in conjunction with other market obligations, and that providers would not be penalised for obligations outside of their control.

At least 6 respondents suggested that, given that the 3% allowable unavailability is set in order to manage unplanned outages, these events are likely to take multiple days to manage and that this would therefore be more suitably measured on an annual basis. These respondents suggested that the 3% allowable unavailability, equal to 1 day per month, would be insufficient given it is “unlikely for the outage to be responded to, diagnosed and rectified in less than 24 hours”. Respondents also noted that such unplanned availability was unlikely to occur on a monthly basis and therefore the 3% would be more appropriately implemented on an annual basis. One respondent suggested that the figure of 3% is too high for the likely type of technology which will be participating, and that battery providers in particular “would typically have higher availability metrics”.

More clarity was sought on the periods of ‘planned maintenance’ which the TSOs propose would not count towards the unavailability performance scalar. One respondent suggested that, on an annual basis, at least 7 days should be allowable. Another respondent suggested, based on experience in previous projects, 2 weeks should be allowable. Another suggested 5 days annually and that it should be possible to roll-over days up to a maximum of 10 for a year. Another respondent suggested no more than 30 days per year with a minimum of 5 days’ notice.

It was also highlighted how important these availability obligations are given the nature of the service, and the infrequent instances of frequency deviations which would activate the unit, particularly for its full output.

One respondent queried whether service availability would be measured against 0 MW or against a baseline of charging/discharging (this topic is also addressed as part of Section 3.3.3).

A number of respondents did not agree with the availability obligations as outlined, and wished to see fundamentally different arrangements.

One respondent suggested that the availability obligations should only be applicable for periods of time above 50% SNSP. This suggestion is based on the scalars defined under the regulated arrangements where FFR is only remunerated during periods of SNSP of above 50%. This would allow units with Volume Capped contracts to participate in other markets or provide other reserve services during periods of lower SNSP.

One respondent indicated general disagreement with the concept of high availability obligations for a low probability, high consequence service, and that they would prefer to see providers having the ability to participate in other markets and stack revenues. Given the high availability obligations linked to a low frequency threshold, this respondent wished to see this proposed setting revisited.

3.5.3 TSOs' Response to Stakeholder Comments

The TSOs notes that a significant number of respondents indicated agreement with the proposed high availability obligation, and that, in general, comments were mostly with respect to providing clarity on how these obligations would be applied and measured.

We note the suggestion by a limited number of respondents that such high availability may not be necessary, either because they viewed it as only being appropriate over 50% SNSP or otherwise, because they would like to see a different frequency trigger and fundamentally differing service delivery. As outlined in Section 3.3.3, the TSOs have significant reasons for requiring a service of this nature, with a provider that does not act in the regulation zone but instead mitigates for more infrequent but significant events. Given that this type of system event is the condition for which this Volume Capped service provision is intended, we view it as appropriate that availability is required during all time periods, and not only those with high SNSP.

With respect to a number of recurring questions which were raised, the TSOs can provide further clarity.

- *Will availability obligations be measured as a percentage or as a binary consideration?*

The TSOs recognises that should the availability obligations be measured in a binary 'all or nothing' manner, units may have lower incentive to provide services in instances where they only have partial availability.

We therefore recommend that the availability obligations are calculated on a percentage basis (covering both volume and duration).

- *Will the availability obligations be measured on a per service basis or for the bundle as a whole?*

The TSOs recommend that availability will be evaluated for the bundle as a whole.

For each trading period, the availability of the services would be assessed cumulatively against the overall expected volume to determine the percentage availability. The availability for each service will be measured based on a time weighted average of the unit's declared availability during the trading period.

The TSOs intend to provide further information on how availability obligations will be assessed, and how these will be reflected in remuneration for providers, ahead of the beginning of the procurement process.

- *How will periods of dispatch (whether automatically due to frequency or manually by the TSO) be measured with respect to the availability obligation?*

The Performance Availability scalar is intended to act as an incentive for a unit to make itself available to provide the contracted services. However, we recognise that there are times when a unit will not be available to provide a service because it is already providing that service, or has just provided that service.

As such, the TSOs recommend that a unit's availability will not be negatively impacted during, and for a reasonable period after, responding to a system event (or a non-energy action requested by the TSOs). Specifically, this would be for the full duration of the response times (i.e. 20 mins for the provision of TOR2), plus a period of 90 mins recovery time (or the first trading period to complete after this time). We believe this would allow opportunity for an energy storage device to refill its storage levels via the market without negatively impacting on its performance availability scalar. We also recommend that in circumstances where a non-energy action prevents a unit from recharging as they wished, they will be counted as available to provide services during the period covered by the non-energy action. Further consideration with respect to unit recharge is provided in Section 5.4

Planned and unplanned maintenance

We recognise that a number of respondents suggested that the 97% obligation should be measured on an annual, rather than monthly basis. These respondents indicated that unplanned maintenance outages are unlikely to be a monthly occurrence, but could be multiple days when it does occur. We therefore agree with the proposal to measure this on an annual basis. The TSO recommends this constitutes assessment across a rolling 12 month period, to avoid any boundary or end-of-year effects which may arise should this be measured on a per annum/calendar year basis. More information is provided in Section 4.6.

With respect to planned maintenance, we agree that further clarity is needed with respect to requirements for notification and total allowable time. We note the number of differing suggestions for the period of allowable planned maintenance over a year. The TSOs will further consider these suggestions and provide additional clarity on this in the contracts consultation. It should be noted that such outages should be planned and notified in line with relevant Grid Code or Distribution Code requirements.

3.5.4 TSOs' Recommendation for availability obligations

The TSOs view the 97% availability obligation as appropriate, and have adjusted our recommendation to account for clarifications sought by respondents. Further information on how such availability will be incentivised is provided in Section 4.6.2.

Recommendation: The service availability obligation will be 97% for all providers and will be assessed on an annual basis. Service availability will be measured on a per bundle basis, including the availability of overfrequency.

This obligation will exclude planned periods of maintenance (with further information to be included within the contracts consultation).

The full duration of the response times (i.e. 20 mins for the provision of TOR2), plus a period of 90 minutes recovery time (or the first trading period to complete after this time), whether activated due to system frequency or non-energy action requested by the TSO, will not be counted as unavailability.

3.6 Connection Offers

3.6.1 Consultation Paper Background and Proposal

It was noted in the consultation that requirements with respect to grid connection would be of significant importance in terms of who would be eligible to participate in the Volume Capped procurement exercise. It was noted that the process for grid connections are jurisdictional in nature and hence different in Ireland and Northern Ireland, but that across both jurisdictions 4 general stages for a grid connection application exist at both a transmission and distribution level:

1. *On Hold*

Application for connection has been received but is not progressing at present and there is no scheduled offer issue date.

2. *Processing*

Application for connection is deemed complete and is being processed.

3. *Live Connection Offer*

A connection offer has been made to a customer and it is with them for acceptance.

4. *Contracted*

A customer and the TSO/DSO have entered into a legally binding connection agreement/offer.

It was highlighted that the connection offer requirements had the potential to increase certainty of service delivery for the TSOs, but could unduly limit the number of participants.

In the TSOs' view, the objective requirement is that applicants should have connection offers which would enable build completion and contract go-live at the target service delivery date in 2021 at the latest. Given this, the TSOs proposed that providing units in the 'Live Connection Offer' and 'Contracted' stage would be the most appropriate in order to demonstrate an offer which will enable this contract go-live date, with the following options given.

Option 1: applicants must provide a valid legally binding accepted connection agreement(s)/offer(s) for the site(s) in question suitable for a contract go-live date of 31st May 2021.

Option 2: applicants must provide a valid legally binding connection agreement(s)/offer(s) or be in receipt of a valid connection offer for the site(s) in question suitable for a contract go-live date of 31st May 2021.

Option 3: applicants must provide a valid legally binding connection agreement(s)/offer(s) or be in receipt of a connection offer for the site(s) in question suitable for a contract go-live date of 31st May 2021, or be in the connection offer process with their connection request deemed complete.

TSO Proposal: Applicants must provide a valid legally binding connection agreement(s)/offer(s) or be in receipt of a connection offer for the site(s) in question suitable for a contract go-live date of 31st May 2021.

Stakeholders were asked the following question.

Question 4: Do you have any comments on pre-requisites with respect to Connection Offers?

3.6.2 Stakeholder Comments

Stakeholders provided a wide range of responses on this topic. A significant number (at least 9) provided explicit agreement with the proposed Option 2, but in most circumstances provided caveats (which were not the same for all respondents).

The most common clarifying remark by those supporting Option 2 was that such a requirement was appropriate, but only provided that this encompassed projects applying for connection offers in Ireland under ECP-1. Given concerns that this wouldn't be the case (and that providing units looking to connect under ECP-1 would not have a connection offer in time for the application window), at least 3 respondents indicated support for Option 3 with an additional 2 respondents indicating this option would also be acceptable.

Conversely, at least 3 respondents indicated that they believed Option 1 would be the most appropriate. These respondents cited reduced risk of non-delivery for their preference, and indicated a view that providing units which had made earlier significant commitments to building projects should be rewarded.

In addition to these preferences, several clarification requests were made.

One respondent requested clarification as to whether connection agreement(s)/offer(s) can be for a modification for an existing connection.

Several respondents suggested amendments to the connection process in order to better align it with the Volume Capped procurement exercise. This included the following points.

- A number of respondents suggested that providers should not be obliged to accept their connection offer until the outcomes of the Volume Capped competition were known.
- Alternatively, in the instance where Option 3 was used, the connections team should offer applicants a meeting to discuss their connection and provide more information to them ahead of their bid submission.
- Another suggested that connection offers should be all made prior to the DS3 Volume Capped auction to allow applicants to be sure of their connection arrangements before submitting any bid.
- Others noted concerns that the ECP-1 process may only provide offers for a very limited number of applicants, which may significantly limit the number of providers able to participate in the Volume Capped arrangements.
- Another requested was that a list of application offers could be made publicly available, with it noted similar information is available in other jurisdictions.

It should be stated that the majority of feedback on this topic related to the connection process in Ireland and in particular, ECP-1. It is important however that all comments are viewed within the context of a process which works for both jurisdictions.

3.6.3 TSOs' Response to Stakeholder Comments

The TSOs note the majority of stakeholders were in support of Option 2, but with significant clarifying remarks, particularly with respect to the ECP-1 process in Ireland.

The TSOs agrees that, ideally, the ECP-1 process would align to enable applicants in ECP-1 to take part in the Volume Capped competition in order to increase competition. We understand that at the point of procurement launch and likely tender submission closure, connection offers may not have been received by projects connecting via ECP-1. However, applicants should know whether they will be receiving a connection offer or not by the time at which applications will be submitted. It may therefore be possible to take this confirmation that an offer will be received as acceptable entry criteria. Similarly, in Northern Ireland, after submission of a complete connection application, as validated by the relevant TSO/DSO, a connection offer will be provided within 90 days. A provider at this stage of the process would be similar to those under ECP-1 who have confirmation that they will receive an offer.

Overall the TSOs view this way forward as consistent with the objective requirement, which is that the pre-requisites for connections should be consistent with connection and operation by the service delivery date in 2021. In this regard, we can clarify that connection offers/agreements can be for the modification of an existing connection. It would be expected however that a provider must have accepted their connection offer prior to contract execution, should they be successful in the competition.

We recognise that a number of parties had several queries and/or suggestions with respect to the connection processes and in particular, the ECP-1 process in Ireland. Whilst we appreciate this input, it is not within the scope of this consultation or procurement exercise to make recommendations or changes with respect to the ECP-1 Regulatory process.

3.6.4 TSOs' Recommendation for connection offers

We have reviewed stakeholder's feedback and are of the view that it would be beneficial to accommodate applicants in Ireland who will be receiving an offer under ECP-1, as well as providers at the equivalent stage in Northern Ireland. As such, the TSOs recommendation is as follows.

Recommendation: Applicants must provide a valid legally binding connection agreement(s)/offer(s) or be in receipt of a connection offer for the site(s) in question suitable for a contract go-live date of 1st September 2021. Applicants who have confirmation that they will receive a connection offer will also be eligible.

3.7 Network Limitations

3.7.1 Consultation Paper Background and Proposal

In consideration of the availability requirements proposed, the impact of potential network constraints was evaluated as part of the consultation. Whilst a unit may itself meet the availability obligations, network constraints could mean that this capacity is not available to the TSOs, requiring additional expenditure by the TSOs or unavailability in instances of system need.

Given that a unit which is located frequently behind a constraint is of less value to system stability, it could be justifiable that this should negatively impact the amount paid by the TSOs to this provider. However, financial liability for constraints could add revenue uncertainty for providers and it could be argued that the TSOs should manage this risk.

The consultation outlined that for this risk to sit with the TSOs, requirements as to where units must connect to the network would need to be imposed in order to reduce the risk of non-availability due to network limitation. It was proposed in the consultation that a reasonable level of confidence would be evident if the provider was to connect to:

- i) A connection point on the Transmission System for which they have confirmation from the TSOs that they expect this location to meet the availability requirements.
- ii) A connection point on the Distribution System for which they have confirmation from the DSO that they expect this location to meet the availability requirements.

It was noted in the consultation that such a confirmation would not be viewed as assurance but as indication that it is reasonable for the TSOs to enter into such a contract based on latest information, and that the mechanism for this confirmation would need further clarity.

Alternatively, without this assurance the risk of non-delivery would be too high and as such, providers would only be remunerated when available. This could be seen as an incentive for service providers to connect to parts of the system where network limitations are less likely.

The TSOs therefore outlined the two options below and sought feedback on these

Option 1: Connecting providers would need to provide confirmation from the TSO/DSO that network limitations will not prohibit service availability. Providers will be remunerated if unavailable due to network limitations.

Option 2: Providing units will not be remunerated in the event of unavailability due to network limitations.

Stakeholders were asked the following question:

Question 5: Do you have a view on the two options provided with respect to managing network limitations?

3.7.2 Stakeholder Comments

A significant majority of respondents indicated a preference for Option 1, that remuneration would be provided in instances of network unavailability and that applicants would be required to submit confirmation from the TSO/DSO that their connection location was appropriate as part of the connection process. At least 13 respondents indicated explicit preference for this option, notwithstanding a number of queries and clarifications sought.

In support of this preference, the general rationale was that this approach would improve the ease of achieving financing or “bankability” by removing a revenue risk.

One recurring query was for clarity around the process for achieving this confirmation from the TSO or DSO, and that this would need to be “entirely transparent and objective” given it may preclude projects from participating in the Volume Capped arrangements. It was noted that with 4 TSO/DSO organisations across Ireland and Northern Ireland, undertaking meaningful engagement could be a challenge, and suggested by at least 1 respondent that if Option 1 was to be chosen, the TSOs could be the party responsible for acquiring the confirmation of suitable location (rather than applicants themselves).

At least 4 respondents drew parallels between this topic and the concept of firm and non-firm access which exists as part of the connection process. These respondents were of the view that projects which have ‘firm’ access should not be liable for lack of availability due to network limitations. One respondent suggested that projects with firm access should be given priority in the procurement process above other applicants. Another suggest that a “firm type concept could be created for high availability technologies with DS3 Volume Capped Contracts”, given these providers will be needed at times of system stress.

Several respondents queried interactions with the ECP-1 connection process in Ireland. The respondents felt that such a consideration (as to whether a connection location was suitable for delivery of the DS3 Volume Capped service) should be “dovetailed” with allocation of capacity as part of the ECP-1 process i.e. that capacity should not be allocated under ECP-1 for unsuitable sites from a DS3 Volume Capped perspective. One respondent suggested that this confirmation could be provided at the same time as ECP-1 offers, whilst another stated that approval for the DS3 Volume Capped process would be needed before providers financially commit to their ECP-1 connections.

A smaller number of respondents noted preference for Option 2, or highlighted significant risks with Option 1. One respondent indicated explicit support for Option 2, noting that this risk sat

with the provider as part of the Enhanced Frequency Response (EFR) competition in GB. They also noted that risk of network unavailability sat with wind farm providers under I-SEM. They highlighted concerns with Option 1 being non-transparent, with providers having not enough information to challenge any pass/fail decisions.

Similarly, another respondent highlighted lack of information about the network and network strength available to providers. The respondent, whilst supporting in principle Option 1, did not see how such a consideration could “objectively be applied in the bid assessment process such that it is fair and transparent”.

3.7.3 TSOs’ Response to Stakeholder Comments

As the TSOs highlighted in the consultation, we are aware that Option 1 was outlined at a high level, with more detail needed. Whilst further discussions have been undertaken in this area, in parallel and subsequent to the consultation, no definitive version of this process yet exists which would be suitable for making pass/fail or prioritisation decisions as part of a procurement exercise. As one respondent noted, developing a process which could objectively be applied in this way, in a fair manner, represents a considerable challenge. It is important to reiterate that such a process would not only need to be fair and transparent to participants, but also needs to be robust enough to justify this financial risk sitting with the TSOs and the consumer. However, we do note that a majority of respondents preferred this option on the whole.

We are aware of the parallels to the concept of firm and non-firm access, which respondents highlighted. At present, at a distribution level all offers are given as firm. However, it is unlikely at this stage that firm status will be offered as part of the ECP-1 process. We therefore do not see this as being viable criteria for use in the procurement exercise.

With respect to suggestions or queries regarding alignment with ECP-1 with the Volume Capped process, we make note of this interaction and we continue to further consider the correct approach in this area. As has been highlighted elsewhere in this recommendation, specific changes to the ECP-1 process sit outside of the scope of this paper and this procurement exercise.

With respect to the comments in support of Option 2, we do view it as viable for providers to absorb this risk (as demonstrated in the GB EFR process). The TSOs’ view is that if this risk can be reduced in a sensible and robust manner (via a process envisaged in Option 1) then this reduction in risk will improve the competitiveness of this process. A process of this nature, however, does not appear possible due to the rationale outlined above. The TSOs therefore view Option 2 as the preferred option.

3.7.4 TSOs’ Recommendation for Network Limitations

Whilst the TSOs do believe that the effectiveness of the competition would be improved via reduction of this risk for participants, this can only be the case if a process can be developed which is fair and transparent for providers, can be applied objectively as part of the assessment process, and is sufficient enough to warrant additional risk to the consumer. At present, no such process exists and the development of such a process represents a significant challenge.

Therefore, the TSOs recommend Option 2: that no pre-conditions will exist with respect to network limitations and that risk of unavailability due to network limitations will sit with the provider.

Recommendation: No pre-requisite will exist with respect to suitability of connection location. Lack of availability due to network limitations will be reflected in remuneration to providers.

4 TSOs' Recommendations on Procurement design and contract payment

4.1 Overview

Section 4 of the consultation outlined characteristics with respect to the procurement exercise itself, including volumes which would be procured. The format of bids which would be required, and principles with respect to how these would be assessed, was also outlined. The application of the scalars, as developed as part of the regulated 'uncapped' arrangements, was also considered given the different nature of this competitive process. Requirements with respect to bonding were also outlined.

4.2 Staged Procurement Approach

4.2.1 Consultation Paper Background and Proposal

The TSOs have previously noted that up to a maximum of 300 MW of services may be procured via the Volume Capped procurement exercise. It was noted in the consultation that, in designing this procurement, there are two broad procurement approaches possible for the competition. These are:

- Procure the full volume of services in single procurement exercise; or
- Procure the full volume of services through multiple procurement stages.

The positives and negatives to these approaches were highlighted:

Procuring the full volume of services in a single stage gives the opportunity for a faster rollout of these services from new market entries. Conversely, by taking a staged approach we would not presuppose the portfolio required in order to achieve increased levels of renewables and instead, could stimulate investment in the required service provision as necessary. It was noted that a multi-staged procurement also provides the opportunity for the TSOs to learn from the previous competitions which would help to limit risk when procuring the next allotted volume of services.

Additional benefits with respect to a staged approach were also highlighted, including a reduction in pressure on market participants to ensure projects are ready to enter the competition this year, as well as benefiting from possible future technology capital cost reductions.

On consideration of these arguments, the TSOs outlined that they viewed a staged approach as offering considerable advantages, and proposed a volume of 100 MW for the first stage. The TSOs noted that, at this point in time, they envisaged a second procurement stage of 100 MW volume taking place subsequent to the first stage. The following recommendation was given. It should be noted that the proposal with respect to maximum contract size will be fully considered as part of Section 4.5 of this recommendation paper.

TSO Proposal: A staged approach to procuring volume capped System Services will be undertaken. In the first round 100 MW will be procured, with a limit of 30 MW per connection point.

Stakeholders were asked the following question:

Question 6: Do you have a view on the staged approach proposed for procurement under the Volume Capped arrangements?

4.2.2 Stakeholder Comments

The majority of respondents (14) were supportive of a staged approach, though with a significant number (at least 7) requesting clarity on future procurement stages (both in terms of timelines and minimum volume “floor”). It was noted by respondents that clarifying these details would ensure that there remained a “clear signal, and therefore strong incentive” for parties to continue developing projects of this nature in Ireland and Northern Ireland. At least 3 respondents indicated acknowledgement of the TSOs’ concerns in relation to management of risk and the TSOs’ obligation to undertake this procurement in a prudent fashion, with the opportunity to learn from an initial stage.

Several respondents noted that a volume of 100 MW represented a “surprisingly small volume” given the significant interest in projects of this nature and the 400 MW connection capacity ring-fenced for DS3 projects in Ireland under ECP-1. Respondents highlighted the significant current interest by developers, with a number of projects at various stages of development in both jurisdictions.

A number of respondents noted that, although they agreed with the staged procurement proposed, they would wish to see higher than 100 MW procured and gave proposals for acceptance of last tenderer to achieve this. These will be considered as part of ‘Acceptance of last tenderer’ discussions in Section 4.3.

Those respondents (at least 6) that did not agree with the staged approach (or felt the first stage should include a significantly higher volume) generally cited concerns regarding facilitation of renewables and delivery of public policy objectives as their rationale. At least 6 respondents highlighted concerns of this nature. Respondents sought assurance that by undertaking a staged approach, movement to 75% SNSP would not be obstructed. Other respondents cited public policy objectives with regards to renewable energy and the impact of these not being met, and suggested procuring via a staged volume, as proposed by the TSOs, may damage the likelihood of these targets being met (due to increased curtailment of renewable energy and continuing reliance on conventional generation). One respondent highlighted that, given the timescales of these contracts; the TSOs should procure volumes with likely 2030 targets in mind. One of these respondents also challenged the TSOs rationale with respect to decreasing capital costs for providers in future rounds, and noted there was no certainty that this would be the case.

One respondent highlighted that, given the interest from providers and number of projects in development; some may prefer to enter the Volume Uncapped arrangements, should they consider the risk that tariffs are changed as being sufficiently low.

Three respondents highlighted concerns with respect to expectations of industry in relation to this Volume Capped competition, given previous communications by the TSOs. These concerns will be addressed as part of Section 4.5 of this Recommendation paper ('Maximum Size of Provider')

4.2.3 TSOs' Response to Stakeholder Comments

The TSOs welcome the support for the TSOs' proposals by a majority of respondents. As outlined in the consultation, the TSOs believe that such a staged approach will reduce risks associated with procuring a significant volume in fixed 6-year contracts with little mechanism by which to change arrangements. Such contracts represent a considerable commitment by the TSOs, and the consumer, and it is therefore prudent that the TSOs enter into such arrangements in an appropriate manner.

As highlighted in the response, the Volume Capped arrangements are not the only mechanism by which providers may contract to provide System Services, with the Volume Uncapped arrangements also incentivising new providers in Ireland and Northern Ireland. This is important for two reasons:

- The TSOs will look across both arrangements to determine whether service provision meets system requirements.
- The TSOs are obligated to manage the System Services spend, within the €235m by 2020 cap, across both arrangements.

In respect of the first point, it is across both arrangements that the TSOs will consider the ability of the system to meet, in a cost effective manner, the challenges of facilitating increasing levels of renewable energy on the system. The staged procurement process, as proposed, will allow greater insight into the regulated arrangements, particularly with respect to provision of FFR, before a total volume under the Volume Capped arrangements is determined.

The TSOs view it as possible that only 100 – 130 MW of this type of high availability plant is needed to meet the needs of the system for 2020 renewable policy targets, with further targets yet to be set in either jurisdiction.

This view of delivery under the Volume Uncapped arrangements is also critical to management of appropriate spend, within the regulated cap, by the TSOs.

Plans under the DS3 programme are for an increase to 75% SNSP in 2020, with this being dependent on numerous work streams such as control centre tools and RoCoF policy. The TSOs would highlight that the DS3 programme to date has delivered a non-synchronous penetration in excess of any comparable system in the world, with a prudent approach undertaken in order to gain these achievements so far.

It is for this reason that the TSOs view it as important to retain flexibility in the overall volume of service under Volume Capped that will be procured. We do recognise the stakeholder comments that providers could determine that the Volume Uncapped arrangements are preferable - such a decision will be each provider's to make.

On balance, the TSOs view it as appropriate to undertake a staged approach and that this will correctly allow the management of risk with respect to the procurement process itself and

associated ongoing expenditure, and that having subsequent stages will enable the TSOs to have a greater view of the service characteristics delivered across both arrangements.

4.2.4 Recommendation for staged procurement approach

The TSOs view a staged approach as providing significant benefit and as enabling appropriate management of risk associated with the Volume Capped procurement process. Delivery of 75% SNSP is not predicated on procuring a higher volume during this first stage. This recommendation should be viewed in conjunction with that given in relation to acceptance of last tenderer made in Section 4.3.

Recommendation: A staged approach to procuring volume capped System Services will be undertaken. In the first round 100 MW will be procured (dependent on last successful tenderer).

4.3 Bid Requirements, Assessment and Remuneration

4.3.1 Consultation Paper Background and Proposal

The consultation outlined various aspects in relation to the characteristics of the bids applicants would be required to submit, and the assessment of those bids. The contract start date was also outlined.

Requirements in relation to bonding were also outlined and will be discussed in section 4.4 of this recommendation paper.

Contract Start Date

The DS3 System Services Tariffs and Scalars SEM Committee Decision⁹ indicates that contract arrangements for Volume Capped procurement should be “set at a maximum of 6 years from 1st September 2018, with a flexible operational start date of up to 31st August 2020, and that the end date of these arrangements will be set for 6 years from the go-live date of each individual providing unit, therefore this will range from 2024-2026”.

As noted in the consultation, these timelines have now shifted later than initially envisaged in the SEM Committee decision, though the principles outlined above are maintained. The TSO therefore proposed that contracts should start no later than 31st May 2019, and that these contracts will be set for 6 years from the go-live date of each providing unit.

For projects that do not meet this date, the Performance Bonds shall be used to manage these circumstances. In all cases (in line with the SEM Committee decision), the latest date on which contracts will end is 31st May 2027.

⁹ ‘DS3 System Services Tariffs and Scalars SEM Committee Decision’

<https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-17-080%20DS3%20SS%20SEMC%20Decision%20Paper%20Regulated%20Arrangements%20Tariffs%20and%20Scalars%20Final%20version.pdf>

The following proposal was given

TSO Proposal: Contracts should start no later than 31st May 2021 and will end no later than 31st May 2027.

Bid Structure

The TSOs considered whether bids should be submitted as a single price for the bundled service, or with a price per service.

As stated in the consultation, the intention of the procurement exercise is to award contracts for the provision of the bundled service in order to provide sufficient incentive for new entrants wishing to provide services, and effective service delivery to the system.

A requirement to submit one price for the overall bundled service provides a potentially much simpler route to submitting and assessing bids, with a single bundle price easily comparable between applicants.

However, if one price only is submitted a number of complexities arise. It is proposed that the bid price for this competitive procurement will be capped by the relevant service tariff for each individual service, and scalars will be applied on a per service basis also. Given these are both defined on a per System Service basis, further consideration would be necessary to determine how they could be applied for a bundled System Service.

As such it was TSO's view in the consultation that a single price for a bundled service may not be feasible. It was proposed that a MWh value per System Service should be submitted to enable the relevant scalars to be applied and to ensure the proposed tariff limits are respected. The following proposal was therefore made.

TSO Proposal: Prices should be submitted for each System Service within the bundle to enable the relevant scalars to be applied and to ensure the proposed tariff limits are respected.

Considerations with respect to application of the temporal scarcity scalar were also given in this section of the consultation, along with examination of a potential cap and floor – these will be examined in Section 4.6 of this consultation, 'Application of Scalars'.

Price Determination

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

Various frameworks across Europe use both mechanisms and in theory, both pay-as-bid and pay-as-clear should produce similar results, assuming sufficient competition. A pay-as-bid mechanism is generally seen as preferable in market power scenarios i.e. where market liquidity

is relatively low. Conversely, pay-as-clear pricing is generally seen as a more ‘market like’ approach.

The TSOs noted that they considered either option as a credible mechanism by which to determine remuneration for successful applicants, but given the proposal that prices will be submitted on a per service basis, saw the pay-as-bid mechanism as the only viable solution given complexities with enacting pay-as-clear for such a design. The following options and proposal were given.

Option 1: Pay-as-clear pricing is used

Option 2: Pay-as-bid pricing is used

TSO Proposal: Pay-as-bid pricing will be used for the volume capped procurement exercise.

Acceptance of Last Tenderer

Finally, the consultation considered the conditions related to the acceptance of the most expensive successful tenderer. For example: suppose a volume of 100 MW was procured and the first 5 tenderers constitute a total of 80 MW. If the next lowest price tender is sized at 30 MW, should this be accepted or rejected?

The consultation outlined the TSOs’ view that whole bids only should be accepted, to reduce complexity in the process for both applicants and assessment of bids. This could therefore constitute whole bids up to and not exceeding 100 MW, or up to and over 100 MW (should the last successful tenderer take the volume above 100 MW). For the former solution, the TSOs noted that should this produce a volume under the total target volume, and that this could be procured in future stages under the proposed staged approach. The TSOs’ proposal was therefore as follows:

TSO Proposal: Whole bids only will be accepted in price order up to and not exceeding the total volume.

With respect to these various elements of bid requirements, assessment and remuneration, stakeholders were asked the following question:

Question 7: Do you have a view on the proposed bid pricing requirements and the mechanism for assessing bids, determining price and remunerating providers?

4.3.2 Stakeholder Comments

Contract Start Date

Of the 10 respondents that did comment specifically on this proposal, the majority were in agreement with the dates proposed for contract start date. However, there were two notable recurring comments:

1. *That the dates proposed applied to the first procurement stage only.* At least four stakeholders noted that for any subsequent procurement round “it would be unequitable

to impose a shorter build time” and therefore the two year build period should apply for each stage individually, such that if a second stage were to award contracts in 2020, the delivery date would be in 2022.

2. *That the contract start date proposed did not provide an incentive to start provision of services at an earlier date:* at least three stakeholders suggested that a mechanism be put in place to incentivise early delivery. One stakeholder noted that if this was not the case, their view was that parties would be incentivised to deliver at no earlier than the stipulated contract start date. Another stakeholder suggested that by fixing the end date rather than the start date, earlier delivery could be incentivised.

One respondent however did not agree with the dates proposed, believing them to be excessively long and seeking that dates should be brought forward in line with timelines originally envisaged for this process.

Bid Structure

On the topic of whether a price per service or bundled price should be submitted, respondents were split relatively evenly with six explicitly in favour of a price per service (or in acceptance of the TSOs’ proposal) and four in favour of a bundled price. The TSOs had proposed a price per service, with the rationale that this mechanism would allow the tariff rates to be adhered to and scalars to be applied as appropriate. It should be noted that the TSOs were also of the view that this proposal allowed participants additional flexibility in their bid submissions, which we viewed as being beneficial for participants.

Of those respondents who did support or accept the proposal to require a price per service, generally this was with a view to acceptance of the TSOs’ rationale. One respondent provided different reasoning however, this being that such flexibility would “guarantee adequate remuneration” avoiding a risk of “unhappy winners”.

The respondents who supported a single or bundle price did so generally for reasons of reduced complexity, particularly given the obligation for all participants to provide all services all to the same volume. One respondent highlighted potential perverse incentives in relation to a price per service, in that a provider could bid very low for a service (particularly those with longer timescales) and then develop their unit in such a way as to not supply these services, with little impact on remuneration. Another suggested that a single price allowed providers to clearly illustrate the revenue requirement for the overall project as part of their bid.

Suggestions were provided as to how a bundled price could work. One respondent in favour of this approach suggested that applicants could provide a “discount factor” against the tariff rates – that being they would submit an application at X% reduction on the tariff rates, with that percentage discount consistent across the 5 services. Another respondent suggested that applicants can submit a bundled price which can then, for the purposes of application of scalars and ongoing settlement/remuneration, be divided as per the ratios of value for each service as defined by the tariffs.

Price Determination

In general, stakeholders indicated a slight preference (at least 6) for pay-as-bid price determination, as proposed by the TSOs. At least three respondents indicated a preference for pay-as-clear, whilst two stated that they saw either mechanism as viable.

For those in support of the TSOs' proposal, rationale was provided by some parties into a perceived increase in risk of abuse, including submission of unfeasibly low bids, in a pay-as-clear scenario. One respondent noted that pay-as-bid was similar to the approach taken in other jurisdictions for such competitions.

For the smaller number who indicated a preference for pay-as-clear, multiple reasons were given. Two respondents indicated that, in their view, pay-as-clear "ensures all participants bid their lowest possible price" with increased "subjectivity" in a pay-as-bid system, which could lead to higher costs.

Acceptance of Last Tenderer

The significant number of respondents (at least 9) indicated agreement with the TSOs' proposal that whole bids only would be accepted, though with several (at least 6) suggesting this could be up to and over the proposed 100 MW volume (rather than up to and under). Rationale for this was the perceived high level of interest in the competition and the possibility that an 'up to and no more than' approach may leave the TSOs with a volume significantly short of the 100 MW volume.

Of these respondents who proposed more, most suggested accepting the next whole bid over 100 MW, with one respondent suggesting the TSOs could set a stipulation that a minimum over 4 tenderers are accepted, with a minimum total volume of 91 MW and maximum of 120 MW total.

Another respondent did not agree with the proposals and suggested that whilst the TSO can look to contract a minimum of 100 MW they should be open to contracting a further 200 MW provided that an appropriate price is achieved (via a so called 'sloping demand curve'). They saw this as offering the TSOs the opportunity to procure a higher volume earlier, but only where certain prices are achieved.

4.3.3 TSOs' Response to Stakeholder Comments

Contract Start Date

We welcome the support for the proposed contract start dates and can provide clarity with respect to comments/queries posed by respondents.

"The dates proposed applied to the first procurement stage only" – the TSOs agree that dates for any future procurement stages should be compatible with the timelines of those procurement processes, with build times similar to those provided for this first stage (i.e. 2 years).

"That the contract start date proposed did not provide an incentive to start provision of services at an earlier date" – Whilst the TSO recognise that this may be the case, it should be noted that the SEM Committee decision with respect to the Volume Capped procurement exercise foresaw contracts of a fixed term of 6 years, and no more. Solutions including extended contract lengths or a fixed contract end (rather than start) date are therefore not compatible with this. Whilst some other form of incentive could be designed to incentivise earlier delivery, the TSOs are of the view that this added process complexity, along with likely additional expenditure, may not be warranted at this time.

Whilst we recognise that the timelines for the Volume Capped process are later than had been initially envisaged, we are of the view these are appropriate at this time. Due to the timescales

required for the development of this recommendation paper and the accompanying SEMC decision paper, the contract execution date has now moved from 31st May 2019 to 1st September 2019.

Bid Structure

The TSOs remain of the view that, where possible, flexibility should be offered to providers competing within the Volume Capped process. This flexibility offered to providers is consistent with the approach the TSOs have taken for the DS3 System Services programme at large. Providers are best placed to understand their specific equipment and business cases and participate (or not) in System Services procurement as they see fit. These reasons, along with the need for application of tariff caps and scalars, provided the rationale for the TSOs' previous proposal that prices should be submitted on a per service basis. We recognise that a majority of respondents who provided comments on this point did accept this proposal.

We do however note the suggestions from some respondents as to how a bundled price may work, and that such an approach could increase simplicity for this specific procurement exercise. The TSOs accept the rationale provided by these respondents in support of their suggestions i.e. that the requirement is for all five services to the same volume and therefore a single price is appropriate, and that perverse incentives may be created via a price per service mechanism.

We note one respondent's proposal that a 'discount factor' could be applied against the tariff rates, consistent across all 5 services. The TSO views this as a reasonable solution with respect to allowing a simple bid and assessment mechanism (i.e. a single price), whilst providing a transparent means via which settlement and application of scalars, which are needed on a per service basis, may be done.

We would highlight that the TSOs view the appropriateness of a bundled price within the scope of this procurement process only, and that our view remains that flexibility should be offered where possible. For a bundled service however, we do see it as appropriate to accept a bundled price, or discount factor.

Price Determination

As recognised in the consultation, the TSOs view either a pay-as-clear or pay-as-bid mechanism as being viable for determining remuneration for providers. We note the various arguments submitted by respondents in favour of both mechanisms, but do not accept that there is a clear answer as to which would result in a lower price or more effective outcomes. We also do not accept that it can be said, with certainty, as to how participants will behave when either mechanism is used.

The TSOs' preference for pay-as-bid was given in the consultation with respect to the challenges of using pay-as-clear for a price per service. Given the TSOs' thinking in this regard, both options could now be viable.

Our preference, however, remains that pay-as-bid is used in this Volume Capped competition. We note that this aligns with the preference of a majority of stakeholders. As highlighted by one respondent, this has been used as the price determination mechanism in other similar competitions, notably the EFR competition in GB.

Acceptance of Last Tenderer

We note that a majority of respondents agreed with the proposed acceptance of whole bids only, but with most wishing to see this up to, and over 100 MW. As noted by one respondent, an 'up to and not exceeding' approach could see a significantly lower volume than 100 MW procured. The TSOs do agree therefore that this approach may result in a much lower volume, and as such are minded to go with an alternative approach.

One respondent suggested that bid should be accepted on the basis that a minimum of 91MW is required, up to 120 MW, ensuring a minimum of 4 providers were successful. This suggestion should be viewed in conjunction with the TSOs' proposed 30 MW maximum volume per contract. The TSOs view it as representing a reasonable mechanism for determining overall volume procured during this stage. For the sake of clarity, the TSOs view this as the next whole bid which takes the total volume procured to above 90MW will be the last successful tenderer.

We note the proposal that a 'sloping demand curve' could be used. Whilst we accept the rationale that additional volume could be procured should it be of a low enough cost, significant challenges would be present in assigning the parameters for such a mechanism. The TSOs have recommended a staged approach to this procurement, as outlined in Section 4.2, for various reasons.

4.3.4 TSOs' Recommendation for Bid Requirements, Assessment and Remuneration

The TSOs have considered stakeholders views on the topics with respect to characteristics of the bids. It should be noted that further detail in this regard will be provided, both as part of the upcoming contracts consultation, as well as during the procurement process itself (i.e. exact format of bids and information required).

Recommendation: Contracts should start no later than 1st September 2019 and will end no later than 1st September 2027. Details with respect to circumstances of delay and/or force majeure scenarios will be included in the subsequent contracts consultation.

Recommendation: Applicants will be required to submit a percentage discount factor against the tariff rates, with a consistent percentage figure for all 5 services.

Recommendation: Price will be determined by a pay-as-bid mechanism

Recommendation: Whole bids only (to the nearest MW) will be accepted, with the next whole bid taking the total volume procured to above 90MW will be the last successful tenderer, with an overall minimum volume of 91MW, up to a maximum of 120MW

4.4 Bonding

4.4.1 Consultation Paper Background and Proposal

With the understanding that bonds would be consulted on further during a contracts consultation, the TSOs considered the nature of Service Providers who will be bidding into the Volume Capped procurement; new providing units. The TSOs were conscious of delays that occur in some new developments. It followed there was a need for security in the case of Service Providers inability to provide the agreed services by the Go-Live Date. The TSOs saw the advantages of including a performance bond into the Volume Capped Procurement and considered the appropriate level of bonding to be €12,000 per MW or the equivalent in GBP, deliverable by deposit to the company or a letter of credit.

The TSOs were minded to give Performance Milestones in order to ensure delivery of services at the Go-Live Date, and sufficient notice and security where it was not possible. It was decided to seek indicators of progression of a development from the connection process, and therefore align the Performance Milestones with the stages in the Connection Agreement of each new site.

4.4.2 Stakeholder Comments

Although not posed directly as a question, 13 stakeholders shared their views on bonding. All 13 indicated support or did not object to the use of bonds as part of the procurement processes.

Among the responses the following suggestions were made:

At least 7 respondents called for the use of bid bonds or payment of the bond before the tender rather than at contract execution in order to mitigate the risk of speculative bidding which would be called on when a bidder fails to execute the agreement. Two respondents suggest that the level for the proposed bid bond should be €10,000 per MW. This would be particularly relevant where an applicant had not reached a planning permission stage.

Three respondents highlighted that where there is a delay as a result of non-contestable grid delivery issues/force majeure the contract should extend accordingly. One respondent further suggested that it should include any delays as a result of a third party including the TSO, DNO, planning authorities etc.

At least 4 respondents suggested that the level of the Performance Bond of €12,000 per MW was appropriate, whilst at least 2 respondents suggested that the level of the Performance Bond was too high.

4.4.3 TSOs' Response to Stakeholder Comments

The TSOs note that the use of bonds was supported. The TSOs note that some stakeholders believed that some form of measure may be necessary to stop potential bidders from gaming bids, only later to not execute the contract. Whilst the TSOs do see potential benefit to this, we remain of the view that such bonding may prohibit or discourage participants from taking part in the procurement process.

The TSOs note, as highlighted in the consultation paper, that any delay resulting from the TSOs should have appropriate contractual arrangement for such circumstances. This process will be consulted on in the contracts consultation.

Many respondents asked for clarity on the milestones. This too will form part of the contract consultation.

4.4.4 TSOs' Recommendation for Bonding

With the majority of participants suggesting that the level of bonding as appropriate, or silent on the matter, the TSOs recommend that the level of bonding remains €12,000 per MW (or an equivalent GBP amount calculated at the time of bond payment)

The TSOs recommend that the bond is received before the point of contract execution. Further information, along with the milestones which will be implemented, will be consulted on in the contracts consultation.

Recommendation: Bonding at a level of €12,000 per MW (or equivalent in GBP) shall be required ahead of contract execution.

4.5 Maximum Size of Provider

4.5.1 Consultation Paper Background and Proposal

In examining the maximum MW capacity of contracts to be awarded, the consultation considered several options. It was considered that at the lower end, a maximum capacity limit of <10 MW per separate grid connection could be set, as this value would enable participants to remain below the threshold at which full market participant conditions are obligatory. The TSOs noted that this would mean that a relatively small contract is awarded, which could discourage potential providers from participating.

In contrast, an option of a significantly larger upper limit of 100 MW per separate grid connection could be considered. It was highlighted that this would provide a larger incentive to applicants,

though could potentially result in a single service provider being successful in a first procurement stage (if 100 MW is procured as was proposed). The TSOs viewed potential significant disadvantages with respect to this option, in that risk exposure would be higher in the case of one or more projects failing to deliver, or where a service provider was unavailable or failed in operational timescales.

A maximum contract capacity limit between these two points was therefore considered, in order to diversify projects and locations and reduce the risk to the system of non-delivery. It was noted that a similar competition in Great Britain (for Enhanced Frequency Response 'EFR') set a maximum limit of 50 MW, and that this market has significantly higher levels of system demand than Ireland and Northern Ireland.

The TSOs therefore considered 3 options for maximum size per separate grid connection: <10 MW, 30 MW and 100 MW, with the TSO proposing a maximum contract size of 30 MW per separate grid connection bidding. This proposal was made with a view that such a value would be large enough to stimulate competition, whilst ensuring that a number of providing units will be successfully awarded contracts and the risk related to non-delivery and/or unavailability of a single site is sufficiently reduced.

It should be reiterated that the proposals contained within the consultation relate to the proposed maximum size of contract which would be awarded. A provider may have a higher capacity than this value but will be contracted for the services up to the maximum contract size only.

Option 1: Maximum size <10 MW per separate grid connection

Option 2: Maximum size 30 MW per separate grid connection

Option 3: Maximum size 100 MW per separate grid connection

TSO Consultation Proposal: A maximum contract volume of 30 MW is proposed per separate grid connection

The following question was asked in the consultation:

Question 8: Do you agree with the proposed maximum contract volume proposed per separate grid connection?

4.5.2 Stakeholder Comments

Of the 24 responses received, a significant majority expressed support or agreement with the TSO's proposed contract upper limit of 30 MW. In total, 15 noted their agreement with the proposal, whilst 2 more indicated they had no objection. In contrast, 4 respondents were of the view that the upper limit should be higher.

Stakeholder comments in support of 30 MW maximum proposal

Of the 15 respondents who indicated agreement with the proposed 30 MW cap, the general reasoning given was that such a limit represented a sensible level with a view to operational considerations as well as competition concerns, with resultant benefits to the consumer.

Six respondents were of the view that limiting contract sizes at 30 MW would diversify risk, accepting concerns that a larger size would result in greater challenges to the system in relation to non-delivery and/or unavailability. Two respondents specifically outlined their view on locational diversification with both viewing it as “essential for the successful provision of these critical services” and that “large, single projects concentrate project delivery risk, project performance risk and network failure risk and are not in the best interests of consumers”. Similarly, another respondent noted that in their view “the system will benefit from having a geographical spread and a number of service providers”.

Similarly, 6 respondents highlighted concerns that an upper contract size of above 30 MW would not be appropriate for this procurement, and that particularly in the case of Option 3 (100 MW limit per contract) this could be damaging for competition. These respondents expressed a view that a lower cap would allow more potential providers and promote “healthy competition”, without which “the best price will not be achieved”. They therefore viewed the proposed 30 MW cap as representing “the best value to the consumer”.

Three respondents noted that, in their view, 30 MW represented an appropriate point with respect to achieving economies of scale, whilst respecting the benefits associated with a more diverse portfolio of providers. One respondent noted that in their experience, benefits associated with economies of scale in the development of battery storage projects were limited above the 20-30 MW level.

Five respondents requested clarity on whether a unit which was successful in the first stage of the procurement, and which had a capacity higher than the proposed 30 MW limit, would be eligible to bid in the envisaged second stage of the volume capped procurement with their remaining capacity. It was viewed that allowing this would “seem counter to some of the reasons put forward for capping the contract sizes at 30 MW”, with two of these respondents indicating that their view was this should not be allowed.

Two respondents expressed concern with the limit being set per connection point, rather than per provider. This, they felt, could result in a single providers being successful for multiple connection points, and that this increased the risk of failure to deliver. Another respondent viewed that there was a risk that a single large site could apply for multiple connections of 30 MW each, in effect, circumventing the 30 MW contract limit.

One respondent suggested increasing the maximum volume per connection point to 33MW, to maximise the use of the proposed 100 MW volume.

One respondent, though agreeing with a 30 MW cap, queried whether any preference would be given for projects at that volume ahead of lower volumes.

Stakeholder comments in support of 100 MW maximum option

Of the 4 respondents who indicated a preference for a larger volume per contract, a number of concerns and opportunities were indicated.

A common concern across the 4 respondents was that, in their view, prior signals had been given by the TSOs and RAs to potential providers and investors, indicating that projects of up to

100 MW would be allowable. Specifically, respondents highlighted the ECP-1 decision¹⁰ in Ireland, which contained a prioritisation mechanism for DS3 applicants up to 100 MW each, as setting either a precedent or decision on the maximum contract size which would be subsequently contracted for. Another respondent specifically highlighted the ‘Volume Calculation Methodology and Portfolio Scenarios Decision Paper’¹¹ from 27 July 2016 as setting a decision of 100 MW maximum for provision of FFR. It was raised as a concern by these respondents that such signals have resulted in large levels of investment in providers of up to 100 MW, in both Ireland and Northern Ireland.

Operational considerations were considered as insufficient rationale by 2 respondents. The inherent reliability of, specifically, battery (lithium-ion) storage technology was highlighted. These respondents noted that a large provider of this type would have very high redundancy given the modular nature of their build. It was also noted by 1 stakeholder that a limit set per connection point may fail to geographically diversify providers, given savings may still be possible to an applicant by using a single site with multiple connections points.

Two respondents highlighted benefits of economies of scale that could be achieved via a larger maximum contract limit of 100 MW, with ultimate benefit to the consumer.

Three respondents linked the lower cap proposed with potential impact on renewable integration, with a view that a higher cap (and larger battery storage providers) would support (or be needed for) a system with increasing renewables, and would minimise wind curtailment.

One respondent highlighted limits for other fast providers, and questioned whether a lower limit proposed in the Volume Capped arrangements could be viewed as discriminatory.

4.5.3 TSOs’ Response to Stakeholder Comments

The TSOs notes that a significant majority of responses were in support of the proposal for a maximum contract limit of 30 MW.

Operational Risk

We note, and support, the view that a maximum contract of 30 MW will diversify risk in a number of areas. In general, the TSOs tend to get reserves from a range of providing units. The long term consequence of regularly operating the system where the majority of service provision was concentrated to a very small number of units is unknown.

We view that the awarding of a number of smaller (though still significant) contracts will reduce impact in the case of project failure, significant performance issues or network issues. Whilst such issues can, in part, be addressed through the proposed bonding requirements, we view that further risk can be mitigated by a maximum contract limit as proposed. In operational timescales, whilst it is proposed that a high availability will be incentivised by a performance scalar, the TSOs view that spreading this service delivery over a number of projects will be

¹⁰ ‘Enduring Connection Policy Stage 1 (ECP-1) Decision’ <https://www.cru.ie/wp-content/uploads/2017/04/CRU18058-ECP-1-decision-FINAL-27.03.2018.pdf>

¹¹ ‘Volume Calculation Methodology and Portfolio Scenarios Decision Paper’ <http://www.eirgridgroup.com/site-files/library/EirGrid/DS3-System-Services-Decision-Paper-on-Volume-Calculation-Methodology-and-Portfolio-Scenarios-FINAL.pdf>

beneficial for ensuring the resilience of the system in Ireland and Northern Ireland, and mitigating against risks including common mode failure. This should be viewed within the context of the challenging system conditions where such providers will be called upon (periods of significant system frequency disturbance), and the period in which they will be operation (up to at least 2027, with increasing levels of non-synchronous generation anticipated).

A number of respondents indicated that the operational considerations outlined above should also be considered with respect to the ability of a single provider to be able to submit bids for multiple connections. The TSOs recommend that additional rules may be needed as part of the procurement process, with respect to such splitting over multiple connections. The TSOs will develop rules with respect to preventing such project splitting, as part of the procurement process, should such restrictions be viewed as necessary.

The TSOs note and welcome the comments in relation to the inherent reliability of battery storage providers, provided by respondents in favour of a larger maximum contract limit. It is of significant importance that successful providers are able to provide the services over a 6 year period, with very high levels of availability expected. We would highlight that the TSOs' operational concerns are not primarily technology specific. Numerous factors can, and do, impact on the ability of a provider to deliver critical System Services at a given moment. This includes (and is not limited to) network conditions and outage periods, both planned and unplanned. We also view the risk of project delivery failure, or delivery with significant delay, within the considerations on reliability. As highlighted above, these issues can, in part, be addressed through the proposed bonding requirements. We do however view that the provision of the proposed services, by a number of different successful providing units, will provide significant additional system resilience benefit in comparison to a single large providing unit.

Concerns were also expressed regarding the ability of providers to submit additional unused volume into subsequent stages of the Volume Capped procurement. Whilst we recognise these concerns, the TSOs are of the view that an important rationale for the staged approach is that learnings can be gained from the first procurement stage, and that it is appropriate that preconditions for any second stage will be determined subsequent to the first procurement stage being conducted.

Competition and Economies of Scale

A number of respondents noted that the proposal of 30 MW represented an appropriate level with respect to economies of scale, and that benefits of this kind were limited above this point. It should however be noted that a similar number of respondents indicated greater economies of scale could be achieved at 100 MW. Whilst respondents have not provided detailed costings in support of either argument, the TSOs are minded to view this consideration within the context of battery developments in other jurisdictions. These are currently very limited at levels of 100 MW, with a significantly greater number of developments at the proposed 30 MW or lower, suggesting such sizes represent a viable business case.

Market Signals

With respect to the four respondents in support of a maximum contract limit of 100 MW, we do take significant note of the view expressed by these parties that such a proposal is not in line with market expectations, and that a 100 MW cap had been previously signalled, specifically via the ECP-1 decision. In light of previous feedback on this, the TSOs issued a clarification note, subsequent to publication of the Volume Capped consultation, clarifying the maximum contract

size published under the Volume Capped consultation. With respect to the previous ‘Volume Calculation Methodology and Portfolio Scenarios decision paper’¹², which indicated a 100 MW limit for FFR provision, it should be noted that this decision taken in 2016 was not made with a view to the Volume Capped arrangements, particularly given it was also noted that an “annual procurement process will separately state the maximum to be procured from any single provider” and that these limits may need re-evaluation “as the power system evolves”. It should also be noted that this 100 MW value does not represent a regularly used service amount, and was included to allow service provision up to 100 MW only in specific circumstances.

As noted in the clarification note, we do understand that these previous decisions have resulted in confusion with regard to the subsequently proposed Volume Capped requirements for some stakeholders. Whilst such confusion is regrettable, it is appropriate and necessary that the design of the Volume Capped arrangements is taken in consideration of the specific benefits and risks associated with procuring significant fixed term and fixed remuneration 6-year services contracts. It should be noted that competitions of comparable volumes have been undertaken in other jurisdictions with significantly higher levels of demand, such as Great Britain and Australia. This Volume Capped competition therefore represents a significant commitment by both the TSOs and consumers across both jurisdictions.

Integration of Renewables

We note the concerns highlighted with respect to impact on integration of renewables by setting a lower cap. We understand, in part, that such concerns may relate specifically to the 100 MW total proposed for this first stage, discussed in Section 4.2. The TSOs do not view the maximum contract limit per provider as impacting on the integration of renewables.

Comparison with Volume Uncapped Arrangements

With respect to the point raised by one stakeholder regarding other limits for different types of technology, the TSOs would like to clarify that any limits previously set are as part of the ‘Volume Uncapped’ (regulated arrangements). It is important to highlight the fundamental differences between the System Services Volume Capped and Volume Uncapped arrangements. The Volume Capped arrangements are designed in such a way that they provide contractual certainty (length and remuneration) for those providers who require it. To do this, 6 year fixed term contracts are proposed, with few mechanisms via which these arrangements may be changed by the provider or the TSOs. In contrast, the Volume Uncapped procurement provides more flexibility to both the providers and the TSOs. This difference is particularly important in consideration of the maximum contract size.

The Volume Uncapped arrangements are open to all providers, with larger limits set per service than those proposed in the Volume Capped arrangements. The Volume Capped contracts however are fixed for 6 years. We must therefore consider limits for which we have maximum certainty with respect to ongoing suitability, out to 2027.

The consideration, from a system operator perspective, would be that any individual size of providing unit in this competition greater than 50 MW runs a risk of not been operated at those

¹² ‘Volume Calculation Methodology and Portfolio Scenarios decision paper’

<http://www.eirgridgroup.com/site-files/library/EirGrid/DS3-System-Services-Decision-Paper-on-Volume-Calculation-Methodology-and-Portfolio-Scenarios-FINAL.pdf>

higher levels. The TSOs' view is that the FFR requirements of the power system could be best satisfied by the provision of FFR from a number of Providing Units. For maximum certainty of use over the lifetime of the contracts, these should be a similar size to the majority of reserve providing units which are used currently.

The TSOs therefore view 50 MW as representing the absolute maximum value which would be operationally appropriate for these contracts. In addition, the TSOs are of the view that further benefits which can be gained by setting a lower maximum contract size of 30MW.

In summary it is appropriate that the Volume Capped arrangements are not the same as the Volume Uncapped, given that they will be fixed term and fixed remuneration, a fundamental difference to the Volume Uncapped arrangements (where both tariffs and arrangements can be altered).

Additional Comments

In response to the suggestion of increasing the maximum volume per connection point to 33 MW, the TSOs are of the view that the concerns around underutilisation of total volume will be addressed as part of the 'acceptance of last tenderer' consideration, with a recommendation to be made as part of the full recommendations paper.

The TSOs can reiterate that applicants will be judged on a per MW basis, with no preference for projects at any level below the maximum contract level which is set.

4.5.4 TSOs' Recommendation for Maximum Contract Size

The TSOs are responsible for ensuring the real time resilience of the system including the provision of System Services. The responsibility for ensuring the System Services spend does not breach the Expenditure Cap, set by the RAs, also lies with the TSOs. The issues of maximum participant size and total volume procured have significant impact on both system security and System Services expenditure. The recommendations made by the TSOs with respect to maximum size of contract, as well as the total volume (outlined in Section 4.2), represents the best outcome in enabling the TSOs meet these responsibilities. Conversely, the TSOs view that volumes significantly larger than these will have a negative impact on its ability to fulfil these obligations.

In the consultation on the DS3 System Services Volume Capped arrangements, the following reasoning was provided by the TSOs in support of the 30 MW proposal:

"This value [30 MW] is set such that the incentive is considered large enough to stimulate competition in the procurement exercise, whilst ensuring that a number of providing units will be successfully awarded contracts and the risk related to non-delivery and/or unavailability of a single site is sufficiently reduced."

With stakeholder responses in mind, the TSOs are of the view that the 30 MW maximum contract limit does achieve the aim of incentivising and stimulating competition.

In addition, there are clear technical considerations that lead the TSOs to conclude that there are strong, demonstrable benefits for system security, long term operational flexibility and reduction in risk related to common mode failures that should be incorporated into a procurement exercise. The simplest mechanism for doing this is with a maximum single provider

of no more than 30 MW, and we view 50 MW as representing the absolute maximum which would be operationally appropriate for the Volume Capped arrangements at this time.

This consideration reflects the significant interest so far shown in the Volume Capped procurement exercise by battery storage providers, and is based on the following:

- For a given volume of the proposed type of service, there is a clearly a technical increase in reliability in the operation of 3-4 sites of circa 25-30 MW compared to 1 large site 100 MW. The common-mode loss of the single unit, given the size of reserves, will be challenging to replace..
- The use of large scale batteries greater than 30 MW for service provision is not common, whilst there is significant global experience of operation of circa 30 MW size batteries in other jurisdictions for a number of years. In particular the 'Enhanced Frequency Response' (EFR) competition in Great Britain resulted in a number of 20-35 MW plant, with a maximum of 50 MW. This is a significant technical consideration with respect to system resilience issues.
- The use of 3-4 units rather than one provides flexibility opportunities to utilise 4 distinct and unique frequency trajectory response parameter sets in the long term, rather than 1 parameter set. This provides operational flexibility to better adapt and manage to system conditions over the lifespan of the capped volume arrangements.

TSO Recommendation: A maximum contract volume of 30 MW is applied for the Volume Capped competition, per separate connection point.

As highlighted in the TSOs' response, we do not recommend that pre-conditions with respect to potential future stages of the Volume Capped arrangements are decided at this point, given one of the reasons why a staged approach is proposed is to enable learning subsequent to an initial stage.

4.6 Application of Scalars

The design of System Services at large has included the concept of 'scalars' which can be applied to payments to increase or decrease them depending on a number of variables.

These scalars fall under 3 categories with the scalars relevant for this procurement exercise noted:

- **Product Scalars** (for the Faster Response of FFR, Enhanced Delivery of FFR, POR, SOR and TOR1, Continuous Provision of Reserve from FFR to TOR1)
- **Performance Scalars**
- **Scarcity Scalars** (both temporal and locational)

As part of the consultation, the TSOs reviewed the appropriate application of these scalars with regard to this Volume Capped procurement, particularly given the different nature of this procurement and the service to be delivered (e.g. very high availability) in comparison to the Volume Uncapped arrangements (for which the scalars were developed).

Stakeholders were asked the following question for this section.

Question 9: Do you have a view on the proposed application of performance, scarcity, product and locational scalars?

4.6.1 Application of Product Scalars

4.6.1.1 Consultation Paper Background and Proposal

'Product Scalars' are proposed in order to incentivise service delivery with characteristics of increased benefit. The consultation noted that given the Volume Capped procurement will be setting these requirements, the ongoing applicability of these product scalars could be queried. Not applying these scalars may however have a significant impact on revenue.

Product Scalar for the Faster Response of FFR – designed to incentivise the faster provision of FFR up to an upper threshold of 0.15 seconds following a frequency event

The consultation noted proposed requirements for FFR speed of response are between 300 ms and 150 ms. Taking the definition of this product scalar, this would provide a product scalar of 2.57 for 300 ms, rising to 3 for 150 ms.

The TSOs proposes that this scalar should apply as defined but considered that there could be several ways of approaching this.

1. *Product scalar to be applied as part of bid assessment* – a faster response would therefore lead to a higher price in the assessment
2. *Product scalar not applied as part of assessment, but applied for remuneration of successful providers* – in the eyes of the competition, provided that over 300 ms could be met, all units would be treated equally. Ongoing remuneration at a higher scalar would incentivise faster speeds of response.
3. *Speed of Response added as assessment criteria* – units which could offer a speed of response above a certain threshold would be prioritised over those below that value

These options were provided for consideration.

Option1: Product Scalar for faster response is applied in the calculation of bundle price for the basis of assessment

Option2: Product Scalar for faster response is applied after assessment i.e. in actual remuneration only

Option3: Applicants are sorted on speed of response with those faster than 200 ms prioritised over those which are slower

Product Scalar for the Enhanced Delivery of FFR, POR, SOR and TOR1 – designed to incentivise frequency trigger and trajectory capability.

This scalar works down from a base level of 1, decreasing with lack of capability. The TSOs noted that given we are setting requirements with regard to frequency trigger and trajectory, it does not appear necessary to penalise these technical requirements via this scalar. Consequently, the TSOs proposed that this scalar should not be applied.

Product Scalar for the Continuous Provision of Reserve from FFR to TOR1 – to incentivise the continuous provision of FFR to TOR1

Given this continuous provision is required as a pre-requisite for applicants, it could be viewed as not required (similar to the scalar for enhanced delivery). Consequently, the TSOs proposed that this scalar should not be applied.

TSO Proposal: The product scalar for Enhanced Delivery will not be applied. The product scalar for Continuous Provision of Reserve from FFR to TOR1 will not be applied

4.6.1.2 Stakeholder Comments

Product Scalar for the Faster Response of FFR

A significant majority of stakeholders who provided comments were in support of Option 2 – where the product scalar in relation to speed of response would not factor in the assessment of bids (but would be reflected in ongoing remuneration). At least 11 stakeholders expressed this view, with the predominant rationale being that only by leaving this scalar out of the assessment process (and therefore not increasing prices of faster units) could speeds faster than 300 ms be incentivised.

It was also noted by at least one respondent that a speed of response at this level would be “non-trivial to measure and test”.

Two respondents indicated that either Option 2 or 3 would be acceptable (given both look to incentivise faster speeds of response). One respondent indicated a preference for Option 3 i.e. prioritisation of units with a speed of response faster than 200 ms. One respondent indicated a preference for Option 1, with the rationale that Option 2 is inconsistent.

Product Scalar for the Enhanced Delivery and Continuous Provision

Respondents were split with respect to Continuous Provision scalar should apply, with 7 indicating a preference that the scalar should be applied and 6 preferring it not to be applied.

Rationale for including the Continuous Provision scalar in remuneration was that it was considered “when determining the proposed tariff caps”. It should be noted that the 7 respondents who indicated preference for the Continuous Provision scalar to be applied, on the whole, did not indicate their preference with respect to the Enhanced Delivery scalar.

For those in favour of the TSOs’ proposal, where rationale was given it was in line with the TSOs’. That being, that given the service requirements were fixed, these scalars are not required.

4.6.1.3 TSOs’ Response to Stakeholder Comments

Product Scalar for the Faster Response of FFR

We note that the majority of stakeholders were in favour of Option 2 and saw this as a route via which faster provision than the lower boundary can be incentivised, whilst not increasing the complexity of the bidding or assessment process.

We also note the comment that testing of such speeds of response is non-trivial. For this reason in particular, the TSOs believe that it could be wise to not include this characteristic within the assessment process itself, given the potential that tested values could differentiate from submitted characteristics given this additional complexity. That is notwithstanding a minimum requirement from all parties for at least 300 ms speed of response.

However in a tie-break situation (where an equal bid is placed by two participants, but there is only enough volume to accept one), speed of FFR could be considered in determining the successful participant.

Whilst we do recognise that not fully including this scalar within the assessment process, but subsequently using it for remuneration, could be viewed as inconsistent, we do view it as appropriate. We also view it as more consistent than either Option 1 or 2 in that it uses the scalar to incentivise speed of response, as the scalar was designed to do.

Product Scalars for Enhanced Delivery and Continuous Provision

The TSOs acknowledge that feedback was mixed but agree with stakeholders who indicated that the Continuous Delivery scalar was incorporated into the setting of the tariffs. This is also true of the Enhanced Delivery scalar however.

We view these two scalars, applied for the characteristics set by this competition, as setting roughly equivalent uplift and downlift. It is for this reason that we view it as possible that they both are removed. The alternative to this is that they both remain.

The TSOs are keen to increase simplicity in the process where possible and are therefore inclined to agree with the stakeholders who supported the proposal to remove both scalars, given their redundancy in this competition. Our recommendation is to remove them from both the procurement process and service remuneration.

4.6.1.4 TSOs' Recommendation for Application of Product Scalars

The TSOs' recommendations with respect to application of the product scalars are as follows:

TSO Recommendation: The Enhanced Delivery and Continuous Provision product scalars will not be used in the Volume Capped competition or in remuneration of services.

TSO Recommendation: The product scalar for Faster Response of FFR will not be included within the assessment of bids. However in a tie-break situation, speed of FFR should be considered in determining the successful participant. This scalar will be applied with respect to ongoing remuneration of successful providers.

4.6.2 Application of Performance Scalars

This section should be read in conjunction with Section 3.5 of this Recommendation Paper, where the availability obligations themselves are outlined.

4.6.2.1 Consultation Paper Background and Proposal

The consultation outlined that in support of the proposed 97% availability obligation, the performance scalar could be utilised as an incentive.

As such, a potential mechanism was outlined which would reflect unavailability in a service provider's performance scalar. The proposed scalar was structured to restrict payments should the availability obligation not be met (excluding planned periods of maintenance). The TSOs proposed that this structure should reflect grades of availability, giving the rationale that a provider which is under the availability obligation by a relatively small amount should not have payments reduced as heavily as one which was significantly under.

An incrementally set performance scalar was therefore outlined, with it proposed that this could be measured and applied on the basis of the same scalar assessment frequency as indicated in the 'DS3 System Services Protocol – Regulated Arrangements' i.e. monthly.

Taking into account the high degree of availability required by the TSO, the TSOs proposed that the availability performance scalar structure in Table 5 would apply, in order to provide the TSO with confidence that the successful bidder will provide the contracted services when required.

Table 5: Application of Performance Scalar linked to Availability

Availability	Performance Scalar
<60%	0%
≥60% <70%	25%
≥70% <80%	50%
≥80% <90%	70%
≥90% <95%	85%
≥95% <97%	95%
≥97%	100%

The following proposal was given:

TSO Proposal: The Performance Scalar outlined in Table 5 will be applied in order to incentivise availability.

4.6.2.2 Stakeholders' Comments

Of those who provided comments, a significant majority (at least 11) agreed in principle, or supported, the TSOs' proposal that such a scalar could be used to incentivise availability. This agreement was generally given in conjunction with a request for further clarity on a number of areas.

One recurring query (raised by at least 7 respondents) was whether the post-event (or event specific) performance, as defined under the Volume Uncapped arrangements, would be applied

for providers in the Volume Capped arrangements. One respondent requested that, should this scalar also be applied, interactions with the availability scalar should be outlined.

Another repeated request was for clarity on the following two areas:

1. *Over what timescales will the scalar be applied?* – Respondents queried how availability would be measured and over what timescales. At least three respondents suggested that the metric should be applied on an annual, as opposed to monthly, basis.
2. *How will periods of dispatch and re-charging be treated?* – Respondents, in general, indicated that they should not be penalised for periods of unavailability that are outside of their control.

At least two respondents explicitly disagreed with the proposal. One of these respondents believed that there were already sufficient incentives in place given loss of remuneration and the event performance scalar, and that an additional scalar added unnecessary complexity.

The other respondent outlined their view that such a performance scalar should only apply at SNSP levels of above 50%, given that in the uncapped arrangements the TSOs have indicated that it is only at these levels where FFR is needed. This suggestion, and the TSOs' response, is outlined in Section 3.5 of this Recommendation paper.

4.6.2.3 TSOs' response to stakeholder comments

The TSOs welcome the general support given for proposed mechanism for incentivising performance, and recognise the need for clarity in a number of areas.

In response to the respondent who indicated that this scalar adds unnecessary complexity, the TSOs view is that the event performance scalar alone cannot ensure ongoing availability, given the low probability and high consequence nature of the service being dispatched. An additional scalar, particularly with periods between events in mind, is a prudent measure to incentivise high availability.

Event Performance Scalar

The TSOs can confirm that the 'event' performance scalar, as outlined in the volume uncapped arrangements, will apply for service delivery under Volume Capped. This scalar is explicitly outlined in the System Services Regulated Arrangements Protocol¹³.

Under the Volume Uncapped arrangements, the Performance scalar (P) will consist of two components:

- Performance Availability (P_A)
- Performance Incident Response Factor (P_E)

The value of the Performance scalar will be a multiple of the two components:

$$P = P_A \times P_E$$

¹³ http://www.eirgridgroup.com/site-files/library/EirGrid/DS3-System-Services-Protocol-Regulated-Arrangements_final.pdf

P_A will account, in the uncapped arrangements, for the ability of a Providing Unit to accurately forecast its availability to provide System Services. Given the requirement for high availability in the Volume Capped, we would propose that this scalar is, instead, used to account for availability, as per the proposed scalar and percentage thresholds.

P_E will be based on a Providing Unit's response to a Performance Incident. In the Volume Uncapped arrangements at present, a unit gets a Performance scalar of 0 if it completely fails an event (as P_E will be 0). We would propose that this remains the same for the Volume Capped arrangements.

Further detail on the calculation of P_E is provided within Annex II of this document.

Timescales

It is recommended in Section 3.5 that the service availability obligation will be 97% for all providers and this will be assessed on an annual basis. We would therefore look to apply the availability component of the performance scalar on the same basis. Further detail of how this will be applied will be outlined in the contracts consultation, but the TSOs envisage that the scalar will reflect availability during the previous 12 months.

Treatment of dispatch and re-charging

As outlined in Section 3.5, the TSOs recommend that a unit's availability is not detrimentally impacted during, and for a reasonable period after, responding to a system event (or a non-energy action from the TSOs). Specifically, this would be for the full duration of the response times (i.e. 20 mins for the provision of TOR2), plus a period of 90 mins recovery time (or the end of the first trading period to complete after this time).

4.6.2.4 TSOs' recommendation for application of Performance Scalars

The TSOs believe that both components of the performance scalar are critical for incentivising availability and service delivery. We therefore propose that the following scalar is applied.

TSO Recommendation: A performance scalar, P , will be applied as follows:

$$P = P_A \times P_E,$$

where, P_A represents the Performance Availability and P_E represents the Performance Incident Response Factor.

P_A will reflect total amount of unavailability, with further details to be outlined in the contracts consultation. Unavailability will be calculated for the year and reflected in a provider's remuneration in line with the table given above.

P_E will be applied, as defined for the Volume Uncapped arrangements, to reflect service provision during an event in comparison to the expected amount.

4.6.3 Application of Scarcity Scalars

4.6.3.1 Consultation background and proposals

Temporal Scarcity Scalar

The System Service procurement framework introduces a temporal scarcity scalar in order to incentivise service availability during times of high SNSP. This scalar is set such that during periods in which SNSP is above certain thresholds, payments are increased to reflect the increased system need.

The consultation outlined that given the high availability obligations (i.e. 97%) proposed for applicants under the Volume Capped arrangements, such a scalar could be viewed as unnecessary in that it provides an incentive which is not required.

The TSOs acknowledged that the tariffs which will be used to cap bid submission were designed on the provision that scarcity scalars would apply, and we therefore proposed that it was not appropriate to remove these scalars entirely. However, the TSOs proposed that this scalar could be applied in two ways: either based on actual SNSP, or based on a 'typical' year.

The latter approach would allow providers certainty in revenue, as well as certainty of payments for the TSO.

Should actual SNSP be used, it was noted that a revenue cap and floor could be set to provide certainty of remuneration in either direction. The TSOs proposed that should this mechanism be used, a floor could be set based on a standard low wind year i.e. wind factor of 24%, and a cap could be set based on a high wind year with wind capacity 33%.

The TSOs presented both options and outlined that they believed, given the specific circumstances and characteristics of the Volume Capped arrangements, that there are advantages to basing remuneration on a 'typical' year.

Option1: Apply Scarcity Scalar based on 'typical' wind year to remuneration

Option2: Apply Scarcity Scalar based on actual SNSP to remuneration and impose cap and floor

Locational Scarcity Scalar and Jurisdictional Volumes

In addition to a scarcity scalar, the opportunity exists for a locational scalar to be applied to reward projects which locate in areas with higher need. This locational scalar can be used to incentivise connection in more beneficial parts of the network. It was noted in the consultation that the use of these scalar would add significant additional complexity to the Volume Capped competition, particularly given these scalars have not been utilised in other System Services arrangements up until this point.

Given the nature of the service (primarily responding to system frequency) as well as the additional complexity, the TSOs proposed that a locational incentive or scalar was not necessary at this time, but indicated this could be reviewed for future procurement stages. The TSOs therefore proposed the following.

TSO Proposal: Locational incentive/scalar should not be applied for delivery of services under this initial stage of Volume Capped procurement arrangements (though may be used in the future if such a locational signal is necessary).

Similarly, with respect to jurisdictional volumes and whether a minimum for each jurisdiction was necessary, the TSOs viewed that given that the bundled service relates to frequency stability purposes (and with frequency as a common characteristic across the system) the technical justification for requiring a certain volume in each jurisdiction is seen as low. The TSOs, therefore, did not propose a jurisdictional volume requirement be set at this point.

TSO Proposal: No minimum volume per jurisdiction will be set.

4.6.3.2 Stakeholders' Comments

Temporal Scarcity Scalar

The majority of stakeholders indicated a preference for Option 1, that a 'typical' wind year was used as the basis for remuneration, over Option 2, that actual SNSP would be used. At least 11 stakeholders indicated a preference for Option 1, with at least 5 preferring Option 2.

Those that indicated a preference for Option 1, in general, highlighted the increased budgetary certainty for providers from such an approach, which they viewed as enabling lower bids costs and therefore additional benefit to the consumer. It was noted by these respondents that clarity on how this remuneration would be calculated would be important to participants. At least 2 of these respondents also highlighted that, given the very high availability obligations, with unavailability expected only due to planned or unplanned outages, the incentive associated with actual SNSP levels was not needed.

Those that supported Option 2, in general, were of the view that the temporal scarcity scalar was designed to incentivise availability during times of high SNSP and should be used as such. In at least 2 of these responses, this preference was given in conjunction with a view that availability obligations should be significantly lower, to enable providers to participate in other markets.

Of those that did prefer Option 2, a range of preferences was given with respect to any revenue cap and floor which would be needed to provide additional certainty. One respondent supported the high/low wind year cap and floor as per the TSOs' proposal. One respondent indicated a preference that the floor is set at no less than the typical wind year. Another suggested that no cap and floor would be needed due to the long contract duration.

Locational Scarcity Scalar and Jurisdictional Volumes

At least 8 respondents agreed with the proposal not to use locational scalars and not to set minimum jurisdictional volumes in this first stage, with only 1 respondent specifically suggesting that the TSOs should develop such a scalar now. A number of comments were provided, particularly with respect to future use.

One respondent, whilst viewing the TSOs' approach as reasonable, did suggest that there may be benefits to geographical dispersion of projects, and suggested the TSOs may wish to consider whether a mechanism would be needed to ensure this for subsequent procurement stages.

At least 2 respondents highlighted that they would hope any retroactive implementation of these scalars would increase its' value above 1, and not lead to diminishing payments.

One respondent urged the TSOs to develop a locational scalar for this stage and did not view that, given the scalars already in place, it added significant complexity. They viewed this as a potential mechanism via which to manage potential network/congestion issues.

4.6.3.3 TSOs' response to stakeholder comments

Temporal Scarcity Scalar

The TSOs developed Option 1, that remuneration should be based on a 'typical' wind year, with a view that this would increase investment certainty for providers and in turn, provide benefit to the consumer. We note support for this proposal and this rationale from a majority a respondents. We acknowledge that this proposal also increases certainty in terms of System Services expenditure management for the TSOs. This 'typical' wind year could, on reflection, be called a 'typical' SNSP year instead (or average/representative SNSP year).

As highlighted, several respondents indicated a preference to see the temporal scarcity scalar applied as per actual SNSP conditions, given the scalar was designed to incentivise availability during high SNSP periods. However, the availability obligations which we recommend setting are 97%, with 3% anticipated as primarily covering unplanned outages. An additional incentive for availability during periods of high SNSP, as such, runs counter to this design for very high availability.

Provided the availability requirements are set correctly, we do not view a temporal scarcity scalar linked to actual SNSP as providing a necessary incentive. As such, we believe the increased uncertainty for providers, and likely increased bid prices, are unnecessary.

More details on how the 'average' wind year approach would be applied will be provided by the TSOs at least one month in advance of the procurement process.

Locational Scarcity Scalar and Jurisdictional Volumes

We welcome the support for the TSOs' proposal not to utilise this locational scarcity scalar at this time. We can confirm that we view future implementation as being applicable for future procurement stages only, with no retro-active application. We take note of the view that this scalar could be used to ensure locational dispersion of projects, and will investigate this for future procurement rounds (with learning from stage 1 gained).

4.6.3.4 TSOs' recommendation for application of Scarcity Scalars

The TSOs recommend that the scarcity scalars are applied as follows. More detail on the use of an 'average' wind year will provided in advance of the procurement process.

TSO Recommendation: The Temporal Scarcity Scalar will be applied to remuneration based on 'average' wind year.

The Locational Scarcity Scalar will not be applied during the first stage of the Volume Capped procurement. No minimum jurisdictional volumes will be set.

5 TSOs' Recommendations for Relevant Industry Frameworks and Market Interactions

5.1 Overview

In this section of the consultation, the TSOs outlined a number of potential obligations and interactions which exist outside of this volume capped procurement exercise, but which potential providers will be required to be mindful of or compliant with. This included interactions with existing industry framework (e.g. Grid Code) and interactions with I-SEM Energy and Capacity markets.

In relation to the entirety of this section, stakeholders were asked to following question

Question 10: Do you have a view on the market interactions outlined here and the proposed mechanism for mitigating?

5.2 Licensing and Code Obligations

5.2.1 Consultation background and proposals

The TSOs outlined the potential difference between Grid or Distribution Code requirements, with it noted that the Grid Code or Distribution Code standards which a provider is required to meet may be of a higher technical specification than the characteristics which are required to deliver the service outlined. The TSOs highlighted that this discrepancy exists across technology types.

The consultation highlighted that all prospective providers under the Volume Capped arrangements will need to meet the applicable Grid Code or Distribution Code requirements for their appropriate size, connection point and class of technology. Providers will, however, be required to operate under technical specifications reflecting the System Services which they are providing. In effect, the units must be able to operate in either 'Grid Code mode' or 'System Services mode'.

TSO Proposal: Service providers must meet the applicable Grid Code or Distribution Code requirements for their connection.

5.2.2 Stakeholders' Comments

Stakeholders, on the whole, indicated agreement that units should be required to meet the appropriate Grid Code or Distribution Code requirements, though noted the following two recurring queries:

1. *Where the Grid/Distribution Code and service requirements were not consistent with each other, which would take precedence?* – A number of respondents queried what hierarchy existed in these cases, whilst one explicitly disagreed with the TSOs view that units would be able to operate in two modes (with a view that the ‘Grid Code mode’ would always need to be operated to). One respondent explicitly cited a part of the Grid Code (PPM 1.5.3) and requested confirmation as to whether providers would need to comply with this.
2. *In the case of future code changes, could guarantees be provided that contracted parties under Volume Capped would be exempted from these changes?* – A number of respondents suggested potential, and unknowable, future changes to code obligations could incur costs and therefore reduce investment certainty. These respondents sought confirmation that providing units under Volume Capped would be given the necessary derogations from such requirements.

One respondent indicated that, in their view, they did not believe that the current Grid Code requirements with respect to battery storage providers would enable providers to comply fully with the Grid Code, and suggested either derogations or modifications would be necessary.

5.2.3 TSOs’ response to stakeholder comments

We welcome the acknowledgement from stakeholders that such code requirements will need to be complied with, and understand the reasoning behind the clarifications which have been requested.

We address the two recurring requests for clarification in turn.

Where the Grid/Distribution Code and Service requirements were not consistent with each other, which would take precedence? – Differences between Grid/Distribution Code requirements and specific service requirements will arise. Code obligations set out a full range of technical requirements a party must have, whilst these are only utilised within a specific range and/or parameters for the purpose of a service. We will work with stakeholders to further understand concerns of this nature. The TSOs view that should substantive inconsistencies exist, which make provision of the service under the Volume Capped arrangements incompatible with Grid/Distribution Code obligations, then derogation requests for relevant requirements could be sought. For providers successful under the Volume Capped arrangements, the TSOs envisage that if derogations from the Grid/Distribution Code were necessary to enable service delivery, the TSOs would support these requests. Such time-limited derogations would need to be sought via the standard derogation process.

In the case of future code changes, could guarantees be provided that contracted parties under Volume Capped would be exempted from these changes? – Though the TSOs understand this request for certainty, it should be stated that there is a specific derogation process defined under the Grid and Distribution Code, with the regulatory authorities as final decision makers. This process would need to be complied with in case of future derogation need.

In the case of future changes, it should also be noted that changes of this nature may originate from European legislation/codes, which could mean derogations are not possible.

The TSOs would reiterate that a derogation process is in existence for both the Grid and Distribution Code, in both jurisdictions, and should providers be of the view that one or more

aspects of these requirements are not possible; this avenue is available to them. Any such derogations would be applicable to providers under the Volume Capped process only and, as such, would be time-limited in their nature.

5.2.4 TSOs' recommendation for Grid Code/Distribution Code requirements

The TSOs recommend the following with respect to Grid Code or Distribution Code obligations.

TSO Recommendation: Service providers must meet the applicable Grid Code or Distribution Code requirements for their connection. Should such requirements be incompatible with provision of the service contracted under the Volume Capped arrangements, appropriate derogations should be sought by these providers.

5.3 Network Charges

5.3.1 Consultation background and proposals

In common with the Grid and Distribution Code requirements outlined above, the TSOs noted in the consultation that applicants will be subject to the relevant network charges for their connection. This will include payments for the respective Maximum Export Capacity (MEC) and Maximum Import Capacity (MIC). The TSOs note that the process for this application and charging exists entirely outside of the requirements for this Volume Capped procurement competition, and therefore proposed that these will be progressed as per the existing relevant process.

TSO Proposal: Service providers will be subject to the network charges applicable to their connection.

5.3.2 Stakeholders' Comments

Stakeholders who provided comments did not object to the proposal that units should pay applicable network charges, but several questioned whether the charges as currently designed in Ireland and Northern Ireland were appropriate for battery storage providers in particular, with it emphasised that if these charges were not reasonable, this could act as a barrier to entry for prospective providers.

At least 3 respondents noted battery storage units are not typical providers, and should not be considered as either solely generator or demand, and should not be charged for both. One respondent noted that at a European level they are treated "as neither generation nor demand" which they viewed as representing a fairer arrangement. Another was of the view that charges (including PSO levy) should not be disproportionate or unreasonable, given the technology's "requirement to churn electricity".

Several respondents also noted a desire for the applicable network charges to be communicated in order to provide clarity to stakeholders, given the potentially significant impact on bid prices.

5.3.3 TSOs' response to stakeholder comments

The TSOs take note of the concerns with respect to potentially disproportionate charges, particularly for battery storage providers given their specific nature (i.e. acting as both demand and generation). We agree that arrangements for these units should be reviewed, particularly with respect to the direction of Europe on these types of providers and their treatment in charging regimes.

As highlighted in the consultation, the TSOs do not view it as viable to review these requirements ahead of initiating the Volume Capped procurement process (i.e. OJEU notice launch). The options are therefore that this is delayed to enable a review of network charges to take place, or that the Volume Capped procurement process takes place with a view that applicable network charges will be reviewed ahead of service delivery in 2021. Given the level of interest in the competition, and the aim of enabling service delivery by this date, we view this as the appropriate route forward.

5.3.4 TSOs' recommendation for Network Charges

The TSOs recommend the following with respect to network charges.

TSO Recommendation: Service providers will be subject to the network charges applicable to their connection.

5.4 I-SEM Interactions

5.4.1 Consultation background and proposals

It was outlined in the consultation that units with a capacity of above 10 MW will be under certain obligations within I-SEM, namely; balancing and capacity market participation. We acknowledged that if a unit was to be dispatched on in the balancing or capacity market, their availability for the provision of the System Service for which they were contracted would reduce.

The TSOs proposed that, in both cases, this conflict was for the service provider themselves to manage. In the balancing energy market, we envisaged units bidding in such a way to ensure they are not called upon, enabling them to offer high levels of service availability. This option was utilised to avoid equivalent concerns when implementing the similar EFR service in Great Britain.

We did note that were a TSO to dispatch a unit in balancing timescales for purposes other than energy provision, e.g. congestion management, such instances would not be classified as non-fulfilment of availability for the contracted services.

With respect to the Capacity Market/CRM, it was noted that it would not be possible to impede providers from competing in the Capacity Market given their obligation to do so. The TSOs did acknowledge this mandatory participation could be reviewed by the Regulatory Authorities.

Specific interactions between re-charging subsequent to events and I-SEM were also outlined. The concept of ‘trickle’ charging was discussed, as was a unit recharging more quickly by bidding in the balancing market, in order to make themselves available again after an event. If a unit positions themselves in the market successfully, the units will receive a dispatch instruction from the TSO in order to re-charge (as per standard process).

The TSOs proposed in the consultation that periods of re-charge will be counted when considering fulfilment of availability obligations.

In summary, the following proposals with respect to I-SEM interactions were outlined.

TSO Proposal: Service Providers should manage their own positions in the energy balancing and capacity markets to ensure they can fulfil the service and availability outlined in their contract.

TSO Proposal: Service providers must adjust their balancing bids to recharge after an event or may utilise their trickle recharge function (within the appropriate frequency conditions).

5.4.2 Stakeholders’ Comments

In general, respondents providing comments on this topic indicated agreement with the principle that providers should manage their own positions within other markets, but raised concerns as to whether the arrangements worked “as a coherent whole”, particularly with respect to conflicting priorities between provision of the Volume Capped services versus fulfilment of other obligations. In addition, several respondents requested clarity on the charges that providing units would be exposed to whilst in the process of service delivery and/or recharge. On both of these topics, several respondents provided suggestions with respect to arrangements in GB which may be appropriate in Ireland.

On the topic of interactions with the balancing energy market, several respondents queried how energy imbalances resulting from dispatch of DS3 System Services would be treated under the I-SEM arrangements, with a concern that providers would be subject to imbalance costs. At least 3 respondents highlighted the approach taken in GB, where an ‘Applicable Balancing Services Volume Data’ (ABSVD) methodology is used to net off from the calculation of imbalance position, any energy resulting from frequency response provision by contracted parties.

Similarly, on the topic of Capacity Market obligations, at least 5 respondents highlighted the approach taken in GB where a list of ‘Relevant Balancing Services’ is created. Respondents highlighted that this method means that service providers who are on this list will not be penalised in the case where they do not respond to a capacity event, but are compliantly providing their contracted services at this time. In addition to this point, several respondents requested clarity as to the “hierarchy” between CRM obligations and System Service delivery. In addition, at least one respondent suggested that providing units under these arrangements should be derogating from CRM obligations.

In contrast, at least one respondent indicated that, in their view, the 97% availability obligations would “not act as a barrier to...providers participating in the capacity market and taking on Reliability Obligations”.

On the topic of recharging, respondents were of the view that these arrangements should work as a cohesive whole with several queries given. One respondent indicated that they supported the TSOs' proposal on this topic, but requested clarity as to whether, if the trickle recharge function was utilised, providers would experience a reduced availability performance scalar (thus, incentivising the recharge via balancing market approach).

5.4.3 TSOs' response to stakeholder comments

The TSOs welcome the information provided relating to other markets where similar system services have been created. However it is worth emphasising that the I-SEM will have a different structure and rules to BETTA, and approaches used in GB may not be well suited to I-SEM. For example, the de-minimus value for market participation in GB meant that participants in the EFR process would generally not be obliged to participate in the energy market. This is not the case in I-SEM, where a de-minimus of 10 MW applies for energy and capacity market participation.

The TSOs do not view that a System Service contract can exclude a participant from their obligations under both the energy and capacity markets, and the costs associated with these obligations. A participant has the ability to account for an expectation of these costs (and all costs associated with their project) through the bidding process.

The TSOs note the perceived conflict in delivering in the Capacity Market and providing System Services. However service providers need only be available at times of capacity scarcity in order to fulfil their Capacity Market Obligation. Actual dispatch of a unit's energy will generally only occur where the price is greater than the unit's bid, or for a non-energy action.

Such events should be manageable within the availability requirements of the System Services contract, particularly given the annual nature of the availability calculation. Also, any units dispatched during such events would receive a comparatively high energy price which would compensate for any reduction in system service payments should this occur.

However, it should be noted that the recent SEM Committee Decision Paper 'Capacity Remuneration Mechanism (CRM) 2019/20 T-1 Capacity Auction Parameters and Enduring De-rating Methodology' SEM-18-030¹⁴ the following was outlined: "*The TSOs proposed to allow storage units to apply a decreasing tolerance (DECTOL) to their derated capacity to allow such units to respond to delivering system services to meet a system security need and therefore avoid the potential exposure to Capacity Market penalties*". In the same decision paper, the "*SEM Committee decided to introduce a decreasing tolerance (DECTOL) for storage units (applicable to both "Pumped Storage" and "Other Storage" technology classes) on a voluntary basis to help facilitate the flexibility of a storage unit to meet their obligations in the provision of system services at times of stress without being unnecessarily penalised in CRM in respect of having to pay Reliability Option difference payments*". The TSOs therefore consider that this

¹⁴ SEM Committee Decision Paper 'Capacity Remuneration Mechanism (CRM) 2019/20 T-1 Capacity Auction Parameters and Enduring De-rating Methodology' SEM-18-030
<https://www.semcommittee.com/sites/semc/files/media-files/SEM-18-030%20CRM%20T-1%20CY201920%20Parameters%20%26%20Enduring%20De-rating%20Methodology%20Decision%20Paper.pdf>

decision provides a mechanism via which providers may reduce their capacity market obligations, in order to meet their System Services availability requirements.

We are of the view that participants are in the best position to manage their energy market position for charging, and their resultant availability. Participants should be responsible for the cost of procuring energy as per I-SEM rules – to do otherwise would lead to costs being passed on to the consumer and the TSOs see no benefit in this.

Similarly, participants will be responsible for ensuring their availability to provide system services. However, should a non-energy action prevent a unit from recharging as they wished, they will be counted as available to provide services during the period covered by the non-energy action.

With regard to the 'trickle charge' concept, further reflection by the TSOs has led us to dismiss this as an option for special consideration. The mandatory nature of market participation for units above 10 MW means that all charging energy must be procured through the energy markets. While a storage unit is free to recharge slowly over an extended period, we do not recommend dispensation for such charging behaviour.

5.4.4 TSOs' recommendation for I-SEM interactions

The TSOs recommend the following with respect to capacity and energy market interactions:

TSO Recommendation: Service Providers should manage their own positions in the energy balancing and capacity markets to ensure they can fulfil the service and availability outlined in their contract. However a unit's availability will not be negatively impacted by response to a non-energy action requested by the TSO.

The TSOs recommend the following with respect to recharging:

TSO Recommendation: Service providers should manage their own market positions to ensure recharging after an event. No dispensations will be given to particular charging behaviours with respect to energy costs or service availability.

6 TSOs' Recommendations for Mechanism for evaluation of applications

6.1 Consultation background and proposals

The consultation outlined the following with respect to the mechanism by which applications will be assessed. An overall general principle for how this is undertaken was given (outlined below). It was noted that this was for the purposes of the consultation only, and was subject to change based on the final requirements of the services being procured and the procurement procedure selected.

Step 1: Application deadline: only applications received by the TSO by the set deadline will proceed to Step 2.

Step 2: Assessment of submission completeness: only applications containing required information will proceed to Step 3.

Step 3: Feasibility requirements (binary yes/no): the feasibility conditions as proposed in this document will be used to filter viable and non-viable applications. Only viable applications will proceed to Step 4.

Step 4: Viable applications will be sorted on price: individual service bid prices will be applied to a typical year to give a price per service which will be combined to give an overall price for the bundle.

Step 5: Bids compared on a price per MW basis and contracts awarded up to (and not exceeding) volume available in the first stage.

Respondents were asked the following question:

Question 11: Do you agree with the proposed mechanism for assessing applications?

6.2 Stakeholders' Comments

The majority of stakeholders who responded to this question indicated broad agreement with the proposed approach (though with multiple queries included).

A number of stakeholders, in their response to this question, had queries or comments in relation to various other aspects of the consultation, including (and not limited to) alignment with ECP-1, assessment of last tenderer, total volume amount, maximum contract size, as well as speed of response. The TSOs trust that these various issues raised by respondents are addressed in the other parts of this consultation.

In addition, several respondents indicated that these proposals needed more detail, and that a precise methodology would be needed by applicants ahead of the bidding process.

At least 3 respondents suggested that the process should be split into two parts; a qualification or pre-qualification stage, followed by submission and assessment of bids. Rationale for this proposal, where provided, was the timelines proposed would be challenging for parties as that

this would allow parties to progress by demonstrating technical capability first, followed by submission of bids. Another stakeholder indicated such an approach may offer a solution for the issue of ECP-1 connections not having connection offers in time for this procurement.

6.3 TSOs' response to stakeholders responses

We welcome the broad agreement with the proposed procurement approach and recognise that the proposal will require significantly more detail before the launch of procurement.

We take note of the proposed two stage approach by a small number of stakeholders, and will consider such a model in the development of the detailed procurement process and strategy.

With respect to publishing a final, detailed design of how the procurement process will be run, the TSOs will need to consider to final SEM Committee decision and develop this ahead of the procurement launch.

6.4 TSOs' recommendation for mechanism for evaluation of applications

The TSOs welcome feedback received on the mechanism for evaluation of applications and will further consider this feedback, along with a final SEM Committee Decision, in the development of a final assessment design.

We currently envisage that such a process will broadly mirror the proposed approach in the consultation, i.e. a process with pre-requisite requirements, with winning bids determined primarily on price. The TSOs also intend to specify tie-breaker requirements – these potentially being size of over-frequency capability and speed of response. It is appropriate that the mechanism for this, including prioritisation, is specified as part of the procurement process itself, taking into account the procurement design at large and with due consideration of the bid submission requirements.

7 Next Steps

This paper provides stakeholders with information on our recommendations in relation to the DS3 System Services Volume Capped procurement exercise. It has been submitted to the SEM Committee to inform their decision on the various elements of the design.

The SEM Committee's decision paper will set out the final decisions on the Volume Capped arrangements to be implemented by the TSOs. The SEM Committee decision on certain elements of the arrangements may differ in parts to our recommendation.

The TSOs will assess the final SEM Committee decision and develop a plan to implement the various aspects of the arrangements as soon as possible. Subsequent to this decision, a contracts consultation will be conducted, providing stakeholders with the opportunity to comment on the proposed contract for the Volume Capped arrangements.

Appendix I.

Freq Trigger	Year 2015 Data	Year 2016 Data	Year 2017 Data	Avg per year	Avg per month
49.80 Hz	59	27	31	39	3.3

Table A.1: Number of occurrences during which frequency dropped below 49.8Hz

Appendix II. Performance Event Scalar

This appendix provides an overview of the Performance Event scalar, which will be further detailed in the contract and/or protocol. Though no differences are envisaged, the design outlined in the contract/protocol will take precedence over the details listed here.

The post-event scalar P_E will be based on a Providing Unit's response to a Performance Incident. In the Volume Uncapped arrangements at present, a unit gets a Performance scalar of 0 if it completely fails an event (as P_E will be 0). We would propose that this remains the same for the Volume Capped arrangements.

This performance scalar is calculated as follows:

$$P_E = \text{MAX} (1 - \text{SUM} (K_m * V_m)_i, 0)$$

There are two core elements:

- a) The Dynamic Time Scaling Factor (V_m); and
- b) The Scaling Factor (K_m)

The **Dynamic Time Scaling Factor (V_m)** is calculated based on the time difference between the month in which Performance Incidents occurred and the Scalar Assessment Month in which the Performance Incident Response Factor is being calculated (i.e. how many months before the Scalar Assessment Month did the Performance Incidents occur). Table A.2 below provides an overview of how this is applied.

Number of Months between Performance Incident Month and Scalar Assessment Month 'M'	Dynamic Time Scaling Factor 'V _m '
1	1
2	0.8
3	0.6
4	0.4
5	0.2
6+	0

Table A.2: Calculation of Dynamic Time Scaling Factor

The **Monthly Scaling Factor (K_m)** is calculated using the outcomes of all applicable Performance Assessments undertaken within each calendar month.

$$K_m = \text{AVERAGE} (Q_{im})$$

Where;

m = Month within which the Performance Incidents occurred

i = the Performance Incident number for that month (e.g. Event 1, 2, 3 etc)

Q = the Performance Incident Scaling Factor as calculated in line with Section 5.6 of this document.

The **Performance Incident Scaling Factor (Q_i)** is calculated based on the Providing Unit's response in line with the Performance Assessment methodologies which are outlined in the protocol document where significant further detail is provided.

At a high level, **Q_i is calculated as follows for POR-TOR2** (e.g. for POR):

for each Frequency Event, where the following holds true;

- a) the Expected POR Response (inclusive of the POR Inertia Credit) minus the greater of 10% of the Expected POR Response or 1 MW is greater than or equal to 0 MW; and
- b) The Expected POR Response (exclusive of the POR Inertia Credit) is greater than 0 MW

Then the Performance Incident Scaling Factor 'Q_i' is then calculated as follows;

i) If the Expected POR Response minus the Achieved POR Response is less than or equal to 1 MW, Then Q_i = 0,

ii) Otherwise;

Let S = Achieved POR Response / Expected POR Response

$$\text{If } S \geq 0.9, Q_i = 0,$$

If $S \leq 0.7$, $Q_i = 1$

Otherwise, $Q_i = (0.9 - S) * 5$

In summary, this results in a Providing Unit being awarded a Pass should it achieve greater or equal to 90% of its Expected POR response, a Fail if it achieves less than or equal to 70% and a Partial Pass in between

Q_i is calculated similarly for FFR but with two S factors existing:

$S_1 = \text{Achieved FFR Response at a point in time} / \text{Expected POR Response at a point in time}$

S_2 is determined for each sample point during the FFR Period and compared to the Achieved FFR. If the Achieved FFR is less than the Expected FFR, the deficit is summated for all sample points and an average deficit produced.

$S_2 = \text{Achieved FFR Response over FFR period} / \text{Expected FFR Response over FFR period}$

The Performance Incident Scaling Factor, Q_i , is calculated as follows:

$S = S_1 (0.8) + S_2 (0.2)$

If $S \geq 0.9$, $Q_i = 0$,

If $S \leq 0.8$, $Q_i = 1$,

Otherwise, $Q_i = (0.9 - S) * 10$

In summary, this results in a Providing Unit being awarded a Pass should the combined 'point in time measure' and 'response over a period measure', achieve greater or equal to 90% of its Expected POR response, or a Fail if it achieves less than or equal to 80% and a Partial Pass in between.