DS3 System Services Contracts for Regulated Arrangements RECOMMENDATIONS PAPER

DS3 System Services Implementation Project

12 December 2017



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1 Introduction and Background

1.1 EirGrid and SONI

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

We have a responsibility to enable increased levels of renewable sources to generate on the power system while continuing to ensure that the system operates securely and efficiently. In 2010, we published the results of the *All Island TSO Facilitation of Renewables studies*¹. Those studies identified a metric, the System Non-Synchronous Penetration (SNSP), as a proxy for the capability to operate the power system safely, securely and efficiently with high levels of renewable generation. SNSP is a real-time measure of the percentage of generation that comes from non-synchronous² sources, such as wind generation, relative to the system demand.

The studies identified 50% as the maximum level of non-synchronous infeeds allowable on the power system until solutions could be found to the various technical challenges identified. Should this limit not be increased out to 2020, the curtailment of generation from installed wind could rise to over 25% per annum³.

1.2 The DS3 Programme

Our Delivering a Secure Sustainable Electricity System (DS3) programme seeks to address the challenges of increasing the allowable SNSP up to 75% by 2020, whereby the curtailment of wind would be reduced to approximately 5% per annum. Operating in this manner should deliver significant savings to consumers through lower wholesale energy prices.

¹ Al- Island TSO Facilitation of Renewables studies - <u>http://www.eirgridgroup.com/site-</u> <u>files/library/EirGrid/Facilitation-of-Renewables-Report.pdf</u>

² Non-synchronous infeeds (generator output or High Voltage Direct Current (HVDC) imports) inject power into the electrical grid via power electronics. Power electronics are used to convert the injected current to match the frequency of the transmission network.

³ DS3: System Services Consultation Finance Arrangements – <u>http://www.eirgridgroup.com/site-files/library/EirGrid/System-Services-Consultation-Financial-Arrangements-December_2012.pdf</u>

DS3 incorporates mutually reinforcing innovative technical, engineering, economic and regulatory initiatives. It is divided into three pillars:

- System Performance
- System Policies
- System Tools

DS3 is not only making the operational changes necessary to manage higher levels of renewable generation, but is also aiming to evolve the wider electricity industry and implement changes that benefit the end consumer. From the onset, the integration of wind generation presented a range of challenges previously unseen in the power sector. Through collaboration with the Regulatory Authorities and the wider electricity industry, DS3 has developed a number of innovative and progressive solutions.

The results of the programme are now beginning to deliver benefits to the consumer. In recent months the maximum SNSP level allowable has been increased to 60%, following the successful conclusion of a 60% SNSP operational trial. It is expected that similar trials will be conducted in the coming years with a view to achieving the overall goal of a maximum 75% SNSP limit by 2020.

1.3 DS3 System Services Process

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

In December 2014, the SEM Committee published a decision paper on the high-level design for the procurement of DS3 System Services (SEM-14-108)⁴.

The SEM Committee's decision paper aims to achieve the following:

- Provide a framework for the introduction of a competitive mechanism for system services procurement;
- Provide certainty for the renewables industry that the regulatory structures and regulatory decisions are in place to secure the procurement of the required volumes of system services;

⁴ DS3 System Services Procurement Design and Emerging Thinking Decision Paper (SEM-14-108): <u>http://www.semcommittee.eu/GetAttachment.aspx?id=c0f2659b-5d38-4e45-bac0-dd5d92cda150</u>

- Provide certainty to new providers of system services that the defined procurement framework delivers a mechanism against which significant investments can be financed;
- Provide clarity to existing providers of system services that they will receive appropriate remuneration for the services which they provide;
- Provide clarity to the TSOs that the required system services can be procured from 2016 onwards in order to maintain the secure operation of the system as the level of renewables increases;
- Provide clarity to the Governments in Ireland and Northern Ireland (and indeed the European Commission) that appropriate structures are in place to assist in the delivery of the 2020 renewables targets;
- Ensure that Article 16 of Directive 2009/EC/28 is being effectively implemented (duty to minimise curtailment of renewable electricity);
- Provide assurance to consumers that savings in the cost of wholesale electricity, which can be delivered through higher levels of renewables on the electricity system, can be harnessed for the benefit of consumers;
- Provide assurance to consumers that they will not pay more through system services than the benefit accrued from System Marginal Price (SMP) savings arising from higher levels of marginally low cost renewable generation⁵.

1.4 Overview of System Services

EirGrid and SONI have licence 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 system services (POR, SOR, TOR1, TOR2, SSRP, RRS, and RRD) procured under the Harmonised Ancillary Services (HAS) arrangements.

New system services are required to support a move to higher levels of nonsynchronous generation. Four new services (SIR, RM1, RM3, and RM8) were introduced from 1 October 2016 following the commencement of the new DS3 System Services arrangements. These 4 services, together with the former 7 services are

⁵ Note that the composition of the price that will be paid by end consumers for wholesale electricity will change significantly following the introduction of the I-SEM trading arrangements. The savings delivered by DS3 will be split across the imbalance settlement, balancing costs, the price in the ex-ante markets and the Capacity Remuneration Mechanism.

referred to herein as the '11 existing services'. A further 3 services (FFR, DRR, FPFAPR), referred to herein as the '3 new services', will be introduced in 2018. All services are required to maintain the resilience of the power system as the SNSP levels increase. Table 1 provides a high-level summary of the DS3 System Services.

The Grid Codes do not oblige service providers to deliver the new system services. However through the DS3 System Services arrangements, the standards to which service providers will offer these on a commercial basis are being developed. This will necessitate a consideration of a range of issues including standards, performance monitoring and settlement issues.

Table 1: Summary of DS3 System Services⁶

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 2 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 MM/ output that can be delivered with a good
Ramping Margin 3	RM3	MWh	degree of certainty for the given time horizon.
Ramping Margin 8	RM8	MWh	
Fast Post Fault Active Power Recovery	FPFAPR	MWh	Active power (MW) >90% within 250 ms 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

⁶ Further detail on the DS3 System Services can be found at: <u>http://www.eirgridgroup.com/how-the-grid-works/ds3-programme/</u>

1.5 Enduring Arrangements

In its SEM-14-108 decision paper, the SEM Committee decided that the implementation of the DS3 System Services arrangements would be divided into two stages. The enduring arrangements will deliver competitive procurement, where appropriate, for the 14 system services. A tariff will be applied to services where there is insufficient competition.

Prior to the implementation of the enduring arrangements, the TSOs will contract for services with all eligible providers, who will be paid at a rate, approved by the Regulatory Authorities, for the volume of services they are able to deliver in each trading period.

Under both arrangements, potential providers are required to participate in a procurement exercise.

In October 2016, the TSOs completed the procurement of 11 system services (including four new services) resulting in 107 Providing Units being added to separate Interim Arrangements Framework Agreements in Ireland and Northern Ireland.

On 23 March 2017, the SEM Committee published an information paper on the DS3 System Services Future Programme Approach⁷. This paper set out the SEM Committee's approach to the completion of the delivery and implementation of the new System Services arrangements as set out in the High Level Design (SEM-14-108). The SEM Committee's approach took into account the experience of the Interim Arrangements, responses to the public consultations on the various elements of the detailed design, developments with the EU Electricity Balancing Guideline and the recent I-SEM Stocktake.

In its paper, the SEM Committee set out its view that:

The 107 existing Interim Framework Agreements for the 11 existing services, due to end in October 2017, would be extended until the end of April 2018 – note that procurement regulations mean that during this period no new entrants will be allowed onto the framework nor will existing providers be able to increase their contracted volumes – in order to facilitate learnings from the Qualification Trial Process to be integrated into the enduring Regulated Arrangements, and in order to facilitate the introduction of a new panel-based procurement process;

⁷ SEM Committee Information Paper on DS3 System Services Future Programme Approach: <u>https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-17-</u> 017%20DS3%20System%20Services%20Future%20Approach%20Information%20Paper.pdf

- The TSOs would run a Regulated Tariff procurement process in Q4 2017 for the 11 existing services to enable new contracts to be executed on 1 May 2018. Note that these arrangements will be open to a wider range of service providers; and
- The TSOs will run a further Regulated Tariff procurement process for the 3 new services, with a contract execution date of 1 September 2018⁸;
- The Regulatory Authorities will review the options for competitive procurement for enduring implementation in the coming years. This initial investigative work on competitive procurement options started in Q1 2017.

1.6 Transition to New Technologies

Given that system services should be procured in an efficient manner, system services should only be paid for where delivery and quality of performance can be measured. Therefore, there is a need to establish reliable methods for measuring the quality of service provision for all 14 services.

Over many years of proven experience, confidence has been built in traditional power system technologies, such as conventional synchronous generation. While the deployment of new technologies through the DS3 System Services enduring arrangements is intended to reduce total costs and facilitate the delivery of public policy objectives, the TSOs need to be confident that the deployment of new technologies will not inadvertently undermine the resilience and security of the power system. As TSOs, we have a duty to maintain system stability and avoid loss of supply. We therefore need to take steps to identify the associated risks, obtain information about the capability of new types of service providers and manage this transition in a prudent fashion.

The Interim Arrangements have provided an opportunity to establish the mechanisms by which the characteristics of new technologies can become "Proven" and "Measureable" for the widest range of non-energy system service providers possible.

A Qualification Trial Process ran from 1 March 2017 to 31 August 2017 with the aim of giving technologies that have not previously provided system services, on a system with similar characteristics to that of the all-island system, an opportunity to demonstrate their capabilities. It is also necessary to measure the quality of provision

⁸ The TSOs informed the SEM Committee of the necessity to stagger the introduction of the 3 new services (FFR, FPFAPR and DRR). This longer implementation timeline will allow for learnings from the Qualification Trial Process to be integrated into the arrangements, and also allows for the TSOs to develop the appropriate contractual definitions for technical product delivery, product response criteria, and settlement and performance monitoring system requirements for these services.

of "fast" services (FFR, FPFAPR, DRR) when these are procured in 2018. As part of the Qualification Trial Process, "measurability" aspects were also explored.

A total of 12 contracts were executed covering 15 trials.

The Qualification Trial Process is the mechanism by which new, as of yet unproven, technology classes can ultimately gain access to DS3 System Services contracts in future central procurement processes.

The learnings gained from the Qualification Trial Process have been finalised and published in the DS3 System Services Qualification Trials Process Outcomes and Learnings 2017 report.⁹

The trials conducted during 2017 aimed to identify operational complexities associated with new technologies or services, develop understanding of these, and suggest solutions on how to integrate these technologies into our processes and systems.

The report lists technologies which may be deemed proven to provide certain DS3 System Services by virtue of the trial outcomes. This "proven list" is a subset of a larger DS3 System Services Proven Technologies List which will be published as part of the DS3 System Services Regulated Arrangements procurement.

1.7 Purpose of Document

In this paper we are presenting our recommendation on the appropriate contractual arrangements for the 14 DS3 System Services for the Regulated Arrangements.

In September 2017, we issued a paper for consultation on the draft regulated contracts for DS3 System Services. The document provided stakeholders with information about our proposals and a guide to the consultation process.

As noted in the consultation paper, at the time of publication, TSO recommendations and SEMC decisions on the DS3 System Services Enduring Tariffs and DS3 System Services Enduring Scalar Design had not yet been issued, both of which impacted on a number of the areas in the consultation paper (e.g. proposed term of contract and scalar values). Subsequent to the issue of the consultation, the SEM Committee published its decision on DS3 System Services Tariffs and Scalars (SEM-17-080). The decisions and associated contract drafting in this paper are reflective of SEM-17-080.

⁹ DS3 System Services Qualification Trials Process Outcomes and Learnings 2017 paper: <u>http://www.eirgridgroup.com/site-files/library/EirGrid/DS3-System-Services-Qualification-Trials-Process-Outcomes-and-Learnings-2017.pdf</u>

The Regulated arrangements for DS3 System Services will be in place from 1 May 2018, with lengths of contract terms as specified in SEM Committee Decision SEM-17-080. As per the SEMC decision, the Regulated Arrangements will be in place until 2026, although shorter contract terms with associated termination provisions will be enacted in some phases of procurement, as detailed in Section 4.

For the Regulated Arrangements, the DS3 System Services Interim Framework Agreements will be replaced by a Qualification System and Contracts. While separate Agreements will apply for Northern Ireland and Ireland, arrangements will be aligned in so far as possible.

2 Summary of Recommendations

In light of stakeholder feedback and in accordance with the decisions outlined in SEM-17-080, below is a summary of the key recommendations set out in this paper.

- The DS3 System Services Regulated Arrangements will comprise two procurements, namely Volume Uncapped and Volume Capped (both of which are further defined in this document)
- The term of Volume Uncapped contracts will be a maximum of 5 years. The TSOs will have a right to terminate the contracts with one year's notice.
- The term of Volume Capped contracts will be up to 6 years. A further consultation will be held on the Volume Capped contracts in January 2018.
- Options for a 4 month "Transition Period" were noted in the consultation paper. In light of the expenditure control provisions of SEM-17-080 (i.e. tariff reviews), Option 2 will be implemented i.e. allow unrestricted entry of new high availability units for all services but providing, in the procurement's terms and conditions, for conditional adjustment of tariff rates for all service providers.
- In light of industry concerns in relation to the proposed "bundling" of FFR to TOR2 services, proposals in relation to service bundling will be further consulted on as part of the Volume Capped contract consultation.
- In relation to the implementation of Market Position vs. Physical Dispatch, the TSOs will work with the Regulatory Authorities to develop the payment rules ahead of I-SEM go-live on 23 May 2018. The TSOs will conduct a resettlement exercise (accounting for the impact of the market position) that will cover the period back to 1 June 2018 following implementation of the rules in the TSO settlement system.
- In line with SEM-17-080, the contractual arrangements provide for potential tariff changes, subject to industry consultation and approval from the Regulatory Authorities, in certain scenarios.
- The terms of governance of the Protocol document will be amended so that all
 potential proposed changes to the Protocol document will be consulted on
 with industry and must be approved by the Regulatory Authorities. The
 governance will also be amended to allow changes to the Protocol document
 a maximum of once every three months, where the calendar for change will
 no longer be tied to specific months.
- The Protocol document will be utilised to define the performance monitoring processes and methodologies and operational requirements for the duration of the Regulated Arrangements. In addition, in accordance with the SEM Committee contractual principles, the values of the Temporal Scarcity Scalars will be specified in the Protocol.
- The evaluation of the availability forecasts for the provision of reserve and ramping margin services will not be implemented until at least one year

following the commencement of the Regulated Arrangements. The TSOs will consult further on this measure, with the finalised design subject to approval by the Regulatory Authorities.

- The product scalar for the enhanced delivery of FFR will incentivise the desired behaviours in the provision of the service by Providing Units with dynamic and static capability.
- A frequency response curve applicable to dynamic capability and a curve applicable to static capability for the provision of FFR will be implemented for the Regulated Arrangements.
- The performance assessment of the FFR service will evaluate a Providing Unit's response to a frequency event against its expected response. The initial response of the Providing Unit at its required response time will be weighted more heavily than its maintained response for the duration of the FFR timeframe.

3 Responses to DS3 System Services Contracts Consultation

In total, twenty-two responses to the consultation were received from stakeholders. Five of the twenty-two stakeholders submitted confidential responses. The following stakeholders submitted non-confidential responses:

- AES
- Bord Gáis Energy
- Bord na Móna Powergen
- Brookfield
- Demand Response Aggregators of Ireland
- Electricity Exchange
- Endeco
- Enercon
- EnerNoc
- Energia
- Empower Generation Ltd
- ESB GWM
- PowerNI PPB
- Tynagh Energy Ltd.
- IWEA
- RES Ltd

• SSE

The views of respondents have been summarised and addressed in this paper. In keeping with previous DS3 System Services consultation papers, all non-confidential responses have been published alongside this recommendations paper. In addition, all responses (including confidential responses) were shared with the Regulatory Authorities.

4 Overview of Procurement Process

In the Consultation on DS3 System Services Contracts for Regulated Arrangements, an overview was provided of the proposed procurement process. Following the publication of SEM-17-080, the process has been amended to reflect these decisions. The sections below summarise the updated procurement process.

As previously noted in the consultation paper, further consultation will be required on the "Volume Capped" contracts. It is intended to hold this consultation in January 2018.

The contractual arrangements agreed and published as part of this Recommendations Paper reflect the "Volume Uncapped" contracts only, as do all references to the drafting of contract clauses. However, a high-level overview of the proposed Volume Capped procurement process is provided, amended in light of SEM Committee Decision SEM-17-080, noting that the Volume Capped arrangements will be subject to further consultation.

4.1 Volume Uncapped and Volume Capped Procurement

In the succeeding sections, the terms Volume Uncapped and Volume Capped are used to describe two procurement processes. A definition of the terms is given below.

Volume Uncapped procurement: refers to procurement which does not volume limit any of the 14 DS3 System Services being procured and to which regulated tariffs will apply.

Volume Capped procurement: refers to procurement for which an upper limit will be applied to the volume of relevant DS3 System Services being procured and for which prospective service providers will offer a competitive price as part of their tender. Volume Capped procurement will apply to Providing Units for a subset of the 14 DS3 System Services.

In the consultation paper, it was proposed that Volume Capped procurement would apply to high availability Providing Units whose availability is not linked to energy market dispatch for a subset of system services.

However, there will be no distinction in relation to the classification of Providing Units as high availability in terms of entry to the Volume Uncapped procurement process.

In accordance with SEM-17-080 and the SEM Committee contractual principles, expenditure risk for the Volume Uncapped procurement, will be managed via tariff reviews and scarcity scalar value reviews where appropriate. In addition, the TSOs may close off any of the DS3 System Services Regulated Arrangements procurement Lots to future entry at any stage during the lifetime of the Qualification System.

4.2 Outline of proposed procurement process for Regulated Arrangements

- The proposed procurement process includes both a regulated tariff procurement (detailed in subsequent sections and hereafter known as "Volume Uncapped" procurement) and a competitive procurement (detailed in subsequent sections and hereafter known as "Volume Capped" procurement).
- Notice of the next procurement (Volume Uncapped) is intended to be issued on December 12 2017 with contract execution on May 1 2018. (Phase 1 of Regulated Arrangements procurement).
- Phase 1 of the procurement will be for the existing 11 services that have previously been procured under the Interim Arrangements. However, it will be open to a broader range of technologies, as more technologies will have proven themselves capable of providing system services in the Qualification Trials Process (QTP).¹⁰ In addition, there are changes to some of the terms and conditions for payment relative to the Interim Arrangements for each DS3 System Service reflected by the addition of more scalars to the contractual terms.
- In the Interim Arrangements, every Providing Unit which qualified under the procurement process and subsequently accepted a contract, signed up to a framework agreement. For the Regulated Arrangements a Qualification System and contracts (rather than a framework agreement structure) will be used for the Volume Uncapped procurement.
- An all-island procurement process will be used for the Regulated Arrangements. Providing Units in Ireland will contract with EirGrid and Providing Units in Northern Ireland will contract with SONI. The terms and conditions will be identical for both contracts (save slight differences in definitions arising from jurisdictional differences in the Grid Code etc.).
- For the Volume Uncapped procurement, all Providing Units will have the same terms and conditions (unless there are subsequent rule modifications for certain new entrants as allowed for in the rules of the Qualification System subject to Regulatory Authority approval). Subject to their technical capability, Providing Units will qualify for different levels or "volumes" of service provision. These will be captured by a number of technical parameters, the values of which will be unique to each Providing Unit, in one of the schedules of the contract (Schedule 9).

¹⁰ The QTP is a process which ran from March 2017 to September 2017 for both existing and new Service Providers to prove their technical capability to provide a subset of System Services. The trials measured both the capability of new technologies to provide System Services and the capability of all technologies to be measured providing the 3 system services that have not been procured under the interim arrangements (FFR, FPFAPR and DRR).

- For the Volume Uncapped procurement, notice of procurement for the remaining 3 fast-acting services (FFR, FPFAPR and DRR) will be issued on March 30 2018, with contract execution on September 1 2018. (Phase 2 of Regulated Arrangements procurement).
- For the Volume Uncapped procurement, the Qualification System will be refreshed periodically and new entrants invited to apply. The contract execution date for the first refresh will be in March 2019 for all 14 DS3 System Services and there will be a refresh every six months thereafter. In addition, Providing Units already on the Qualification System may apply to change their contracted parameters at that time.

4.3 Use of Qualification System and Contracts

It is intended to use a Qualification System and associated contracts for the Volume Uncapped procurement rather than the framework agreement structure that was used for the Interim Arrangements to increase the level of flexibility in the procurement process and to reduce administration where possible. The Qualification System will be open to aspiring entrants under a gated process, which enables all qualified applicants to become successful contractors at the specified times.

In the Volume Uncapped procurement, aspiring entrants will be invited to apply to join the Qualification System during specified intervals, initially six months after the first procurement of the 3 new services (i.e. with first refresh contract execution date at end March 2019) and at six monthly intervals thereafter. In addition, Providing Units already qualified and holding DS3 System Services contracts under the Regulated Arrangements may apply to change their contracted parameters when the Qualification System is refreshed. The length of the six month window will be subject to review.

EirGrid and SONI will issue a notice that the Qualification System is open for new applicants/revised contracted values in advance of the 6-month milestone. If an applicant is rejected by virtue of failing to meet the procurement criteria, it can reapply during the next or subsequent gates.

The term of the Qualification System will be of indefinite duration, thus allowing it to remain in place until competitive arrangements (e.g. auctions) are implemented for DS3 System Services. However, in accordance with SEM-17-080, the term of the contracts for the Volume Uncapped arrangements will have a maximum duration of 5 years (i.e. end date 30 April 2023). The Volume Uncapped contract allows for an extension of the 5 year term, should the SEM Committee decide to extend the arrangements. The term of the contracts for the Volume Capped arrangements will be up to 6 years.

Any updated Qualification System notice, will be published as and when required, outlining any changes to the Terms and Conditions and/or scope of contracts to be awarded. While it is not intended to substantively change Terms and Conditions, there are possible changes which EirGrid and SONI may want to make to the Qualification System rules during its lifetime. The frequency of publication is anticipated to occur every 6 months, which may or may not involve updates to the Qualification System.

4.4 Volume Uncapped and Volume Capped Procurement Timelines

As noted in the previous sections, the Regulated Arrangements procurement will be divided into two types:

1. Volume Uncapped

and

2. Volume Capped

The timeline for procurement is illustrated in Figure 1.

The top section of the diagram (shaded in blue) outlines the proposed procurement timetable for the Volume Uncapped procurement, while the lower section of the figure (shaded in pink) illustrates the proposed procurement timetable for the Volume Capped procurement.



Figure 1: Overview of Volume Uncapped and Volume Capped Procurement Processes

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4.5 Volume Uncapped Procurement

The **Volume Uncapped Procurement** will operate in a similar manner to the Interim Arrangements procurement. An OJEU notice will issue on December 12 2017 inviting applications to the process. All service providers who pass technical qualification will receive a contract on the nominated dates and for the stated timeline in respect of the service(s) for which they have qualified. Providing Units will only tender based on their proposed technical solution and not on price, as a regulated tariff rate will be paid for the provision of each service.

The procurement will take place in two phases. Phase 1 of the procurement will be for the existing 11 services that have previously been procured under the Interim Arrangements. However, it will be open to a broader range of technologies, as more technologies will have proven themselves capable of providing system services in the Qualification Trials Process (QTP).

In addition, changes have been made to some of the terms and conditions for payment for each system service relative to the Interim Arrangements, for example the addition of more scalars to the contractual terms. Phase 2 of Regulated Arrangements procurement will begin on March 30 2018 with the issue of a notice of procurement for the remaining 3 fast-acting services (FFR, FPFAPR and DRR). Phase 2 contract execution will be on September 1 2018.

The Volume Uncapped contracts set out the terms and conditions under which providers are paid. The contracts will not mandate minimum service availability levels from providers. Instead, a service provider will be paid for the service whenever the service provider makes the service available.

Term: In line with the SEM Committee decision, these contracts will run for a maximum term of 5 years i.e. with an end date of 30 April 2023 (with the possibility of extension at the TSOs' discretion subject to SEM Committee approval), after which time they will be replaced by competitive arrangements, as decided by the SEM Committee.

Termination: The contract for the provision of one or more system services may be terminated by EirGrid or SONI (as applicable) with one year's notice (in addition to the standard termination clauses).

The Volume Uncapped Regulated Arrangements for DS3 System Services will be in place from 1 May 2018. Under the Regulated Arrangements, service providers who meet the requisite qualification criteria will be added to the Qualification System and may be awarded either an EirGrid or SONI contract in respect of their Providing Units, as applicable. Figure 2 provides an overview of the procurement process for Volume Uncapped procurement.



Figure 2: Overview of Procurement Process for Volume Uncapped Procurement

4.6 Volume Capped Procurement

As per the SEM Committee Decision (SEM-17-080), there will be a further consultation on the Volume Capped contracts in January 2018 and the Volume Capped arrangements will be determined following the consultation. The TSOs envisage that the arrangements may broadly align with the description below.

Volume Capped Procurement will apply to a subset of the DS3 System Services, namely FFR, POR, SOR, TOR1 and TOR2.

In the Volume Capped procurement, there will be an upper limit on the volume of each service for which contracts are awarded and Service Providers will need to submit a competitive price as part of their tender. Volume Capped procurement

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will follow the same timeline as Volume Uncapped procurement Phase 2 (i.e. it will begin on March 30 2018 with the issue of a notice of procurement for the FFR, POR, SOR, TOR1 and TOR2 services and contract execution will be on September 1 2018.)

Minimum length guaranteed term contracts of up to 6 years' duration will be awarded for a subset of DS3 System Services (proposed to be the FFR, POR, SOR, TOR1 and TOR2 services) under the Volume Capped procurement. Specific volumes may be allocated for differing technical grades of service provision (i.e. specific volumes of dynamic and static response corresponding to system requirements). Contracts will be awarded based both on technical qualification and competitive price.

The terms and conditions of these contracts will differ from the Volume Uncapped DS3 System Services contracts and will require further development and consultation (January 2018). They are intended to provide contractual arrangements for aspiring entrants, allowing time for a build phase before service provision commences.

A Service Provider will not be able to simultaneously hold Volume Uncapped and Volume Capped contracts for the same DS3 System Service.

Contract award would be on September 1 2018 but successful Providing Units would have a period of time (e.g. two years) to satisfy the criteria for service provision (which in the case of new entrants will mean that they will need to be operational and capable of service provision by that date). A Providing Unit's contract term will commence on the date of its first service provision.

Term: In line with SEM-17-080, it is proposed that Volume Capped contracts will have a guaranteed minimum term of up to 6 years commencing on the date of first service provision.

Termination: It is proposed that neither EirGrid nor SONI (as applicable) would have the right to unilaterally terminate this contract.

4.7 Bundling of Volume Capped Services

While not explicitly stated in the consultation paper or in the DS3 System Services Tariffs for Regulated Arrangements Recommendations paper, at the DS3 System Services Industry Forum of 12 October 2017, the TSOs outlined that for the Volume Capped procurement the TSOs would require Providing Units to provide all 5 DS3 System Services (FFR, POR, SOR, TOR1 and TOR2) and all to the same contracted volume level i.e. if, for example, a unit is providing availability of FFR up to a 1MW volume, it would have to commit to providing availability of POR,SOR,TOR1 and TOR2 up to the same 1MW level.

This requirement is to ensure the continued safe, secure, reliable operation of the power system. In SEM-17-080, the SEM Committee directed the TSOs "to consider the appropriate sub set of services to be covered in the fixed contracts, and the appropriate terms and conditions to facilitate the relevant technologies in the competitive procurement process". Therefore the requirements in relation to bundling of services will be consulted on as part of the Volume Capped contract consultation.

4.8 Treatment of High Availability Units

The direction by SEM Committee¹¹ (SEM-14-108) is that payments for DS3 System Services will be on an "availability" basis and that this should be interpreted as payment based on "technical realisability".

This means that some types of service providers could be available and eligible for payments for every hour of the year assuming they are not forced out or scheduled out for maintenance, even if the service is not required from those providers for all of these hours. The scale of overall payments will therefore increasingly depend on the portfolio of service providers and the expected availability of individual service providers.

The recent SEM Committee decision (SEM-17-080) directed that the risk of overexpenditure arising from over-investment in high availability technologies should be managed through the procurement process.

To manage this potential expenditure risk, it was proposed in the consultation paper that Volume Capped procurement would apply to high availability Providing Units whose availability is not linked to energy market dispatch for a subset of system services.

However, there will be no distinction in relation to classification of Providing Units as high availability in terms of entry to the Volume Uncapped procurement process and in accordance with SEM-17-080, expenditure risk in the Volume Uncapped procurement will instead be managed by the SEM Committee via tariff reviews where appropriate. In addition, the TSOs may close off any of the DS3 System Services Regulated Arrangements Lots to future entry at any stage during the lifetime of the Qualification System.

¹¹ SEM Committee DS3 System Services Procurement Design and Emerging Thinking Decision Paper: https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-14-108%20DS3%20System%20Services%20Decision%20Paper.pdf

4.9 Industry Feedback

Some concerns in relation to the procurement proposals were expressed by industry stakeholders, most notably by Demand Side Units. A more extensive summary of industry comments is contained in the appendix of this paper. The DSUs' concerns can be broadly summarised as follows:

- "Bundling" of services: The requirement to provide fixed levels of all five services would limit a DSU to contract based on its FFR capability thereby reducing the overall volumes that DSUs could commit to DS3 System Services participation.
- Mandatory availability requirements: The high availability obligation would mean that DSUs will need to contract based on their lowest projected availability over the 6 year term of the contract.
- Inability to adjust contractual volumes: The nature of the DSU industry is such that individual DSUs are constantly in a state of flux with Individual Demand Sites (IDSs) being added/removed. This makes it challenging for a DSU to commit to providing a certain contractual volume for an extended period of time.

More generally, a number of industry stakeholders queried the inclusion of TOR2 as a mandatory requirement given that it is classified as a "dispatched" service as opposed to an automatic response service. Similarly, some windfarms with emulated inertia capability have queried how it will be possible for them to contract for DS3 System Services if they only have the capability to provide a subset of the five services e.g. FFR and POR.

The TSOs believe that the recommendations in relation to the procurement process presented in this paper address these concerns.

4.10 Transition Period

In the consultation paper, the TSOs noted that, according to the proposals there would be a period between when the Interim Arrangements end (May 1 2018) and the Volume Capped contracts commence (September 1 2018) during which there would be a transition period for high availability Providing Units providing the expenditure risk services POR, SOR, TOR1 and TOR2. Options were presented to ensure that expenditure would be managed during this 4-month transition period.

They included:

- 1. Limiting the number of services for which new high availability units can contract.
- 2. Allow unrestricted entry of new high availability units for all services but providing, in the procurement's terms and conditions, for conditional adjustment of tariff rates for all service providers.
- 3. Moving the proposed procurement dates.

In SEM-17-080 the SEM Committee noted that it would issue a decision in relation to the transition arrangements for high availability Providing Units following industry response to the Regulated Contracts consultation.

The SEM-17-080 decision provided for tariff reviews, which aligns with Option 2 of the Transition Period options, i.e. allowing unrestricted entry of new high availability units for all services but providing, in the procurement's terms and conditions, for conditional adjustment of tariff rates for all service providers. As high availability units are eligible to apply for all services for which they qualify in the Volume Uncapped procurement, Option 2 is effectively being implemented.

4.11 Tariff and Temporal Scarcity Scalar Reviews

As noted in the preceding section, in line with SEM-17-080 and the SEM Committee contractual principles, the contractual arrangements provide for potential tariff changes and/or changes to the temporal scarcity scalar values, subject to industry consultation and approval from the Regulatory Authorities, in scenarios in circumstances including, but not limited to:

- where the TSO expects the expenditure cap to be breached;
- where the volume which is procured exceeds that which the TSO requires to operate the system at 75% SNSP;
- where the TSO has not procured the volume necessary to maintain stability of the system at 75% SNSP; or,
- where unintended consequences of tariff design emerge post DS3 System Services Phase 1 Go-Live or DS3 System Services Phase 2 Go-Live.

These scenarios are provided for in Section 4.1.2 of the DS3 System Services Regulated Arrangements Agreement.

For the purpose of the tariff review, the Expenditure Cap means the upper level of expenditure set by the SEM Committee for DS3 System Services for the

relevant tariff year and is defined in the DS3 System Services Agreement as such.

4.12 Market versus Physical Dispatch Position

The SEM Committee decision on the DS3 System Services procurement design provided the following direction with regard to determining the amount that a system service provider should be paid in any given trading period: "*The SEM Committee has decided that a provider with a system services contract will be paid for the volume of the service that has actually provided or made available in that trading period to the TSO regardless of the TSO's real-time requirement for that service. The higher of a unit's market position or physical dispatch will be used to determine the available volume.*"

Implementation of the proposed payment arrangements by the TSOs requires consideration of a broad set of issues including the different nature of the 14 services, I-SEM/DS3 System Services interactions, and settlement calculation design. In addition, in line with SEM-17-080, this may include consideration of the payment rules for "constrained-on" Providing Units.

Figure 3 shows the TSOs' recommended high-level plan of action for development and implementation of the proposed new payment arrangements.

May 2018 TSOs and RAs finalise payment rules ahead of I-SEM go-live Relevant Information tracked and collated – TSO obligation to settle on new rules applies Date TBD (≥ June 2019) Resettlement back to 1 June 2018 to account for impact of market position

Figure 3: High-level plan for implementation of the payment ruleset

As noted in the consultation paper, the TSOs will work with the Regulatory Authorities to develop the payment rules ahead of I-SEM go-live on 23 May 2018. It is intended that market participants will know the final payment rules ahead of I-SEM go-live and will

therefore be in a position to reflect the impact of these rules when formulating their energy bids.

Once the ruleset is finalised, the TSOs recommend that it be applied from 1 June 2018. From this date onwards, the TSOs will endeavour to track and collate all of the relevant information needed to implement the ruleset. The date chosen is 1 June 2018 as opposed to 23 May 2018 as it is not possible to deliver such a major change to settlement mid-month. (Settlement is conducted on a calendar month basis). In accordance with the contractual principles set out by the SEM Committee, the ruleset may be subject to future change.

Given the time required to deliver the IT Project necessary to facilitate settlement under the new rules, the TSOs propose to conduct a re-settlement exercise (accounting for the impact of the market position) that will cover the period back to 1 June 2018 following completion of the IT project. This resettlement exercise is not expected to occur before June 2019.

Provisions for this have been included in the DS3 System Services Regulated Arrangements Agreement Payments section – clause 4.2.4.

4.13 Governance of the Protocol document

The consultation proposed a change to the Governance of the Protocol document so that it could be changed a maximum of once every 3 months, but where the calendar for change would no longer be tied to specific months. This change was proposed to increase the flexibility to change the Protocol document periodically if necessary, notwithstanding that the ability to change has only been used once during the Interim Arrangements.

The TSOs propose to implement this change. However, in addition, in light of industry feedback on the potential impact of changes in the Protocol, the Protocol document will be subject to consultation and approval by the Regulatory Authorities for all future proposed changes (as opposed to consultation only in the case of a material change).

4.14 Performance Monitoring

Performance reliability is a key aspect of the DS3 System Services arrangements. A Providing Unit that performs consistently when called upon to provide a service gives a greater degree of certainty to the TSOs than a Providing Unit that performs sporadically. For Regulated Arrangements, a performance scalar will be utilised to incentivise the reliable provision of a subset of DS3 System Services.

For those services where a performance scalar will not be utilised, alternative measures will be implemented to ensure that the TSOs are satisfied that the services are being delivered as contracted.

The Protocol document accompanying the DS3 System Services Agreement describes the performance monitoring methods, be it a performance scalar or alternative measures, which the TSOs will implement for Regulated Arrangements.

Section 4.13 of this paper describes the governance of the Protocol document. Any changes to the performance monitoring methods will be subject to industry consultation and approval by the Regulatory Authorities.

4.14.1 Performance Scalar Composition

For the Regulated Arrangements, the performance scalar (P) will consist of two components:

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

The value of the performance scalar will be calculated by multiplying the two components:

$$P = P_A \times P_E$$

 P_A will account for the ability of a service provider to accurately forecast its availability to provide System Services. Where the requirement to provide a forecast of availability is not applicable to a service from the commencement of Regulated Arrangements, the value of this component scalar will be set equal to 1.

P_E will be based on a service provider's response to a Performance Incident.

4.14.1.1.1 Availability Discount Factor (P_A)

Certainty of service availability will become increasingly important as more Providing Units with greater variability in their service availability provide DS3 System Services.

For Regulated Arrangements, the P_A component of the performance scalar will incentivise a Providing Unit to supply the TSOs with an accurate forecast of its availability to provide reserve and ramping margin services.

Providing Units contracted to provide any of FFR, POR, SOR, TOR1, TOR2, RRS, RRD, RM1, RM3 or RM8 services will be required, from a date to be determined, but no earlier than 1 year after the commencement of the Regulated Arrangements, to supply a forecast of their availability to provide those services. It is envisaged that this forecast will be required 6 hours in advance of a given Trading Period, where the submitted forecast covers a period of 6 hours (12 Trading Periods).

A P_A value less than 1 will apply where an ex-post evaluation of a Providing Unit's declared forecasted availability against its actual availability shows an over-forecast or under-forecast of availability to provide a service.

Consideration will be given in the development of P_A to factors including, but not limited to, the timing of the calculation of P_{A} , whether all relevant Trading Periods or a sample of them will be evaluated, the occurrence of forced or scheduled outages, the nature of applicable tolerances, the metric to express the error rate per Trading Period, and the duration of any discount factor to be applied.

The implementation of P_A is dependent on the establishment of adequate systems and processes, by both the TSOs and Providing Units, to generate, evaluate and utilise the forecast data. Given the complexity of its introduction, the value of P_A will be set equal to 1 for at least the first 12 months following the commencement of the Regulated Arrangements. As requested by the SEM Committee in SEM-17-080, further consultation with industry will be scheduled as the design of this measure is progressed. The finalised design and process will be subject to regulatory approval.

4.14.1.1.2 Evaluation of Forecast Data from Commencement of the Regulated Arrangements

However, in advance of the implementation of P_A , the TSOs will begin evaluating availability forecast data from various sources from the commencement of the Regulated Arrangements. This data will not be utilised for the purposes of calculating the performance scalar.

The TSOs will require that a subset of Providing Units must manually provide a daily forecast of their availability to deliver any of FFR, POR, SOR, TOR1, TOR2, RRS, RRD, RM1, RM3 or RM8 from contract go-live. For this initial period, in advance of the implementation of P_A , this will take the form of a once-a-day forecast of availability for a calendar day (D), i.e. a block of 48 trading periods, with the forecast required to be submitted to the TSOs by 14:00 on the previous calendar day (D-1). The timing of this forecast will closely align with the provision of physical notifications by market participants under I-SEM arrangements (13:30 on D-1).

This subset of Providing Units will include units from the following classes of technology, unless otherwise agreed with the TSOs: Wind Farms (in both the provision of reserve

services via Inertial Emulation and/or Active Power Control), DSUs, Solar, and any units comprising of more than one class of technology if they consist of any of the aforementioned technologies. The TSOs reserve the right to require that other classes of technology must also provide the availability forecast as described.

Further details of this process for the initial period before the implementation of P_A , including the required forecast template, communication protocol, and in-scope technologies will be communicated to applicable parties.

4.14.1.1.3 Performance Incident Response Factor (P_E)

 P_E will be based on a comparison of a Providing Unit's expected response to a Performance Incident with its achieved response. Tolerances and other criteria will apply depending on the service and providing technology.

The tables below describe, at a high level, the intended performance assessment methodologies that will apply to Performance Incidents from the commencement of the Regulated Arrangements. The Protocol document will describe the methodologies in detail.

The Protocol document will also define the template, data standards and communication protocol for the provision of response data by providing units following a Frequency Event.

Performance Monitoring by Service

Tables 2 - 8 provide a high-level description of the performance monitoring methods that will be implemented from the commencement of the Regulated Arrangements.

Table 2: SIR Performance Monitoring

SIR	Required	Description
Scalar	No	There will be no performance scalar for SIR for the duration of the Regulated Arrangements.
P _A	N/A	
PE	N/A	
Alternative Measures	Yes	From the commencement of the Regulated Arrangements, compliance assessments will be carried out from time to time. In accordance with the DS3 System Services Agreement, a Providing Unit is required to accurately reflect its true capability to provide the service.

Table 3: FFR Performance Monitoring

FFR	Required	Description
Scalar	Yes	
PA	Yes	P_A will default to 1 for at least 12 months following the commencement of the Regulated Arrangements. At a future date no earlier than 12 months following the commencement of the Regulated Arrangements, the TSOs will evaluate availability forecasts provided by contracted units for the purposes of calculating P_A . It is envisaged that forecasts will be required 6 hours in advance of a given trading period, where the submitted forecast covers a period of 6 hours (12 trading periods).
PE	Yes	 From the commencement of the Regulated Arrangements, the performance assessment methodology will be as follows: P_E will be calculated based on an evaluation of the unit's expected response to a Frequency Event against its achieved response. The evaluation of the Providing Unit's contracted response time will comprise 80% of the performance assessment. The evaluation of the Providing Unit's contracted response over the duration of the FFR period will comprise 20% of the performance assessment. A Pass will apply if the overall value of the achieved response is ≥ 90% of the expected response.

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		 A Partial Pass will apply if the overall value of the achieved response is > 80% and < 90% of the expected response. A Fail will apply if the overall value of the achieved response is ≤ 80% of the expected response. The Monthly Performance Scaling and Dynamic Time Scaling Factors, as implemented for POR, SOR and TOR1 for Interim Arrangements, will apply to FFR.
Alternative Measures	No	

Table 4: POR, SOR and TOR1 Performance Monitoring

POR, SOR, TOR1	Required	Description
Scalar	Yes	
ΡΑ	Yes	P_A will default to 1 for at least 12 months following the commencement of the Regulated Arrangements. At a future date no earlier than 12 months following the commencement of the Regulated Arrangements, the TSOs will evaluate availability forecasts provided by contracted units for the purposes of calculating P_A . It is envisaged that forecasts will be required 6 hours in advance of a given trading period, where the submitted forecast covers a period of 6 hours (12 trading periods).
PE	Yes	 For the commencement of the Regulated Arrangements, the performance assessment methodologies that have been implemented for Interim Arrangements will apply. P_E will be calculated based on an evaluation of the unit's expected response to a Frequency Event against its achieved response. The Monthly Performance Scaling and Dynamic Time Scaling Factors, as implemented for Interim Arrangements, will apply.
Alternative Measures	No	

Table 5: TOR2 and RRS Performance Monitoring

TOR2, RRS	Required	Description
Scalar	Yes	
P _A	Yes	The value of P_A will be set equal to 1 for at least 12 months following the commencement of the Regulated Arrangements. At a future date no earlier than 12 months following the commencement of the Regulated Arrangements, the TSOs will evaluate availability forecasts provided by contracted units for the purposes of calculating P_A . It is envisaged that forecasts will be required 6 hours in advance of a given trading period, where the submitted forecast covers a period of 6 hours (12 trading periods).
P _E	Yes	For the commencement of the Regulated Arrangements, P_E will default to the value of P_E applicable to TOR1, as has been implemented for Interim Arrangements. At a future date, to be determined, during the lifetime of the Regulated Arrangements, the TSOs will amend the methodology to calculate P_E to include other relevant factors, which may include, but are not limited to, dispatch instructions, load up rates and ramp up / down rates.
Alternative Measures	No	

Table 6: RRD, RM1, RM3 and RM8 Performance Monitoring

RRD, RM1, RM3, RM8	Required	Description
Scalar	Yes	
P _A	Yes	The value of P_A will be set equal to 1 for at least 12 months following the commencement of Regulated Arrangements. At a future date no earlier than 12 months following the commencement of the Regulated Arrangements, the TSOs will evaluate availability forecasts provided by contracted units. It is envisaged that forecasts will be required 6 hours in advance of a given trading period, where the submitted forecast covers a period of 6 hours (12 trading periods).

PE	Yes	 For the commencement of Regulated Arrangements, the performance assessment methodologies that have been implemented for Interim Arrangements will apply: For all providing technologies excluding DSUs, P_E will be calculated based on an evaluation of the unit's observance of the TSOs' Fail to Sync process. For DSUs, P_E will be calculated in accordance with the EirGrid Grid Code Section OC10.4.5.2 and SONI Grid Code Section OC11.10.3. The Monthly Performance Scaling and Dynamic Time Scaling Factors, as implemented for Interim Arrangements, will apply. At a future date, to be determined, during the lifetime of the Regulated Arrangements, the TSOs will amend the methodology to calculate P_E to include other relevant factors, which may include, but are not limited to, load up rates and ramp up down rates.
Alternative Measures	No	

Table 7: SSRP Performance Monitoring

SSRP	Required	Description
Scalar	Yes	The performance scalar will be set equal to 1 from the commencement of the Regulated Arrangements. This will be amended when the development and introduction of TSO systems allows for the accurate calculation of P _E .
P _A	N/A	
PE	Yes	$ \begin{array}{l} P_{E} \text{ will be set equal to 1 from the commencement of the} \\ Regulated Arrangements. \end{array} \\ \\ At a future date, to be determined, during the lifetime of the \\ Regulated Arrangements, it is envisaged that the TSOs will calculate $\mathsf{P_{E}$ based on relevant factors, which may include, but are not limited to, an assessment of the reactive power output of a Providing Unit within applicable tolerances, accounting for different modes of operation and AVR. \end{array}$
Alternative	No	
Measures

DRR, FPFAPR	Required	Description
Scalar	Yes	The performance scalar for DRR and FPFAPR will be set equal to a value of 1 from the commencement of the Regulated Arrangements. This may change during the lifetime of the contracts.
P _A	N/A	
PE	N/A	 P_E will be set equal to 1 from the commencement of the Regulated Arrangements. At a future date, to be determined, during the lifetime of the Regulated Arrangements, the TSOs may calculate P_E based on the Providing Unit's response to a fault disturbance.
Alternative Measures	Yes	From the commencement of the Regulated Arrangements, compliance assessments will be carried out from time to time. In accordance with the DS3 System Services Agreement, a Providing Unit is required to accurately reflect its true capability to provide the service.

Table 8: DRR and FPFAPR Performance Monitoring

Any additional changes to the performance monitoring of System Services that may be implemented before the commencement of the Regulated Arrangements, having been consulted upon and approved by the Regulatory Authorities, will be carried forward to the commencement of the Regulated Arrangements.

4.15 Defining the Provision of the FFR Service

For Regulated Arrangements, Providing Units from diverse technologies that have been contracted for the provision of FFR will be classified, based on qualifying criteria, as having 'dynamic' or 'static' capability.

The TSOs will define a Providing Unit's provision of FFR through the application of frequency response curves. Depending on a Providing Unit's capability, a response curve for dynamic or static provision of the service will apply.

A Providing Unit's capability will also determine the design of the product scalar for the enhanced provision of FFR, together with the scalar's component values, that will be applicable to the Providing Unit for Regulated Arrangements.

4.15.1 TSO Position for Regulated Arrangements

The TSOs will define the FFR service through the utilisation of parametrisable frequency response curves:

- One curve to apply to Providing Units that have been classified by the TSOs as having dynamic capability in response to a Reserve Trigger;
- A second curve to apply to those classified by the TSOs as having static capability.

Given the fast-acting nature of FFR, the TSOs consider that frequency response curves are required to maximise the benefits of the service to the system, while also ensuring that system security is not compromised. These curves will allow the TSOs to define how each contracted Providing Unit is to provide FFR based on its confirmed capabilities and the requirements of the system.

A set of criteria will be used to classify a Providing Unit as dynamic or static. A Providing Unit's capability will then determine whether the dynamic or static curve, and their associated parameters, is to apply to the Providing Unit. The product scalar for the enhanced provision of FFR applicable to the Providing Unit will also be determined by its capability.

The definition of the FFR service, including the qualifying criteria and frequency response curves applicable to dynamic and static capability, will be set out in the Protocol document accompanying the agreement for Regulated Arrangements.

In consideration of Clause 1.4 of the Agreement, in the event of inconsistency between the provisions of the Agreement and the Grid Code, the Distribution Code, the Network Codes or the Metering Code (as the case may be), the provisions of the Grid Code, the Distribution Code or the Metering Code (as the case may be) shall prevail to the extent of such inconsistency unless the contrary intention is explicit.

4.15.2 FFR Provision with Dynamic Capability

For the Regulated Arrangements, the TSOs will define the provision of the FFR service from Providing Units that have been classified by the TSOs as having dynamic capability using the frequency response curve set out in Figure 4.

4.15.2.1 FFR Dynamic Capability – Frequency Response Curve



Figure 4: FFR Dynamic Capability Frequency Response Curve

The frequency response curve in Figure 4 shows a frequency trigger set point, F_1 , at which the providing unit is required to adjust its MW output in response to a Reserve Trigger.

At F_1 , the Providing Unit must provide a response with a specified trajectory to achieve 100% of its available FFR volume by frequency set point F_2 , if required by the system.

By 'trajectory', the TSOs mean the magnitude of the change in frequency from the trigger point, measured in Hz, within which the Providing Unit can deliver 100% of its contracted FFR volume. Taking a sample frequency trigger set point of 49.95 Hz (F_1), a Providing Unit that is capable of delivering 100% of its contracted FFR volume by 48.95 Hz (F_2) has a response trajectory capability of 1 Hz. The capability to provide a steeper trajectory, as required, will be incentivised by the TSOs.

The recovery of the unit, once the frequency begins to revert back to nominal, will follow the same trajectory as the response to the Reserve Trigger.

The TSOs will define the parameters of the frequency response curve, including the frequency set point and trajectory value, when operating the unit during Regulated

Arrangements. All parameters will be set within the agreed contracted capabilities of the unit.

A Providing Unit will be required to commit to a frequency set point and respond with the appropriate trajectory to deliver its contracted FFR volume, assuming available to do so, within 2 seconds of the time of the Reserve Trigger. Where a Providing Unit has committed to a quicker response than 2 seconds, and so eligible for the product scalar for the faster response of FFR, the Providing Unit must respond within the earlier response time following the Reserve Trigger.

For the sake of simplicity, the curve design for an under frequency deviation from nominal is shown. At times of over frequency, where the Providing Unit wishes to provide an over frequency response, the curve design is identical (the control parameters may differ) except mirrored about the nominal frequency.

4.15.2.2 FFR Dynamic Capability - Qualifying Criteria

A Providing Unit must be able to meet the following criteria in order to be classified as a dynamic provider of the FFR service for Regulated Arrangements:

- The Providing Unit must be able to track changes in frequency dynamically;
- For Providing Units that provide responses in discrete steps, the Providing Unit must have the capability to provide at least 10 discrete steps at the frequency trigger set point, with no individual step being greater than 5MW; the response must be provided in a linear, monotonically increasing manner; ideally, all steps will be equal, but a tolerance of 1MW of the average step size, where the average step size is the FFR available volume divided by the number of discrete steps in response, will apply;
- The Providing Unit must have the capability to commit to a frequency trigger set point greater than or equal to 49.8 Hz and less than or equal to 49.985 Hz;
- The Providing Unit must be able to operate with a minimum trajectory of 2 Hz in response to a Reserve Trigger;
- While the basic energy recovery requirement of the FFR product is to apply¹², to qualify as a dynamic provider, the Providing Unit must be able to operate without

¹² DS3 System Services Technical Definitions Decision Paper SEM-13-098 20/12/2013, page 10 <u>https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-13-098%20%20DS3%20System%20Services%20Technical%20Definitions%20Decision%20Paper%20-%20FINAL_0.pdf</u>

recovering its resource¹³ until the system frequency has recovered (the exact timeframe will be instructed by the TSOs);

- The Providing Unit's provision of POR, SOR and TOR1, if contracted for any of these services, must mirror its FFR response characteristics, i.e. 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, SOR and TOR1, as required of the TSOs in response to a Reserve Trigger.
- The Providing Unit must have monitoring equipment that meets the standards set out by the TSOs installed on the site to enable the performance monitoring of the provision of the service.

4.15.2.3 FFR Dynamic Capability - Product Scalar for the Enhanced Provision of FFR

The components of the product scalar for the enhanced provision of FFR for a Providing Unit deemed to have met the qualifying criteria for dynamic capability, together with the assigned weightings of these components, are set out below:

• A dynamic trigger scalar, as graphically illustrated in Figure 5. The linear value range for this component scalar will be a value between 0.7 and 1, depending on the capability and willingness of the Providing Unit to respond to a Reserve Trigger at a frequency set point between 49.8 Hz and 49.985 Hz.

Dynamic trigger scalar weighting: 40%

 A dynamic trajectory scalar, as graphically illustrated in Figure 6. The value of this component scalar will be between 0.2 and 1, depending on the Providing Unit's capability to provide a response with a trajectory between 2 Hz and 0.05 Hz as required by the TSOs, and where a Providing Unit will be incentivised to be capable of providing a trajectory greater than or equal to 0.7 Hz.

It is a finding of the 2017 Qualification Trials Process that if the Providing Unit cannot provide a response to a Reserve Trigger within 1 second, then it should not be eligible for the incentive to provide a higher sensitivity trajectory above 2 Hz.

Dynamic trajectory scalar weighting: 60%

¹³ For example, a battery charging to its pre-event output



Figure 5: FFR Dynamic Capability Trigger Scalar



Figure 6: FFR Dynamic Capability Trajectory Scalar

The following examples show some potential scalar values using this design:

Example 1 – Maximum dynamic scalar value:

Dynamic trigger:	49.985 Hz	Scalar component value of 1.00
Maximum trajectory:	0.05 Hz	Scalar component value of 1.00
Calculation of overall scala	ar: $(1.00 * 0.4) + (1.00 * 0.4)$	* 0.6) = <u>1.00</u>

Example 2:

Dynamic trigger:	49.985 Hz	Scalar component value of 1.00
Maximum trajectory:	0.20 Hz	Scalar component value of 0.88
Calculation of overall scala	r: (1.00 * 0.4) + (0.88 *	* 0.6) = <u>0.93</u>

Example 3:

Dynamic trigger:	49.800 Hz	Scalar component value of 0.70
Maximum trajectory:	0.05 Hz	Scalar component value of 1.00
Calculation of overall scala	r: (0.70 * 0.4) +	(1.00 * 0.6) = 0.88

Example 4:

Dynamic trigger:	49.98	5 Hz	Scalar component value of 1.00
Maximum trajectory:	1 Hz		Scalar component value of 0.20
Calculation of overall scala	ar:	(1.00 * 0.4) +	- (0.20 * 0.6) = <u>0.52</u>

Example 5 – Minimum dynamic scalar value:

Dynamic trigger:	49.8 Hz	Scalar component value of 0.70
Maximum trajectory:	1.5 Hz	Scalar component value of 0.20
Calculation of overall scala	ır: (0.7 * 0.4) + ((0.20 * 0.6) = <u>0.40</u>

4.15.3 FFR Provision with Static Capability

For the Regulated Arrangements, the TSOs will define the provision of the FFR service from Providing Units that have been classified by the TSOs as having static capability using the frequency response curve set out in Figure 7.





Figure 7: FFR Static Capability Frequency Response Curve

For a Providing Unit with static capability, the response to a Reserve Trigger and the recovery may be implemented in multiple steps, i.e. there may be multiple frequency trigger points. The curve in Figure 7 shows 2 frequency trigger set points, F_{on1} and F_{on2} , at which the Providing Unit is required to adjust its MW output.

At each of F_{on1} and F_{on2} , the Providing Unit must provide a response in a discrete step to achieve a specified MW output.

For the purposes of simplicity, the curve shows 2 steps; Providing Units will be incentivised to provide FFR in up to 9 discrete steps (although the Providing Unit may wish to provide FFR in more than 9 discrete steps).

The curve also shows hysteresis capability, with the recovery steps following a separate trajectory to the response. Hysteresis is the phenomenon where a Providing Unit that delivers a response at a particular frequency set point as the frequency falls, does not

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retract its initial provided response at the same frequency set point as the frequency recovers. The capability to provide this will be incentivised by the TSOs.

The TSOs will define the parameters of the curve, including frequency set points in response and recovery, and required MW outputs, when operating the unit post procurement; all parameters will be set within the agreed contracted capabilities of the Providing Unit.

A Providing Unit will be required to commit to a frequency set point and respond with the appropriate trajectory to deliver its contracted FFR volume, assuming available to do so, within 2 seconds of the time of the Reserve Trigger. Where a Providing Unit has committed to a quicker response than 2 seconds, and so eligible for the product scalar for the faster response of FFR, the Providing Unit must respond within the earlier response time following the Reserve Trigger.

For the sake of simplicity, the curve design for an under frequency deviation from nominal is shown. At times of over frequency, where the Providing Unit wishes to provide an over frequency response, the curve design is identical (the control parameters may differ) except mirrored about the nominal frequency.

4.15.3.2 FFR Static Capability - Qualifying Criteria

The criteria to determine whether a Providing Unit is to be classified as a static provider of FFR for Regulated Arrangements are as follows:

- The Providing Unit must have the capability to commit to a frequency trigger set point greater than or equal to 49.3 Hz;
- Relating to the provision of FFR in discrete steps:
 - The Providing Unit must have the capability to respond at any frequency trigger set point – which will be set by the TSOs – with a response no greater than 75MW (this represents the maximum MW response for a single discrete step);
 - The TSOs must have the ability to choose to use the Providing Unit's entire FFR available volume at 1 frequency trigger set point of our choosing, or in any number of steps between 1 and the maximum number of discrete steps that the unit is capable of;
 - The TSOs will reserve the right to use all of the Providing Unit's FFR available volume at its highest frequency trigger capability;
 - The smallest discrete step at any time must be no less than 20% of the MW value of the largest step that the Providing Unit will provide. In the

case of a Providing Unit that will provide 50MW in 1 discrete step, the MW provision of the smallest discrete step can be no less than 10MW;

- The Providing unit must be able to meet the basic energy recovery requirement of the FFR product;
- The Providing Unit's provision of POR, SOR and TOR1, if contracted for any of these services, must mirror its FFR response characteristics, i.e. it must have the capability of continuing along the trajectory of the applicable frequency response curve for the extended timeframes required of POR, SOR and TOR1, as required of the TSOs in response to a Reserve Trigger.
- The Providing Unit must have monitoring equipment that meets the standards set out by the TSOs installed on the site to enable the performance monitoring of the provision of the service.

4.15.3.3 FFR Static Capability - Product Scalar for the Enhanced Provision of FFR

The components of the product scalar for the enhanced provision of FFR by a Providing Unit deemed to have static capability, together with the assigned weightings of these components, are set out below:

• A static trigger scalar, as illustrated in Figure 8. The linear value range for this component scalar will be between 0.1 and 0.5, depending on the capability and willingness of the Providing Unit to respond to a frequency set point greater than or equal to 49.3 Hz and up to 49.8 Hz.

Static trigger scalar weighting: 40%

• A static hysteresis scalar. A Providing Unit that can provide hysteresis control to its response to Reserve Triggers will be rewarded with a component scalar of 1; a component scalar of 0.5 will apply where no hysteresis capability is in place.

Static hysteresis scalar weighting: 40%

- A static discrete step scalar, as illustrated in Figure 9. The linear value range for this component scalar will be between 0.1 and 1, depending on the capability of the Providing Unit to provide responses at between 1 and 9 frequency trigger set points; a single discrete step will be required at each frequency set point; a Providing Unit may wish to provide a response at more than 9 frequency set points, but the TSOs will only reward up to a maximum of 9.
- Static discrete step scalar weighting: 20%



Figure 8: FFR Static Capability Trigger Scalar



Figure 9: FFR Static Capability Steps Scalar

The following examples show some potential scalar values using this design:

Example 1 – Maxi	mum static so	calar value:	
Static trigger:	49.8 Hz (ju	ist under)	Scalar component value of 0.50
Hysteresis:	Yes		Scalar component value of 1.00
Discrete steps:	9		Scalar component value of 1.00
Calculation of ove	rall scalar:	(0.50 * 0.4)	+ $(1.00 * 0.4)$ + $(1.00 * 0.2) = 0.80$
Example 2:			
Static trigger:	49.5 Hz		Scalar component value of 0.26
Hysteresis:	Yes		Scalar component value of 1.00
Discrete steps:	4		Scalar component value of 0.44
Calculation of ove	rall scalar:	(0.26 * 0.4)	+ (1.00 * 0.4) + (0.44 * 0.2) = <u>0.59</u>
Example 3:			
Static trigger:	49.8 Hz		Scalar component value of 0.50
Hysteresis:	No		Scalar component value of 0.50
Discrete steps:	1		Scalar component value of 0.10
Calculation of overall scalar:		(0.50 * 0.4)	+ (0.50 * 0.4) + (0.10 * 0.2) = <u>0.42</u>
Example 4:			
Static trigger:	49.6 Hz		Scalar component value of 0.34
Hysteresis:	No		Scalar component value of 0.50
Discrete steps:	5		Scalar component value of 0.55
Calculation of overall scalar:		(0.34 * 0.4)	+ (0.50 * 0.4) + (0.55 * 0.2) = <u>0.45</u>
Example 5 – Minir	num static sc	alar value:	
Static trigger:	49.3 Hz		Scalar component value of 0.10
Hysteresis:	No		Scalar component value of 0.50
Discrete steps:	1		Scalar component value of 0.10
Calculation of overall scalar:		(0.10 * 0.4)	+(0.50 * 0.4) + (0.10 * 0.2) = 0.26

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Note that the maximum value of the product scalar for the enhanced provision of FFR is 0.80 for a unit that is deemed to have static capability.

4.15.4 Operation of Frequency Response Curves

Operationally, the TSOs may assign up to 6 different frequency response control modes to each unit. These modes will specify:

- For a unit with dynamic capability, a frequency set point and a required response trajectory;
- For a unit with static capability, potentially up to 9 frequency set points and the discrete step values for each frequency set point, subject to the maximum number of discrete steps of the providing unit.

Any control mode will not exceed the unit's maximum declared capabilities.

New signals will be required in order for the TSOs to enable a particular control mode at each providing unit. These signals will be defined on the EirGrid and SONI websites.

As with equivalent instructions for the POR, SOR and TOR1 products, units will have 60 seconds to implement any instructions in real-time, unless otherwise agreed by the TSOs.

4.15.5 Other FFR Product Scalars

Apart from the product scalar for the enhanced delivery of FFR, the composition of which is described above, two other product scalars apply to the FFR product.

4.15.5.1 Product Scalar for the Continuous Provision of Reserve

This scalar will have a value of 1 or 1.5: the criteria for the application of the higher scalar value will be based on a unit's contracted capability to maintain a minimum MW output response, which will be specified by the TSOs, from FFR through to the TOR1 timeframe.

4.15.5.2 Product Scalar for the Faster Provision of FFR

For a speed of response quicker than 2 seconds a scalar greater than 1 will apply on a sliding scale up to a scalar value of 2 at a response time of 0.5 seconds; for a speed of response quicker than 0.5 seconds a scalar greater than 2 will apply on a sliding scale up to a maximum scalar value of 3 at a response time of 0.15 seconds.

It is a finding of the 2017 Qualification Trials Process that it may be appropriate to only apply this scalar to units that can provide 90% of their maximum recorded provision identified during the testing process over the FFR timeframe.

4.15.6 Provision of FFR by Wind Farms

The provision of FFR (and POR) by wind farms through Emulated Inertia and when in Active Power Control (APC) Mode will be considered as separate sub-products: distinct frequency response curves and product scalars for the enhanced delivery of FFR will apply to both sub-products.

It is a finding of the 2017 Qualification Trials Process that if the Providing Unit is contracted for the provision of automated frequency response services through the use of Emulated Inertia, it can only contract for the same services in AFC Mode as those provided through the use of Emulated Inertia.

5 Consultation Questions and Respondents' Views

The following section summarises the views of respondents to the questions posed in

the consultation paper together with respondents' additional general comments.

Question 1: Do you have a view on how the contractual terms for Volume Capped procurement should differ from those of the Volume Uncapped procurement?

There was a significant level of commentary on proposed differences between the contractual terms for Volume Capped and Volume Uncapped procurements:

- Ten respondents expressed the view that the proposal for a Volume Capped procurement process for high availability plant was by its nature discriminatory, though with varying perspectives on the resultant impact and affected party.
- Six of these respondents viewed the different arrangements for Volume Capped and Volume Uncapped as discriminatory against the availability units, specifically highlighting demand side response which would fall under the Volume Capped arrangements. Most expressed the view that this would have a negative effect on such participants and reduce them to "a second tier" and potentially act as a "barrier to entry".
- Concerns were also raised with respect to the inability of demand side response providers to adjust volumes during the contract period, with one respondent advocating that the arrangement "should at least offer aggregators an equivalent level of flexibility/ability to refresh volumes as conventional generation".

- Four respondents mentioned the proposals within the context of EU legislation and policy direction, the mandated "encouragement" of demand side response in EU legislation as well as "the general push" from the European Commission towards prosumers. These respondents felt that the proposed Volume Capped/Uncapped split was not in line with the requirements or direction of travel. One respondent queried whether paying a different price for an identical service would be contrary to EU procurement rules.
- Two respondents commented on the difference in contractual terms and conditions between the Volume Capped and Uncapped providers. This concern relates to providers being treated differently, with one respondent explicitly stating that "prices may be different" but contractual terms should not be and the other acknowledging that the procurement process itself could differ between the two classes.
- One respondent cited developments related to demand side response in the GB Capacity Market Transitional Arrangements, where "the Transitional Arrangements auctions will offer targeted support to Demand Side Response (DSR)" and expressed the view that the Volume Uncapped/Capped arrangements lacked comparable support for DSR.
- One respondent expressed the view that the proposed Volume Capped/Uncapped arrangements favour investment in high availability providing units (i.e. Volume Capped) over investment in other technologies due to more advantageous contract terms, and that such a proposal would not be technology neutral.
- One respondent expressed the view that the Volume Capped arrangements should be accessible to all new entrants, specifically mentioning new entrant conventional generation, and that in their view for the arrangements to not be open to all would be arbitrary and without justification.
- One respondent expressed the view that the Volume Capped arrangements should be accessible only to new entrants who construct new facilities, specifically suggesting that a new DSU which aggregates response from existing DSU sites should be excluded and/or an investment threshold be in place to qualify for the Volume Capped arrangements.
- Six respondents queried the technologies which would fall under the Volume Capped category, with three explicitly querying the applicable category for WPFS units. On this topic, two respondents explicitly stated that they would welcome the decision for WPFS to be considered under the Volume Uncapped category.

Another respondent requested clarification as to where interconnectors will sit within the process.

- One respondent queried which category Rotating Stabilisers would fall under in these arrangements, and provided some information as to why such a unit could fall into either category depending on what considerations were made.
- One respondent proposed that DSUs should form a separate category (i.e. not captured within the 'high availability units' category) given the particular characteristics of such providers.
- Regarding the proposal to bundle the FFR-TOR2 Services for Volume Capped providers, opinion was mixed with five respondents disagreeing and four agreeing with the proposal.
- The five respondents who did not support the bundling of FFR-TOR2 expressed the view that such bundling could stifle new entrants and would limit the supply of useful services deserving of remuneration. One respondent specifically mentioned that such bundling could diminish the "portion of a DSU's registered capacity eligible to participate" whilst another noted that some providers would be more suited to provide one rather than all the bundled services.
- Of the four respondents who supported the bundling of FFR-TOR2, three acknowledged that confidence in volume over this timeframe (out to 20 minutes) would be needed and as such they supported the requirement for the same volume of each of the services to avoid any shortfalls. The other respondent commented that though they recognised that this bundling would result in some providers reducing their level of service provision, the simplicity this bundling would bring to the procurement process would outweigh the negative impact, particularly given the implementation timeframes. The same respondent did however suggest this standardisation could be relaxed in later procurement rounds.
- Three respondents supported rigorous pre-qualification criteria for volume capped providers, both citing discouragement of speculative applications and assuredness of future delivery as their reasoning for this. One of these respondents suggested key project viability criteria such as having planning permission and a connection offer as potential mechanisms by which to increase the likelihood of projects that will achieve actual operation being awarded contracts.
- One respondent commented that they did not see an availability obligation as necessary or implementable under the Volume Capped procurement.

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TSOs' Response:

We note that a significant number of respondents viewed the Volume Capped/Uncapped Arrangements proposed in the consultation paper as discriminatory, with particular reference in the feedback received to disadvantaging DSUs. The Volume Capped/Uncapped Arrangements solution is not intended to be discriminatory, but aims to ensure the appropriate management of expenditure and ultimately value for the consumer. However, as noted in Section 4, the Volume Uncapped procurement process will now be open to all qualified aspiring applicants and where appropriate, in accordance with SEM-17-080, expenditure may be managed with tariff reviews.

The SEMC requested that the TSOs carry out a further consultation for the Volume Capped procurement and associated contracts. This consultation is planned for January 2018.

There were mixed views from respondents on the topic of bundling of FFR-TOR2. In Section 4.7, we address the issue of bundling of FFR-TOR2. The intention of the bundling proposal is to ensure that the arrangements will deliver the TSOs' requirements from a future system operation perspective and protect the consumer from over-expenditure. Confidence in volume of supply over the relevant timescales are critical and it is these system security considerations for which the proposal aims to provide a cost efficient solution. In light of SEM-17-080, bundling of services will be further consulted on in the Volume Capped contract consultation.

We note the concerns raised in relation to compatibility with EU legislation. We have sought independent procurement advice in relation to the procurement strategy for the Regulated Arrangements and have confirmed that it is in compliance with the requirements of the Utilities Directive.

Question 2: Do you have any comment on the high-level options proposed for managing the Transition period?

The majority of respondents who indicated a preference with regard to the Transition Period high-level option were of the view that Option 2 would be preferable (to "allow unrestricted entry of new high availability units for all services but providing, in the procurement's terms and conditions, for conditional adjustment of tariff rates for all service providers"), with issues around discrimination against DSUs being highlighted in a number of cases.

- Six of the respondents voiced explicit support for Option 2, with general comments being that this offered a "level playing field" for all technologies and as such was fairer to high availability units.
- Three respondents voiced concern around potential discrimination against DSUs, with regard to the proposals in Option 1 (limiting the number of services high availability units can provide) which they saw as "contrary to the TSO's mandate to be technology neutral".
- Of those who supported Option 2, two respondents stated that their support was
 predicated on the assumption that "the conditional adjustment of tariff rates
 applies equally to all service providers and does not discriminate on the basis of
 technology type".
- Eight respondents expressed the view that they saw this transition period as being of a very low risk to the TSO, with new units unlikely to be built during this short amount of time. As a result, these respondents saw the risk of over expenditure during this period as being low, with three respondents highlighting that unrestricted access for high availability units during this period could offer the benefit of informing the TSOs what volume of technically qualified service provision exists at present in the all island market.
- One respondent supported Option 1, limiting the number of services for which new high availability units can contract.
- Two respondents advocated that the proposed procurement dates be moved to coincide with commencement in September 2018 of the Volume Capped contracts. Not only did these respondents express that in their view the risk associated with such a change was low, but they also highlighted the additional simplicity this could bring to the process.
- One respondent highlighted confusion with the process and highlighted an example for which they queried what potential level of payments would be applicable

TSOs' Response:

As noted in Section 4, the SEM-17-080 decision provides for tariff reviews, which aligns with Option 2 of the Transition Period options, i.e. allowing unrestricted entry of new high availability units for all services but provides, in the procurement's terms and conditions, for conditional adjustment of tariff rates for all service providers. As high

availability units are eligible to apply for all services in the Volume Uncapped procurement, Option 2 will effectively be implemented.

Question 3: What is your view in relation to the proposed term of the Regulated Arrangements and related contract?

Of the respondents, five were very supportive of the duration of the regulated arrangements. A further eight respondents agreed with the duration proposed and gave additional comments/recommendations.

These included:

- One respondent suggested that EirGrid should commit to markets being available for assets coming off 5 year contracts to continue to bid into in order to increase investor/lender confidence.
- One respondent noted that demand response clients may be reluctant to commit to 5/6 year terms and suggested a renewable annual contract and the possibility to refresh volumes every 6 months within the longer term contract.
- Two respondents suggested that the periods should be aligned to facilitate transfer to volume by those emerging from Volume Capped contracts.
- One respondent suggested a construction/preparation period for new units in order to secure contracts prior to financial close and beginning of construction.
- While agreeing with the term for Volume Uncapped, one participant highlighted that the Volume Capped terms were too short.
- One respondent noted that the longer term should not come at the expense of flexibility. The enduring arrangements proposal is for contracts on a per Providing Unit rather than on a Service Provider basis. For DSUs, units are made up of multiple components and the inability to switch out components will provide no added benefits for DSU providers.
- One respondent noted that due to the Electricity Balancing Guideline coming into force, it is unclear whether this term will be possible.
- One respondent highlighted the potential for cancellation/termination within 1 year, the tariff changes, and the potential changes to the protocol document to negate any financial security or forecast benefits of the longer term and passes all the risk to the developers.

Six respondents disagreed with the proposed term. All five suggested longer terms for each of the contracts. Two respondents stated that the Volume Capped Category 2 should be 7-8 years and two respondents stated that it should be 10 years. The reasons given for lengthening the term are:

• To facilitate new investment;

- Incentivise technologies;
- To provide the lowest price possible to the consumer; and
- The absence of high SNSP scarcity scalar could result in very unpredictably low revenues.

One respondent noted that the term is too long for DSUs. Although classed as a "high availability" unit, they differ from batteries and other technologies. Their contracts with suppliers last no more than 2 years.

Two respondents noted that a mirroring of the two procurement terms and termination notice are necessary in order not to unduly favour one procurement process over the other.

Two respondents noted that there was some confusion over the Volume Capped Category 1 term. One respondent also asked for clarity over the opportunity to enter and refresh Volume Capped Category 2.

TSOs' Response:

In line with SEM Committee Decision SEM-17-080 the term of the Volume Uncapped arrangements will be set at a maximum term of 5 years from May 1st 2018, (i.e. the Volume Uncapped arrangements will commence on May 1st 2018 and end on 30th April 2023).

As noted in the SEMC decision, the introduction and implementation of the EU Balancing Network Code or the introduction of the future competitive arrangements may necessitate the termination of tariff based contracts for all or a number of DS3 System Services and at the request of the SEM Committee, this has been provided for in the DS3 System Services Agreement through the ability of the TSOs to unilaterally terminate the contract with one year's notice.

In line with the SEMC decision, the term of the Volume Capped arrangements will be set at a maximum of 6 years from 1st September 2018, with a future operational start date (to be decided). The end date of these arrangements will be set for up to 6 years from the go-live date.

Question 4: Do you have a view on the notice period for the termination of one or more system services by the Company?

Of the twenty-two respondents, fifteen were supportive of the termination period. Five of these provided recommendations and additional comments including:

- Five respondents called for clarity of when termination will occur:
 - Two respondents further noted that the termination clause must be specific and relate to matters the service providers can control.
 - One respondent added that the scope for termination is far too broad as it essentially gives the Company the right to terminate without reason. This will not be beneficial for new entrants who will not be granted funding arrangements unless there is certainty.
 - One respondent commented that greater clarity is required as to whether it is worthwhile imposing a 1 year termination clause on Category 1 (Capped) procurement which only has a 16 month delivery window.
- One respondent added that a clause should be introduced to allow prospective service providers to terminate their own contract ahead of 1st January 2020 deadline for Volume Capped Category 2.

Of the respondents, five disagreed with the proposed term based on it being a barrier to investment:

- One respondent noted the uncertainty of termination will provide less confidence for investors and the higher risk factors will result in a higher price point. They suggest the service providers should have the ability to adjust their position in the 6 month procurement window.
- One respondent commented that new builds need the certainty and the 1 year termination clause does not allow for high level revenue certainty for the period of the contract.
- Two respondents noted that cancellation should only be in specific circumstances where there are clearly defined and forecastable triggers.
- One respondent suggested that a minimum term for the agreement should be agreed in advance taking into account investment and technology type.
- Two respondents commented on the risk associated with the relationship with the CRM and the T-4 auction process. Generators bids into this market will be influenced by forecasts of and revenues from DS3. An alternative suggested by one respondent was to align the termination period under DS3 to the CRM Reliability Option contracts.
- Four respondents stated that there should not be unilateral termination under Volume Capped Category 2.

TSOs' Response:

As noted in the consultation paper, the proposal to include a one year termination period for one or more services was proposed to apply to the Volume Uncapped and proposed Volume Capped Category 1 contracts only, not to the proposed Volume Capped Category 2 contract.

In line with SEM-17-080, and as described in Section 4.1, there will be two types of contract:

- (i) **Volume Uncapped**, associated with a procurement which does not volume limit any of the 14 DS3 System Services being procured and to which regulated tariffs will apply and
- (ii) Volume Capped associated with a procurement for which an upper limit will be applied to the volume of relevant DS3 System Services being procured and for which prospective service providers will offer a competitive price as part of their tender. Volume Capped procurement will apply to Providing Units for a subset of the 14 DS3 System Services. A consultation in relation to the Volume Capped contracts will be held in January 2018.

For the Volume Uncapped contracts, the termination clause will include a provision which allows the TSO to terminate one or more services with a one year notice period.

Question 5: Do you have any comment on the addition of a provision to terminate the contract for a Providing Unit to provide System Services based on repeated poor performance?

Of the respondents seventeen were supportive of the addition of a provision to terminate the contract for a Providing Unit to provide System Services based on repeated poor performance. Seven of these provided recommendations as long as the provision includes:

- A test of materiality; a clear unambiguous definition of "repeated" and "poor performance" (five respondents).
- An agreed performance criteria (one respondent).
- A reasonable robust and not overly onerous approach (one respondent).
- A tolerance to wind forecasting error for the first 12-24 months (one respondent).
- A clear testing and performance measurement guidelines/metrics (three respondents).
- A disciplinary type procedure including multiple warnings from the TSO, several notices before a final notice of termination (four respondents).

- The opportunity to remedy (four respondents).
- A dispute resolution procedure/appeals procedure (three respondents).

Two respondents requested more information about such a provision before they could pass comment.

Of the respondents, four disagreed.

- Three respondents noted that the performance scalars would address poor performance by giving lower revenue, which would be the equivalent of termination due to poor performance.
- One respondent noted that the pairing of the obligation of service providers to undertake, to maintain, fuel and operate their Providing Units under clause 3.1 should be amended, to allow for flexibility under the new requirements in ISEM where under the CRM RO process there may be service providers who do not hold a CRM RO contract.

TSOs' Response:

The proposal to include a provision for termination based on poor performance has been removed from the Volume Uncapped contract. Performance monitoring and the associated Performance Scalar will continue to be used to incentivise good performance of Providing Units. In addition, EirGrid or SONI (as applicable) will have the right to unilaterally terminate the Agreement with one year's notice.

Question 6: Do you agree with our proposal to implement Frequency Response Curves to define the provision of the FFR Service and our proposed components for the product scalar for the Enhanced Provision of FFR? If not, please specify why or identify what element of the curve design or scalar composition you believe requires amendment?

The proposed measures outlined in the consultation drew a generally favourable response. Four respondents agreed with the proposals without suggesting any changes to the design. One respondent neither agreed nor disagreed with the proposal. Two respondents made no comment.

Thirteen respondents agreed in principle with the proposal, but made suggestions relating to – or requested clarity on – the design. General comments and queries in this regard included the following:

- Respondents queried how the frequency response curves are to be defined operationally, including whether the curves will be changed during the duration of Regulated Arrangements.
- There was an assertion that frequency response curve parameters should be agreed with the providing unit before finalisation of the contract.
- One respondent noted that response curves should be common to all providers, as otherwise there may be an anti-competitive outcome.
- One respondent commented that the FFR design appears to cover all eventualities and that contracting with open-ended definitions passes the risk on to the Providing Unit.
- Relating to DSUs, one respondent stated that the approach should not be so prescriptive that IDSs are targeted a generic desired response was preferred.
- There was a comment that there were apparent inconsistencies between the FFR proposal, as outlined in the consultation, and one of the findings of the 2017 Qualifications Trials Process that was presented to industry on 12 October 2017, which was concerned with applying the dynamic response curve to sub-1 second capability only.
- Clarification was requested as to whether an over-frequency response where the response curve is mirrored about the nominal frequency is still part of the FFR proposal.
- There was a request that the definition of 'event' be aligned across the System Services contract, Protocol document and the Grid Code.

TSOs' Response:

The TSOs have clarified how frequency response curves will be operated during the Regulated Arrangements. A single frequency response curve for dynamic capability and a single frequency response curve for static capability will apply to all Providing Units. For Providing Units that wish to provide an over frequency response, the frequency response curve design is the same (the control parameters may differ) except mirrored about the nominal frequency.

Comments and queries specifically relating to the proposed dynamic and static frequency response curves included the following:

• Some respondents asserted that the dynamic response curves – which attract the higher product scalar values – appear to reward fully programmable and responsive plant, offer little incentive to conventional plant and are not technology neutral.

- Windfarm providers commented that the delayed energy recovery criterion for application of the dynamic response curve would disincentivise the provision of emulated inertia, potentially meaning the loss of a cost-effective dynamic response to the TSOs.
- Several respondents requested clarity on the nature of the droop response required of dynamic providers: whether providers could offer different droop values at frequency trigger points F1 and F3; whether changing droop settings and utilising discrete steps may cause oscillations on the system. One respondent asserted that too high a droop (steeper than 4%) at trigger point F1 would reduce the amount of a unit's available capacity to respond to an event.
- Relating to the frequency trigger points, respondents requested clarity on how a dynamic provider could respond at 2 frequency set points. Two respondents commented that trigger point F1 is in the realm of frequency regulation, where a droop of 4% should apply – a steeper slope would then kick in at trigger point F3 in response to a frequency event.
- Relating to the limits applicable to those providers responding to events with discrete steps, one respondent commented that the 5MW upper limit for an individual step for a dynamic response and the 10MW limit for a static response are too small and may constrain DSUs in the provision of System Services. Respondents requested clarity on how the discrete steps would be comprised from DSUs, given that IDSs would be offering different unequal volumes, and whether the upper step limits would preclude potential providers with larger steps from providing the Service.
- One respondent requested that the TSOs allow for a range of frequencies over which DSUs would be asked to respond in discrete steps, rather than the highest allowed frequency; this would allow the cycling of demand sites over for example 0.3Hz.
- Several respondents requested clarity relating to the recovery from a frequency event: whether the steps in recovery will allow DSUs the required time to switch back on previously tripped loads; how hysteresis can be met and improved by DSU components.

TSOs' Response

For Providing Units with dynamic capability, in previous consultations the TSOs had proposed that an optional second frequency trigger set point would be incentivised. Having considered the system behaviour required of those units that have been classified as having dynamic capability, together with the feedback to the consultations from interested parties, the TSOs have decided that a single frequency trigger set point is appropriate for defining the provision of FFR from Providing Units with dynamic capability.

For Providing Units with dynamic capability, the description of the nature of the response required has been clarified. References to a 'droop' response have been removed. Instead the response has been defined in terms of a trajectory that is determined by the magnitude of the change in frequency that a Providing Unit requires in order to deliver its contracted FFR volume.

For Providing Units with static capability, the value of the maximum allowed discrete step has been amended to reflect Providing Unit constraints. Clarity has also been provided with regard to the minimum allowed discrete step.

Comments and queries specifically relating to the product scalar for the enhanced provision of FFR, a sample proposal for which was included the consultation document, are detailed as follows:

- Respondents requested general clarity on how the scalar component design, values and weightings were arrived at.
- Relating to the dynamic trigger component of the product scalar, respondents commented that the value of this scalar component had changed since the previous consultation, with comparably reduced values applicable to certain frequency trigger points between 49.8Hz and 49.985Hz. Respondents asserted that either the value of the dynamic trigger component should be increased, i.e. to start at 0.9, not 0.7, or that full dynamic capability should be rewarded with a scalar greater than 1.
- Respondents also commented on the droop component of the product scalar applicable to dynamic capability:
 - One respondent questioned why the most vertical droop receives the highest value, when it is essentially a static response;
 - Some respondents asserted that not rewarding a droop below (less sensitive than) 2% sufficiently was unwarranted;
 - One respondent commented that the droop component of the scalar should apply to the highest capability droop at frequency trigger F3 only.
 - Clarity was also requested by one respondent that 'maximum' droop refers to the droop of the greatest sensitivity.

TSOs' Response:

The values attached to both the dynamic capability and static capability trigger scalar components of the product scalar for the enhanced provision of FFR reflect the importance that the TSOs attach to the availability of dynamic capability close to 50 Hz for the purpose of frequency containment, i.e. at frequency set points between 49.8 Hz and 49.985 Hz.

For Providing Units with dynamic capability, the TSOs have amended the components of the product scalar, as previously proposed in consultation, to reflect the removal of the incentive to provide a response at a second frequency trigger set point. The adjusted weightings and values for the remaining dynamic trigger and trajectory components reflect the value that the TSOs place on the trajectory of response once the frequency trigger set point is greater than or equal to 49.8 Hz.

While the TSOs acknowledge that the maximum scalar value of 1 may not align with the SEM Committee's decision paper SEM-14-108 (which states that scalars default to 1 and then increase), its value reflects the holistic approach applied to the overall volumes and tariffs considerations applicable to the commercial arrangements for System Services.

Two respondents disagreed with the implementation of the frequency response curves, and commented as follows:

- One respondent asserted that the curves did not take account of conventional thermal plant capabilities and were not technology neutral; that a droop of 0.1% was impossible for conventional plant; and that an array of alternative frequency response curves would better reflect the capabilities of all technologies in the provision of FFR.
- One respondent commented that a droop more sensitive than 4%, coupled with frequency triggers close to 49.985 Hz, could lead CDGUs continuously incurring Uninstructed Imbalances. The same respondent asserted that continuously triggering FFR at 49.985Hz could lead to accelerated wear and tear of the unit.
- One respondent commented that there was insufficient rationale to justify the scalar values.

TSOs' Response:

The TSOs have designed the frequency response curves to reflect the behaviour in the provision of FFR that has value to the system. The design of the product scalar for the enhanced provision of FFR aims to incentivise such behaviour where possible.

Finally, several respondents commented on the requirements mandated of providers of FFR that also provide POR, SOR and TOR1:

- Respondents questioned the meaning of the following sentence from the consultation: "The unit's provision of POR, SOR and TOR1, if contracted for any of these Services, should mirror its FFR response characteristics."
- One respondent queried whether the FFR product scalars would apply to all of POR, SOR and TOR1 if the response to a frequency event needed to be mirrored through to TOR1.
- Referencing the proposal to procure FFR to TOR2 in a block from high availability technologies, one respondent asserted that DSUs could not be expected to sustain a response for up to 20 minutes.

TSOs' Response:

For Providing Units of FFR that are also contracted for any of POR, SOR and TOR1, clarity has been provided as to the nature of the provision of the response i.e. the Providing Unit must have the capability of continuing along the path of the applicable frequency response curve for the extended timeframes required of POR, SOR and TOR1, as required of the TSOs in response to a Reserve Trigger.

The product scalar for the enhanced delivery of FFR will only apply to the FFR Service.

Question 7: Do you have any comment on the proposals for Price Certainty?

Ten of the respondents agreed with the proposals for Price Certainty. Of the ten, seven provided additional comments/recommendations:

- Four respondents stated that any review of tariffs should only apply to Volume Uncapped. Any change to Capped contracts will undermine investor confidence.
- Five respondents stated that since Volume Uncapped and Category 1 Volume Capped structure are not financeable stating that the change every 3 months is a risk that existing units with other revenue streams may be able to bear. One respondent also stated that a review should also take place for underexpenditure.
- Three respondents commented that without change to the procurement plan outlined, the proposal offers no price certainty for high availability technologies.

In the interest of equitable access to operate, one respondent suggests that periodic reviews should focus on:

- The redistribution of the overall budget between individual pots for service.
- The auctioning of volumes under the Volume Capped process that are projected to not be delivered by Volume Uncapped providers.
- One respondent requested that the industry be provided with a clear increasing trajectory for the DS3 tariffs up to 2020 to provide some revenue certainty. They suggested an annual review of tariffs to ensure that service providers are suitably remunerated.
- Two respondents did not agree with the conditional review of tariffs for contracts already signed stating that this and associated risks will not attract investors and will likely result in consumers paying more than necessary and a lack of new build projects to provide these services.

Two respondents were concerned about when and where adjustments would be made.

Five respondents disagreed with the proposals for Price Certainty:

- One respondent commented that it is unreasonable that EirGrid will have budgetary control over both Volume Capped / Uncapped procurement.
- One respondent identified a need for more certainty in Volume Uncapped procurement to incentivise new unit providers. Further the proposals would allow lower tariff rates for Volume Capped procurement.
- One respondent stated that consideration should be given to separate annual spend caps for Volume Capped and Volume Uncapped procurement, in order to reduce the overspend in the Volume Capped procurement triggering the regulated tariffs associated with Volume Uncapped procurement being adjusted.
- One respondent stated that the proposal presents that it is advantageous to the non-expenditure risk service provider to have price certainty at a static rate, rather than having some visibility of future price certainty from having dynamic annual increases in general tariff rates.
- One respondent commented that the risk is being passed from the TSO to the service provider. The respondent believes that the certainty required by investors is a minimum glide path with regular increases in tariffs but with the minimum as the original contracted rates.
- One respondent noted that the terms and conditions could change depending on new entrants, or every 6 months following a Qualification System review, or the tariffs and scarcity scalars can change every 3 months within a tolerance or if a conditional review is initiated. The respondent stated that greater certainty is needed.

- One respondent stated that the TSOs should apply a tariff review process over a number of years on a rolling basis where no adjustment would occur. The respondent also suggested that over-expenditure in any year in a particular tech class would trigger an automatic conditional review, where changes would be implemented to ensure such over-expenditure does not reoccur. The respondent stated that a conditional review should occur in the event of a high wind year or any other event of over expenditure.
- One respondent stated that the tariff rates and scalar values for the Volume Capped Category 2 contracts should be fixed for the duration of the contract. Lenders will be unable to take a risk on an investment that could change within 3 months. Confirmation that this will only occur in volume uncapped is required.

TSOs' Response

As outlined in Section 4.11, the Volume Uncapped contractual arrangements provide for potential tariff changes and/or changes to the temporal scarcity scalar values, subject to industry consultation and approval from the Regulatory Authorities, in scenarios in circumstances including, but not limited to:

- where the TSO expects the expenditure cap to be breached;
- where the volume which is procured exceeds that which the TSO requires to operate the system at 75% SNSP;
- where the TSO has not procured the volume necessary to maintain stability of the system at 75% SNSP; or,
- where unintended consequences of tariff design emerge post DS3 System Services Phase 1 Go-Live or DS3 System Services Phase 2 Go-Live.

These scenarios are provided for in Section 4.1.2 of the DS3 System Services Regulated Arrangements Agreement.

These provisions have been enacted in line with the decisions of SEM-17-080 and with the SEM Committee contractual principles. We expect that there will be greater price certainty in the Volume Capped contractual arrangements which, as previously noted, will be subject to future consultation.

Question 8: Do you have any comment on the proposed change to the Governance of the Protocol document?

Eleven of the respondents had no comment on the proposed change to the governance of the Protocol Document. Eleven of the respondents made the following comments:

- Three respondents suggested that the changes in the document introduce risk for new investment, and any change should not impact the revenue stream.
- Three respondents stated that the fact that the Protocol Document could be amended every 3 months did not grant a great deal of certainty and is a huge risk for investors. One suggests that it should be an annual review with the potential for variation in extreme circumstances.
- One respondent gave the example of the unilateral changes made after consultations to the performance scalar occurred to illustrate a similar risk that could occur on changes in the Protocol Document.

Material Change

- One respondent explained the impossibility of defining "material change."
- Two respondents suggest that all changes, not just material changes should go through Regulatory Authority approval and consultation.
- One respondent commented that they are concerned by any change to agreed terms once the contract is signed. Any material change will have to be subject to Regulatory Authority approval, but should also include a collaborative input from service providers.
- Two respondents noted that any material change should be subject to consultation and Regulatory Authority approval.

<u>Other</u>

- One respondent expressed concern about unilateral changes to the Protocol document.
- One respondent asked that definitions in the Protocol Document be kept consistent with Grid Codes and that scalar details remain within contract so as to be subject to the change of control process therein.
- One respondent queried as to, after approval from the RA, what time limit would Providing Units have to effect the proposed change and what would be the consequences of non-compliance.
- One respondent stated that the ability to adjust and modify the document without consultation is not prudent.
- Two respondents commented that it was inappropriate to ask for comment on the Protocol document when the document has not been provided to the industry. The respondent stated that it should have been provided as part of the consultation process.
- One respondent made the following comments about the Protocol document:
 - Much tighter governance required with all changes requiring consultation;

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<u>Risk</u>

- Definitions should refer to the correct Grid Code in the jurisdiction of the unit. There should be better definitions and cross definitions between the Protocol document, the contract and the Grid Code;
- A definition of material change is required;
- The Protocol should have greater consistency and clarity;

TSOs' Response:

As noted in Section 4.13, in light of industry feedback in relation to the governance of the Protocol document, the TSOs have decided to amend the terms of governance so that all proposed changes to the Protocol document will be consulted on with industry and must be approved by the Regulatory Authorities.

The proposed change to the governance to allow changes to the Protocol document a maximum of once every three months, but where the calendar for change would no longer be tied to specific months will be implemented. This change is intended to increase the flexibility to change the Protocol document periodically if necessary, notwithstanding that the ability to change has only been used once during the Interim Arrangements.

Question 9: Do you have any comment on the summary changes in relation to Performance Monitoring?

There was a mixed response to the proposed measures outlined in the consultation. One respondent agreed with the proposals without suggesting any changes to the design. Two respondents neither agreed nor disagreed with the proposals. Five respondents made no comment.

Regarding the measure to incentivise certainty of service availability, eight respondents agreed in principle with the proposal, but made suggestions relating to – or requested clarity on – the design. The following comments were made in this respect:

- One respondent stated that the contract consultation was not the vehicle for this subject matter.
- Several respondents queried the technology types or providers that would make up the 'subset' of providing units that may have to provide forecasts of availability in advance of this measure formally becoming part of the performance scalar (at least 1 year after the commencement of Regulated Arrangements).

- A number of respondents commented that accurate forecasts should be rewarded with a scalar value greater than 1, as opposed to only penalising poor forecasts.
- One respondent queried the tolerances applicable to the evaluation of the forecasts.
- Several respondents questioned how this measure would interact with I-SEM, with respondents suggesting that it should not go live until at least 1 year after I-SEM.
- One respondent commented that any evaluation of a forecast of availability that demonstrates an actual provision of reserve or ramping Services above the forecasted amount (under forecast) should not be treated as negatively as the identification of an over forecast from a service provider.
- Respondents from DSUs and Wind Farms commented that the proposed 6 hours forecast windows were workable and could facilitate accurate forecasts, while acknowledging that further work was required to define the process.
- One respondent sought clarity on whether the TSOs intend to identify underlying trends in over forecasting service availability or focus on individual trading periods.

Six respondents disagreed in principle with the measure to incentivise certainty of service availability. Comments detailing the rationale for this position included:

- One respondent asserted that the performance scalar should only be based on a unit's ability to provide the Service.
- One respondent commented that the current performance scalar incentivises sufficiently accurate and reliable System Service provision.
- One respondent asserted that the proposal was costly in terms of development, administration and potential reduced income arising out of application of the measure.
- Several respondents commented that it was not practical or appropriate to implement this measure for conventional / centrally dispatched units, for reasons including: that such units do not have full control of their real-time reserve availability; that unit volumes are not forecastable, being dependent on constraints, wind and interconnector flows; that conventional plant are already strongly incentivised to get their ex-ante forecast correct given their potential exposure to balancing market, their potential exposure to an RO event when the market price exceeds the strike price, and the application of the performance scalar.

- One respondent commented that this measure illustrates why Providing Units have concerns about the Protocol document.
- One respondent commented that it would require investment in IT to implement this proposal and that any manually produced data would be subject to error and contradict other sources.

TSOs' Response:

As noted in Section 4.14.1, as requested by the SEM Committee in SEM-17-080, further consultation with industry will be scheduled as the design of the measure to incentive accurate forecasting of availability is progressed. The finalised design and process will be subject to regulatory approval.

Regarding the proposals relating to the performance assessment of a unit's response to a system event or dispatch instruction, respondents commented on a number of items:

- Several respondents requested that the learnings from the Qualification Trials Process with respect to pass / fail standards should be published as soon as possible.
- Relating to the SIR Service, respondents queried what would be the outcome for the Providing Unit resulting from a breach of compliance and commented that any impact should be equivalent to any performance scalar discount applicable to other Services for comparable poor performance.
- One respondent queried further information on the pass / fail criteria and proposed tolerances applicable to the SSRP Service.
- Regarding the DRR and FPFAPR Services, one respondent requested detail on what the potential reduced payments may be and what the criteria would be for reverting payments back to normal.
- One respondent requested more detail of FFR performance monitoring methods and criteria. One respondent welcomed the consultation proposal that the performance assessment of the delivery of TOR2 to RM8 would be extended to include an evaluation of Load Up and Ramp rates.

TSOs' Response:

The tables set out in Section 4.14.1 describe the performance monitoring methods that will be implemented from the commencement of the Regulated Arrangements for each service. These tables include an overview of how the performance of the three new services – DRR, FPFAPR and FFR – will be assessed.

5.1 Additional General Comments

- One respondent suggested that there is an imbalance of risk stacked against the service provider. An unprecedented procurement procedure, unrealistic ambition from SEMC in the capping of DS3 budget and the fact that DS3 has been built in isolation from CRM all provide delivery and investment risks. To help balance this risk, the respondent commented that there should be visibility of annual rate increases for existing services, where such increases would be paid for by reduced temporal scarcity scalars, versus those proposed for events >60% SNSP for Non-Expenditure risk services.
- One respondent stated that the increase in the number of moving parts is prejudicial to investment.
- One respondent suggests that some other solutions to curb the risk of over expenditure may include:
 - Developing a set of clearly defined technical qualification criteria or trials (for providers who have not proved service delivery capability already through the Qualification Trials Process) prior to allowing market access in order to mitigate against the risk of over expenditure.
 - Fixing a budget in line with the glide path (similar to existing system for capacity payment), for all service providers who are technically qualified and offering payment rates which fluctuate based on availability at a given time. This model would give more investment certainty to highly available technologies than the current proposals.
- One respondent stated that access to the Grid can take up to 2 years to achieve. The respondent commented that this amongst other items out of the control of the asset developer demand a level of flexibility if unable to meet the 2020 target.
- One respondent stated that the delivery of services at a high level should be the objective and not the hard budget and that the excessive immediate focus on reaching a Day 1 solution needs to be loosened. The respondent commented that a staged or incremental approach is preferential for industry to align itself.
- One respondent stated that a volume cap would easily facilitate the over expenditure concern that DS3 is facing.
- One respondent did not agree with the decision to delay the implementation of the Market v Physical dispatch position and asked the Regulatory Authorities to provide participants with indicative settlements through the year prior to a final resettlement.

- One respondent stated that limiting the competitive tender to a regulated tariff price based on a different value to the system does not make sense for a competitive process. A better option may be that existing assets get the proposed regulated tariff and all new entrants (conventional and other) should procure through competitive tender.
- One respondent suggested giving appropriate market signals to industry in expenditure risk services and that the 5 services should be unbundled, and 'seeding' should be encouraged with a first past the post system, as was consulted upon in 'DS3 System Services Enduring Tariffs' which would recognise early innovators who are developing a key market solution – rather than penalise them.
- One respondent notes 'Volume capping', as is proposed, does not seem reasonable, especially given the relatively short duration contracts.
- One respondent has noted a general lack of certainty for new entrants and existing providers, and stated that certainty is necessary due to the link with the CRM market that in the enduring arrangements will primarily be conducted for the provision of capacity four years in the future.
- One respondent stated that this proposed change goes against the outcome of previous consultation responses and industry discussions, where there was an agreement that certainty and stability was to be provided.
- Two respondents stated their disappointment in the consultation process. They felt it was rushed and have not had adequate time to consider their views.
- Two respondents stated that there has been insufficient time to get substantive legal perspective in such an important area and have had to refrain from commenting until they have the time to follow due legal review process.
- One respondent said that there was a lack of transparency as the separate procurement process was only introduced in the August consultation.
- Two respondents believe that the consultation was published without sufficient supporting documentation to allow a purposeful assessment of the proposals. Previous consultation responses should have been published and a draft Protocol document and Statement of Payments should have been released. The information in the contracts consultation did not make it clear that all 5 products must be provided by the high availability units and the associated workshop was the only instance in which it was apparent.
- One respondent commented that any changes to Section 11 of the contract (limitation of liability) should be consulted upon in a separate consultation.
- One respondent commented that the timeline for March 2018 for the high availability category requires the following information and questions to be answered as soon as possible:
 - What volume will be procured in the Volume Capped procurement?
 - Will the payment basis be pay as clear or pay as bid?
 - Obligations on successful tenderers: please provide details of bonding arrangements, financial penalties, construction milestones, etc.; and
 - Calculation methodology of the PSO levy for storage/ battery technologies. We request the approach for calculating PSO costs for these types of units is confirmed as soon as possible.
- One respondent noted the removal of the requirement to be party to a Use of System Agreement. The respondent stated that this is unfair and does not comply with the requirement set down by the SEM Committee (for all providers to be treated alike).
- One respondent suggested that the EU and Irish government consider the development of AGU/DSU as integral to delivering on our national target to achieving 2020 for renewable energy. The respondent stated that the stagnation of the industry has been a result of confusion and uncertainty in the marketplace due to timelines for market entry of new services namely DS3 being continually changed or delayed.
- One respondent suggests a number of options to level the playing field:
 - DS3 could potentially open up new sectors to demand side schemes, for whom the 2-hour requirements of DSU are not viable.
 - The DS3 programme could also provide a revenue stream for some existing demand side units, to allow them to continue operation when capacity values reduce.
 - A potential solution could be to allow all available new providers, who have technically qualified in for a first phase commencing in May 18, to determine the volumes that are actually available and technically qualified. With the benefit of this knowledge, the *Phase 2* competitive arrangements could be better considered in terms of what is most appropriate, we would however, emphasise the importance of the arrangements being truly technology agnostic. We also consider that the short transition window from May 1 – Aug 31 significantly diminishes any over expenditure concerns in the medium to long term

- One respondent stated that the planned procurement discriminates against the demand response industry and a small number of high availability technologies with no technical rationale (only to balance the budget). The respondent stated that although many respondents were happy with the procurement process proposed, these respondents had the safety of the Volume Uncapped procurement.
- One respondent commented that in the event that the proposed procurement process is adopted, the TSOs and RAs should provide a mechanism through which existing DSUs can exit the market in advance of I-SEM and the introduction of the new System Services. The respondent stated that the division of procurement (tariffs versus competitive tender) may also be seen as not being technology agnostic, which was a principle that the TSOs had promoted earlier in the process.

TSOs' Response:

With regard to the length of the consultation process, we acknowledge that service providers would have preferred to have a longer period of time in which to consider the proposals. However, the consultation timeline was dictated by the implementation date for the Regulated Arrangements (and was highlighted earlier in the process). We have endeavoured to listen to industry feedback and to amend the proposals for the Regulated Arrangements where appropriate, in light of this, while being cognisant that the arrangements must align with SEM-17-080 and the SEMC contractual principles.

5.2 Legal Drafting Comments

In response to comments received in the consultation, amendments have been made to the Agreements in the following sections:

Commencement and Duration of Agreement: 2.1.1 (amended); 2.1.2 (amended);2.3.2 (amended); 2.4.1 (amended); 2.4.2 (amended); 2.5 (amended); 3.2 (amended); 4.1.2 (new);4.2.1 (amended); 4.2.4 (new); 5.1 (amended); 7.3 (amended); 8(2)(xi) (removed); 10.1 (amended); 12.1 (amended); 12.3.1 (amended); 12.3.4 (amended); 13.1 (amended); 15.2 (amended); **Schedule 1:** Definitions added: Compliance Tests; Expenditure Cap; Tariff Year; FFR Hysteresis Control; FFR Trajectory Capability; Temporal Scarcity Scalar; Significant Incident (SONI Contracts only); Interconnector Registered Export Capacity(SONI Contracts only); Frequency Control(SONI Contracts only); Interconnector Registered Import Capacity(SONI Contracts only); Operating Security Standard(SONI Contracts only);

Operational Requirements; Locational Scalar; Network Codes; Plant(SONI Contracts only); Power Park Module(SONI Contracts only); Static Steps Capability; Definitions amended: Declared; Declared MinGen; DS3 System Services Regulated Arrangements Go-Live; Fault Disturbance (SONI Contracts only); FFR Continuous Scalar; Interconnector Frequency Droop (SONI Contracts only); Protocol (SONI Contracts only); SNSP; Voltage Dip (SONI Contracts only); TSO; Schedule 2 2 (amended); 3.2 (amended); 4.2 (amended); 5.2 (amended); 6.2 (amended); 7.2 (amended); Schedule 3 3.2 (amended); Schedule 4 Part A 3.2 (amended); Part B 2 (amended); Part B 3.2 (new); Part C 3.2 (amended); Part D 3.2 (amended); Part E 3.2 (amended); Schedule 5 1.1(i) (amended); 1.3(b) (amended); Schedule 6 4 (amended (EirGrid contract only));
Schedule 9 Part 2 (amended) ;Additional Operating Parameters (amended);

Protocol Document: Governance (2) (amended); Operational [Compliance] Requirements (3) (amended); SNSP Forecasting (4) (added); Performance Monitoring (5) (amended); Appendix 1 (removed); Glossary: Definitions added- Connection Conditions; Dispatch Instruction; Distribution System; Fault Disturbance; Emulated Inertia; FFR Hysteresis Control; FFR Trajectory; FFR Trajectory Capability; Grid Code; Intermediary; Pass; Performance Incident; Power System; Providing Unit Output; Regulatory Authority; Synchronised; Temporal Scarcity Scalar;Trading and Settlement Code; Transmission System; Transmission System Operator (TSO).