Consultation on
DS3 System Services Contracts for Regulated Arrangements

DS3 System Services Implementation Project

September 26 2017

EIRGRID SONI

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Executive Summary

The purpose of this paper is to provide an overview of the structure of the proposed DS3 System Services Regulated Arrangements Contracts, the main changes relative to the existing DS3 System Services Interim Arrangements Contracts Framework Agreements and to offer an opportunity for stakeholders to provide feedback on the proposals.

It also provides an overview of the forthcoming DS3 System Services procurement proposals. The procurement proposals have been further developed since the last industry workshop of August 1 2017 and comment is invited in relation to the evolved proposals.

This paper should be read in conjunction with the accompanying proposed draft contracts. The Protocol document which also forms part of the contractual arrangements is currently under development. The Protocol document will specify the Compliance Requirements which a service provider must satisfy before qualifying for remuneration for DS3 System Services in respect of its Providing Unit(s), as well as the Performance Monitoring procedures to be applied and the unit(s)' Operational Requirements.

At the time of issue of this paper, decisions are outstanding on the consultation on DS3 System Services Enduring Tariffs and DS3 System Services Enduring Scalar Design. Both forthcoming decisions will impact a number of the areas noted in this consultation paper (e.g. proposed term of contract and scalar values) and the paper should be read in that context.

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Introduction

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-synchronous[2] 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 annum[3].

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

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

[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 – http://www.eirgridgroup.com/site-files/library/EirGrid/System-Services-Consultation-Financial-Arrangements-December_2012.pdf

annum. Operating in this manner should deliver significant savings to consumers through lower wholesale energy prices.

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;

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

- 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;
- 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 generation[5].

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.

[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.

New system services are required to support a move to higher levels of non-synchronous 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. The later 4 services, together with the former 7 services are 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 Services[6]

Service Name	Abbreviation	Unit of Payment	Short Description
Synchronous Inertial Response	SIR	MWs^2h	(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 MW output that can be delivered with a good degree of certainty for the given time horizon.
Ramping Margin 3	RM3	MWh	
Ramping Margin 8	RM8	MWh	
Fast Post Fault Active Power Recovery	FPFAPR	MWh	Active power (MW) >90% within 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: http://www.eirgridgroup.com/how-the-grid-works/ds3-programme/

1.5 Enduring Regulated 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 phases. 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.

During the interim period (until 2019 at the earliest), 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 Approach[7]. This paper sets 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 takes 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, will 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: https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-17-017%20DS3%20System%20Services%20Future%20Approach%20Information%20Paper.pdf

- The TSOs will run a Regulated Tariff procurement process in Q4 2017 for the 11 existing services so as 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 2018[8];
- 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.

[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.

A Qualification Trial Process[9] commenced in March 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. 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.

It is also necessary to measure the quality of provision of "fast" services (FFR, FPFAPR, DRR) when these are procured in 2018. As part of the Qualification Trial Process, "measurability" aspects are also being explored during the interim phase.

Following an open competitive procurement process, the Qualification Trial Process began on 1 March 2017 and ran to 31 August 2017. A total of 12 contracts were executed covering 15 trials.

The learnings gained from the Qualification Trial Process are currently being finalised and will be reflected in the enduring Regulated Tariff contractual and commercial arrangements.

In this paper we are consulting on the proposed contractual arrangements in advance of the commencement of the next procurement process at the end of November this year. In addition, we will use the learnings from this year's Qualification Trial Process as well as the ongoing Interim Arrangements to inform the format and focus of next year's Qualification Trial Process.

1.7 Purpose of Document

The purpose of this consultation paper is to set out the proposed contractual arrangements which will apply to the DS3 System Services Regulated Arrangements. In addition, it outlines the proposed procurement process for the Regulated Arrangements.

[9] DS3 System Services Qualification Trial Process Decision Paper: http://www.eirgridgroup.com/site-files/library/EirGrid/DS3-System-Services-Decision-Paper-on-Qualification-Trial-Process-FINAL.pdf

1.8 Interaction with Outstanding Consultations

At the time of issue of this consultation paper, decisions are outstanding on the consultation on DS3 System Services Enduring Tariffs and DS3 System Services Enduring Scalar Design. Both forthcoming decisions will impact a number of the areas noted in this consultation paper (e.g. proposed term of contract and scalar values).

In particular for the contract drafting, schedules for these services have been modified to reflect the inclusion of new scalars where appropriate, reflecting the proposals in the Consultation on DS3 System Services Enduring Tariffs and the Consultation on DS3 System Services Enduring Scalar Design.

As decisions on these consultations have yet to issue at the time of publication of this paper, the drafting is provisional and will be amended in the finalised published contract to reflect the final Enduring Scalar and Tariff consultation decisions.

1.9 Proposed Consultation Process

- An overview of the main differences between the DS3 System Services Interim Arrangements framework agreements and the proposed DS3 System Services Regulated Arrangements is presented in this paper.
- The standard legal provisions of the existing Interim Arrangements Framework Agreements have only been amended where necessary to account for the Regulated Arrangements. Therefore we are not inviting comment in this consultation on the already established legal provisions which are not changing in the transition from the DS3 System Services Interim Arrangements to the DS3 System Services Regulated Arrangements
- A number of consultation questions address the main contract elements that have changed relative to the Interim Arrangements. These are interspersed throughout the various sections and repeated in summary form at the end of the paper. A template questionnaire accompanies the consultation paper for the submission of comments.
- A template spreadsheet accompanies the consultation paper for the submission of specific legal comments on the draft contracts by numbered clause. This aims to capture stakeholder comments additional to those covered by the consultation questions. We would ask respondents to use this spreadsheet for any such comments.

- As the proposed procurement process has also evolved since it was last presented at the DS3 System Services industry forum of August 1 2018, an overview of the process is presented here for comment.

2 Overview of Proposed Procurement Process

2.1 Volume Uncapped and Volume Capped Procurement

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

Volume Uncapped procurement: refers to procurement which does not volume limit any of the 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 system services being procured and for which prospective service providers will offer a competitive price as part of their tender. Volume Capped procurement is proposed to apply to high availability Providing Units whose availability is not linked to energy market dispatch for a subset of system services.

2.2 Outline of proposed procurement process for Regulated Arrangements

- The proposed procurement process outlined in the TSOs' industry workshop of August 1 2017, which was based on the SEMC's future approach paper of 23 March 2017, has been further developed by the TSOs to include 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 as "Volume Capped" procurement). The Volume Capped procurement is proposed to apply to high availability Providing Units whose availability is not linked to energy market dispatch for a subset of system services.
- Notice of the next procurement (Volume Uncapped) is intended to be issued on November 30 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 will be changes to some of the terms and conditions for payment for each 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 it is intended to use a Qualification System and contracts (rather than a framework agreement structure), for both Volume Capped and Volume Uncapped procurements.
- 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 RA 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).
- 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 at which time new entrants will be invited to apply. 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

[10] The QTP is a process running 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 are measuring both the capability of new technologies to provide System Services and the capability of all technologies to be measured as providing the 3 system services that have not been procured under the interim arrangements (FFR, FPFAPR and DRR).

already on the Qualification System may apply to change their contracted parameters at that time.

2.3 Use of Qualification System and Contracts

It is intended to use a Qualification System and associated contracts for both Volume Uncapped and Volume Capped 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 new entrants under a gated process.

In the Volume Uncapped procurement, new 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. 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 re-apply during the next or subsequent gates.

The term of the Qualification System will be set as being open-ended, allowing it to remain in place until competitive arrangements (e.g. auctions) are implemented for DS3 System Services.

Options for the term of the Volume Uncapped Regulated Arrangements are being considered by the Regulatory Authorities at the time of issue of this consultation paper. The TSOs, at the time of publication, propose that the contracts remain in place for a minimum term of six years.

Any renewal of the Qualification System, at six-monthly intervals, may involve different terms and conditions. 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 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 procurement 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 appropriate. Figure 1 provides a

graphical overview of the procurement process for Volume Uncapped procurement.

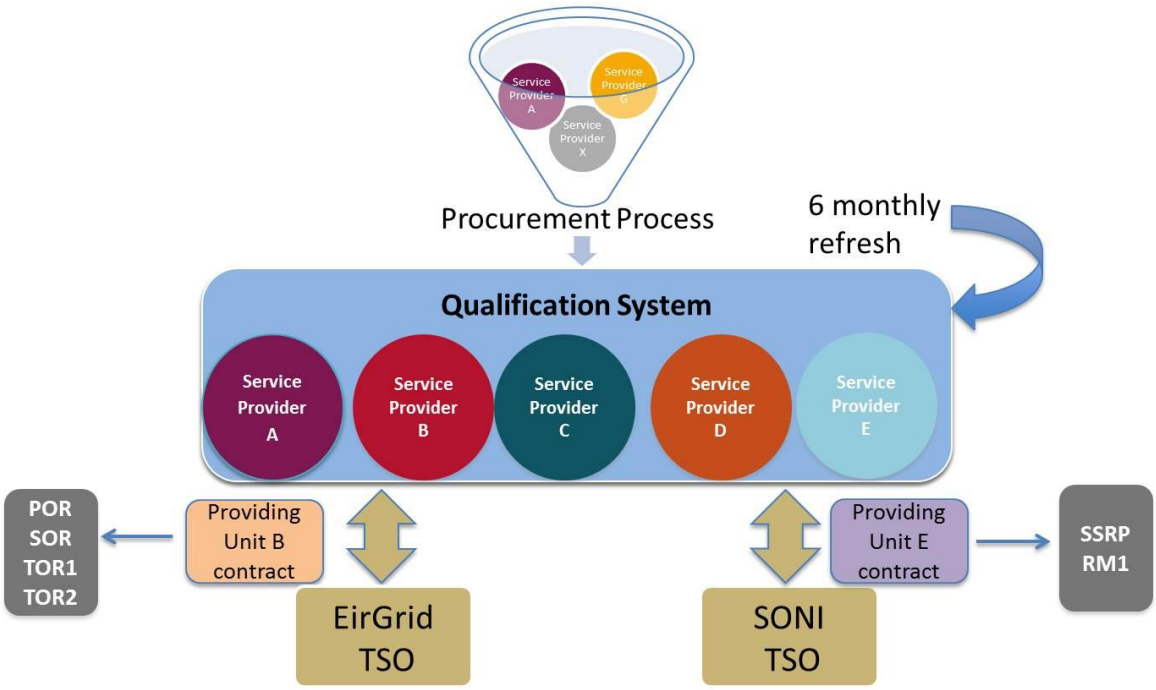

Figure 1: Overview of Procurement Process for Volume Uncapped Procurement

As noted in Chapter 4 of the Consultation on DS3 System Services Enduring Tariffs, the TSOs are seeking to develop the enduring tariff design to be robust against a number of risks which may result in over-expenditure beyond the "glide-path" expenditure set out by the SEM Committee for DS3 System Services.

These risks, along with a number of possible mitigations were presented in Chapter 4 of that paper. Section 4.4.1 in particular discussed the risk that there may be an overinvestment in high availability technologies whose availability is not linked to energy dispatch such as Demand Side Units and Non-Synchronous Technologies.

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

Based on further consideration of the most appropriate mitigation options, the TSOs are proposing to implement a “Volume Capped” approach to address this risk of overinvestment of high availability technologies, which would pose an expenditure risk to the SEM Committee “glide-path”.

The proposed Volume Capped procurement would only apply to a subset of the DS3 System Services for which the TSOs have evaluated that an expenditure risk exists, namely the FFR, POR, SOR, TOR1 and TOR2 services.

The TSOs propose to hold a separate tender process for the procurement of these services from high availability technologies. There will be a competitive element to the Volume Capped procurement. The details of the proposed procurement and its timelines are outlined below.

2.4 Volume Uncapped and Volume Capped Procurement

While for the Interim Arrangements, all service providers who met the technical procurement criteria were awarded a contract, for this stage of the Regulated Arrangements it is proposed that the procurement will be divided into two types:

1. Volume Uncapped

   and

2. Volume Capped

The proposed timeline for procurement is illustrated in Figure 2.

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.

2.4.1 Volume Uncapped Procurement

It is proposed that **Volume Uncapped Procurement** will operate in a similar manner to the Interim Arrangements procurement. All service providers who pass technical qualification will receive a contract in respect of the service(s) for which they have qualified. Providing Units will only tender based on their technical capability, 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, there will be changes to some of the terms and conditions for payment for each system service, 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.

Term: It is proposed that these contracts will run for the length of the Regulated Arrangements (proposed term of 6 years, subject to regulatory approval).

Termination: It is proposed that 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. This provision is similar to that of the previous Harmonised Ancillary Services Arrangements.

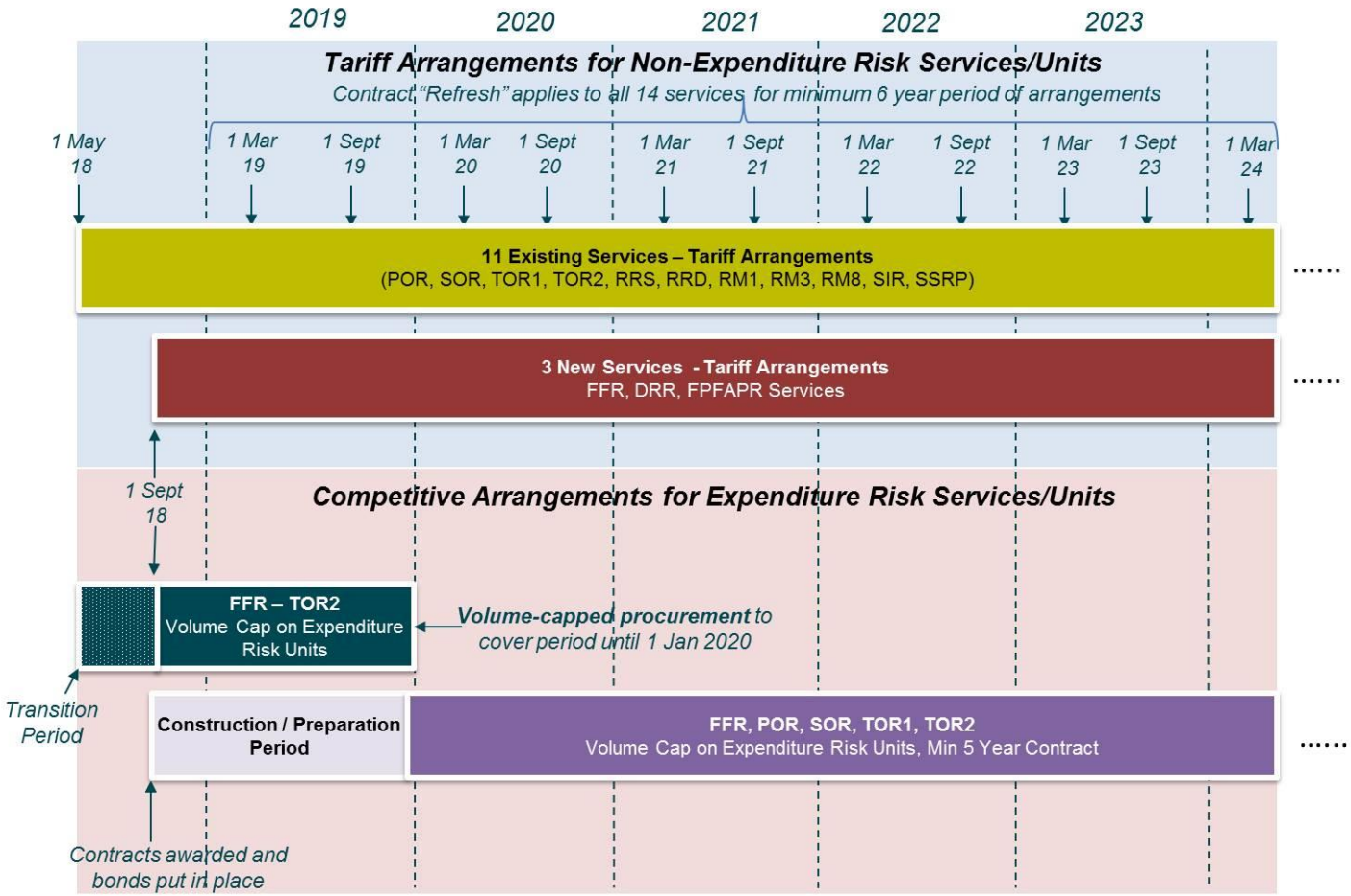

Figure 2: Overview of Volume Capped and Volume Uncapped Procurement Processes

2.4.2 Volume Capped Procurement

It is proposed that **Volume Capped Procurement** will apply to a subset of the DS3 System Services, namely FFR, POR, SOR, TOR1 and TOR2 where the Providing Units providing the services are classified as “high availability” technologies, i.e. they provide services with a high level of availability that is not limited by their position in the energy market (SEM and I-SEM when it becomes operational).

In the Volume Capped procurement, it is proposed that 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 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.)

Volume Capped Procurement can further be subdivided into two categories.

Category 1 procurement will cover procurement for Providing Units for the FFR, POR, SOR, TOR1 and TOR2 services with contract execution on September 1 2018. This procurement will be volume limited and contracts will be awarded based both on technical qualification and competitive price.

It is proposed that the price paid for a given DS3 System Service will be capped at the Volume Uncapped regulated tariff rate.The terms and conditions of these contracts will differ from the other DS3 System Services contracts and will require further development subsequent to this contract consultation, but may for example include different requirements with respect to the percentage of Trading Periods for which contracted Providing Units are required to be available. The upper limit on the volumes of each service that will be procured will be published with the tender notice on March 30 2018.

Term: It is proposed that these contracts will run until Jan 1 2020.

Termination: It is proposed that the contract for the provision of one or more system services may be terminated by EirGrid or SONI with one year’s notice.

Category 2 procurement will be a separate procurement for guaranteed term contracts. It is proposed that this procurement will award minimum length guaranteed term 5 year contracts for the FFR, POR, SOR, TOR1 and TOR2 services. It will be volume limited. 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. It is proposed that the price paid for a given DS3 System Service would be capped at the Volume Uncapped regulated tariff rate.

The terms and conditions of these contracts will differ from the other DS3 System Services contracts and will require further development subsequent to this contract consultation. They are intended to provide contractual arrangements for new entrants, allowing time for a build phase before service provision commences. Therefore the TSOs are considering whether bonding arrangements and stage checks are appropriate for the terms of this contract.

Contract award will be on September 1 2018 but successful Providing Units will have up to January 1 2020 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). It is proposed that a Providing Unit's 5-year contract term will commence on the date of its first service provision.

Term: It is proposed that, subject to regulatory approval, these contracts will have a guaranteed minimum term of 5 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.

2.5 Further consultation on contract terms for Volume Capped procurement

Although the standard terms and conditions of the Volume Capped contract should be similar to the Volume Uncapped contract, further consultation will be required to determine the terms that will differ. This will include the following areas, amongst others:

1. Bonding / level of commitment required to ensure future date delivery
2. Stage Checks – regular checks against delivery plan to assess the likelihood of the service provider being able to deliver at the future service provision date
3. Availability levels of service provision.

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?

2.6 Transition period (May 1 2018 to September 1 2018)

There will be a period between when the Interim Arrangements end (May 1 2018) and the Volume Capped contracts commence (September 1 2018) during which there is a transition period for high availability Providing Units providing the expenditure risk services POR, SOR, TOR1 and TOR2. The TSOs are considering options to ensure that expenditure is managed during this 4-month transition period.

Options under consideration include:

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.

Another alternative would be to move the proposed procurement dates.

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

2.7 Structure of Contracts

The proposed contracts adopt a similar structure to the existing DS3 System Services Interim Arrangements Framework Agreements, except as previously noted, as a Qualification System will be used, the Framework Agreement structure will no longer apply.

The draft contracts specify the requirements and payment mechanisms for the fourteen DS3 System Services including scalar details where appropriate.

Separate contracts will apply for Northern Ireland and Ireland, with arrangements being aligned in so far as possible.

2.8 Overview of main differences between proposed DS3 System Services Regulated Arrangements contracts and existing DS3 System Services Interim Arrangements Framework Agreements

Figure 4 sets out the structure of the contractual arrangements. The provisions in black font are those sections in which there is most significant change.

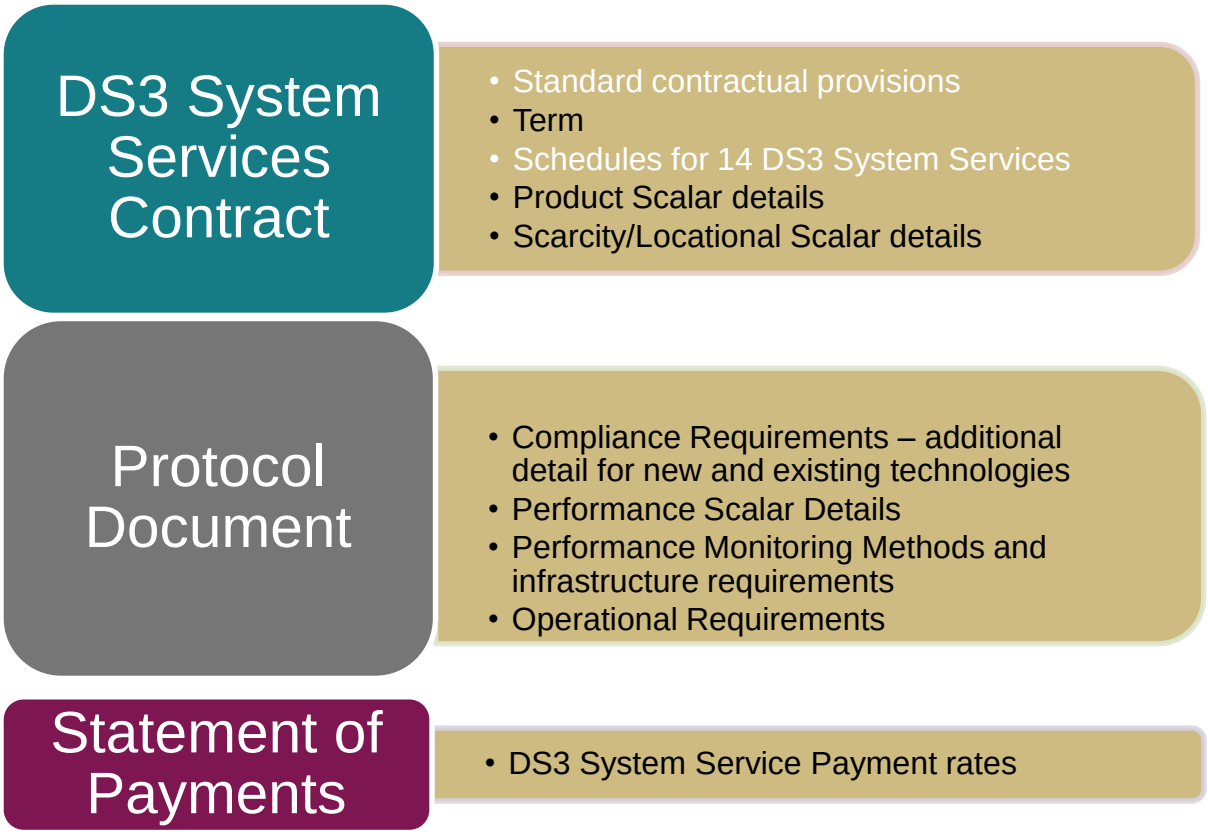

Figure 4 : Structure of Contractual Arrangements

2.8.1 Structure of Contractual Arrangements

- The existing Ireland Interim Arrangements contract has a linked Charging Statement (i.e. DS3 System Services Statement of Payments) with similar arrangements for Northern Ireland. This Charging Statement will remain (updated as appropriate) for the Regulated Arrangements.
- As for the Interim Arrangements, an additional document will be linked to the contract, the Protocol document. This Protocol document will specify the Compliance Requirements which a service provider must satisfy before being paid for DS3 System Services. In addition, it will specify the Performance Monitoring procedures to be applied. It will also contain operational requirements, specifying minimum standards that Providing Units must meet.
- As for the Interim Arrangements, there will be two DS3 System Services contracts, one for Northern Ireland and one for Ireland. As TSOs, SONI will contract with service providers in Northern Ireland and EirGrid will contract with service providers in Ireland.

- The contracts have been developed with the principle that arrangements will align as much as possible in both jurisdictions.
- The Regulated Arrangements will be open to distribution level connected Service Providers. Such providers will require approval from their respective Distribution System Operator/ Distribution Network Operator to participate in the arrangements. EirGrid, NIE and ESBN are currently working together to determine the process and form of agreement for participation of DSO-connected providers in DS3 System Services.
- As for the Interim Arrangements, the contracts will apply on a per Providing Unit basis, rather than on a Service Provider basis.

2.8.2 Changes to the contract drafting for the DS3 System Services

- The existing Interim Arrangements DS3 System Services contracts have been used as a basis for the development of the Regulated Arrangements DS3 System Services contracts. They specify the contractual arrangements for the existing DS3 System Services of:
- Primary Operating Reserve (POR)
- Secondary Operating Reserve (SOR)
- Tertiary Operating Reserve 1 (TOR1)
- Tertiary Operating Reserve 2 (TOR2)
- Replacement Reserve (RR) (Synchronised and De-Synchronised)
- Steady-State Reactive Power (SSRP)
- Synchronous Inertial Response (SIR)
- Ramping Margin 1 (RM1)
- Ramping Margin 3 (RM3)
- Ramping Margin 8 (RM8).

The Interim Arrangements Framework Agreements also specified schedules for the three remaining DS3 System Services which were not procured as part of the Interim Arrangements namely:

- Fast Frequency Response (FFR)
- Fast Post-Fault Active Power Recovery (FPFAPR)

- Dynamic Reactive Response (DRR).

The technical definition of all of these services with the exception of Replacement Reserve (RR) (Synchronised and De-Synchronised) are not changing for DS3 System Services Regulated Arrangements.

2.8.3 Proposed Contract Structure

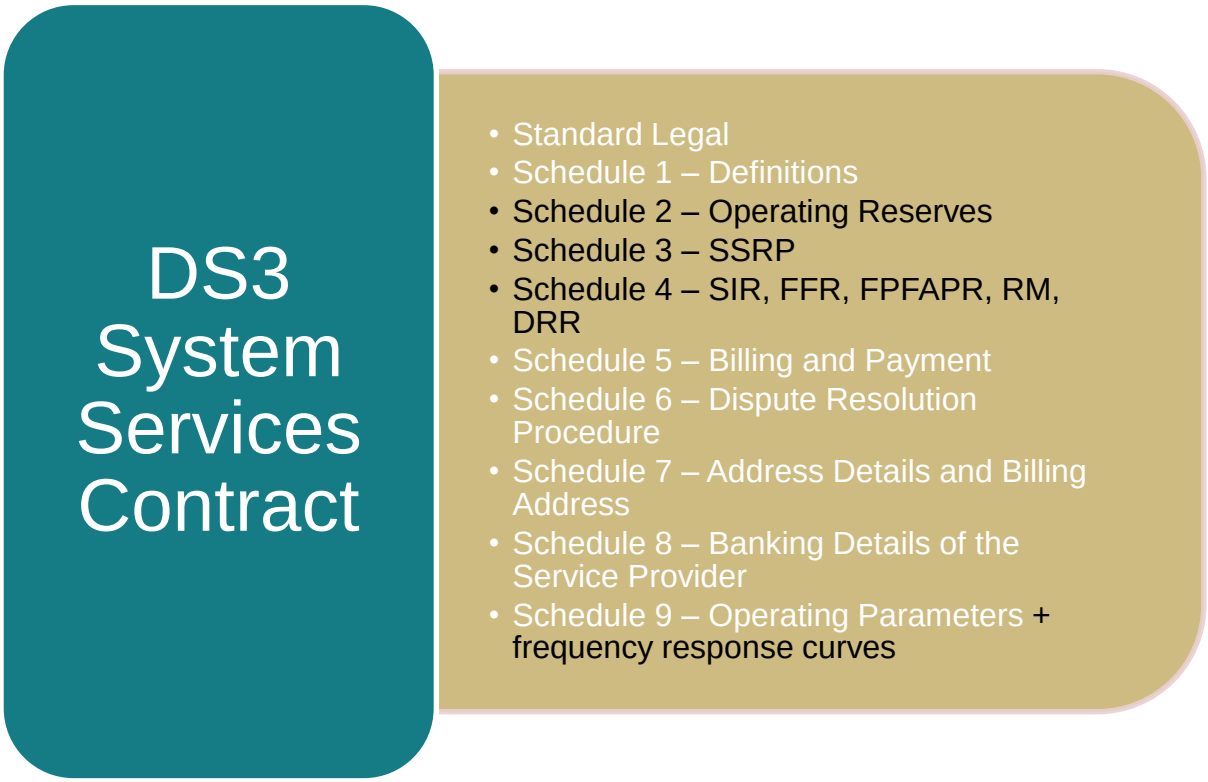

Figure 5: Contract Structure and sections changing relative to the Interim Arrangements

The payment schedules for these services have been modified to reflect the inclusion of new scalars where appropriate, reflecting the proposals in the Consultation on DS3 System Services Enduring Tariffs and the Consultation on DS3 System Services Enduring Scalar Design. As a decision on these consultations have yet to issue at the time of publication of this paper, the drafting is provisional and will be amended in the finalised published contract to reflect the final Enduring Scalar and Tariff consultation decisions. We are not inviting further comment on the scalar design as part of this consultation, with the exception of the FFR scalar detailed in Section 3.29 which was not included in the Enduring Arrangements consultation paper and on which we are inviting comment.

As noted in Section 2.4 the risk that there may be an overinvestment in high availability technologies and possible options to mitigate against this were explored in the Consultation on DS3 System Services Enduring Tariffs. On further consideration of the most appropriate mitigation options, the TSOs are proposing to implement a “Volume Capped” approach to address this risk of overinvestment. This is reflected in the proposals in this consultation paper given its impact on the proposed procurement structure and the TSOs invite comment in relation to the proposals.

3 Differences between proposed DS3 System Services Regulated Arrangements contracts and Interim Arrangements framework agreements by clause

Note: The contract drafting reflects proposals for the Volume Uncapped procurement only.

3.1 General

The contracts have been drafted to provide for standard service provider arrangements in Ireland and Northern Ireland with the intention of aligning such arrangements where possible. All references to the multi-provider Framework Agreements which formed the basis of the Interim Arrangements contractual arrangements have been removed as the Framework Agreement structure used for the Interim Arrangements no longer applies for the Regulated Arrangements.

3.2 Definitions and Interpretation (Section 1 of contract)

No changes are proposed to this section relative to the Interim Arrangements.

3.3 Commencement and Duration of Agreement (Section 2 of contract)

This section of the agreement sets out the duration of the arrangements has been modified to reflect the proposed term of the arrangements i.e. 6 years.

It is proposed, subject to regulatory approval that the Term of the Volume Uncapped and Volume Capped Category 1 procurement be 6 years. While it is proposed that the Term of the Volume Capped Category 2 procurement be 5 years (where the Providing Unit must be operational and capable of service provision by 1 January 2020). (Only the term for the Volume Uncapped procurement is specified in the draft contracts.)

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

3.4 Conditions Precedent (Section 2.3 of contract)

The clause has been amended relative to the Interim Arrangements to reflect the fact that the I-SEM will become operational in May 2018 and that the requirement for a Service Provider to be registered as the Participant (as defined in the TSC) for the Providing Unit under the TSC will alter.

3.5 Appointment (Section 2.4 of contract)

The clause has been amended relative to the Interim Arrangements to reflect the fact that the contractual structure is no longer that of a Framework Agreement.

3.6 Availability of Services (Section 2.5 of contract)

The clause has been amended relative to the Interim Arrangements to reflect the fact that the contractual structure is no longer that of a Framework Agreement. The same conditions in relation to availability of services continue to apply.

3.7 Implementation of Services (Section 2.6 of contract)

The section has been amended relative to the Interim Arrangements to reflect the fact that the contractual structure is no longer that of a Framework Agreement. The same conditions regarding implementation of services continue to apply.

3.8 Provision and Purchase of DS3 System Services (Section 3 of contract)

No changes are proposed to this section relative to the Interim Arrangements.

3.9 Payment (Section 4 of contract)

No changes are proposed to this section relative to the Interim Arrangements.

3.10 Monitoring and Metering (Section 5 of contract)

No changes are proposed to this section relative to the Interim Arrangements.

3.11 Assignment (Section 6 of contract)

No changes are proposed to this section relative to the Interim Arrangements.

3.12 Variations (Section 7 of contract)

No changes are proposed to this section relative to the Interim Arrangements.

3.13 Termination (Section 8 of contract)

The clause has been amended, relative to the Interim Arrangements, to reflect:

a. that the contract for the provision of one or more system services may be terminated by EirGrid or SONI with one year's notice.
b. that the contract may be terminated in the case of repeated poor performance in provision of DS3 System Services by a Providing Unit. The draft contract contains a placeholder for this proposal as the TSOs are considering what form this will take to ensure that a consistent process can be implemented for all Providing Units.

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

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?

3.14 Effect of Termination (Section 9 of contract)

No amendments are proposed to this section relative to the Interim Arrangements.

3.15 Force Majeure (Section 10 of contract)

No amendments are proposed to this section relative to the Interim Arrangements.

3.16 Limitation of Liability (Section 11 of contract)

The TSOs are assessing whether the amount of the Liability Cap needs to be revised in line with the increasing value of DS3 System Services. No other amendments are proposed to this section relative to the Interim Arrangements.

3.17 Confidentiality (Section 12 of contract)

No amendments are proposed to this section relative to the Interim Arrangements.

3.18 Additional Costs (Section 13 of contract)

No amendments are proposed to this section relative to the Interim Arrangements.

3.19 Dispute Resolution (Section 14 of contract)

No amendments are proposed to this section relative to the Interim Arrangements. It is proposed to maintain separate dispute resolution procedures for Ireland and Northern Ireland. In the future as the DS3 System Services arrangements mature, it may be appropriate to consider aligning the two processes.

3.20 Miscellaneous (Section 15 of contract)

No amendments, other than nomenclature, have been made to this clause relative to the Interim Arrangements.

3.21 Governing Law and Jurisdictions (Section 16 of contract)

No amendments are proposed to this section relative to the Interim Arrangements.

3.22 SCHEDULE 1 Definitions

A number of amendments have been made to this section relative to the Interim Arrangements to reflect updated definitions and to provide for new definitions.

3.23 SCHEDULE 2 Operating Reserves

The existing technical definitions for the reserve services POR, SOR, TOR1 and TOR2 have not changed relative to the Interim Arrangements. As communicated during recent industry workshops, we propose to redefine the Replacement Reserve Synchronised (RRS) and Replacement Reserve Desynchronised (RRD) services. This is further detailed in Section 3.24.6.

The payment schedules of all Operating Reserve services have been modified to reflect the inclusion of additional scalars, as proposed in the Consultation on DS3 System Services Enduring Scalar Design. As a decision on the Enduring Scalar Design has not yet issued at the time of writing, the translation of the proposed scalars into the contract are provisional. We are not inviting further comment on the scalar design as part of this consultation, with the exception of the FFR scalar detailed in Section 3.29 which was not included in the Enduring Arrangements consultation paper and on which we are inviting comment.

3.23.1 List of Schedule 2 Amendments

The following section details amendments that have been made to Schedule 2:

3.23.2 POR Payments (Section 3.2)

The POR Scaling Factor has been amended to include a POR Locational Scalar and a POR Temporal Scarcity Scalar.

The POR Locational Scalar has a minimum value of 1 and takes the value defined in Schedule 9.

The definition of the POR Temporal Scarcity Scalar will depend on the outcome of the Enduring Scalar consultation and subject to that provisionally holds the following values:

- 1 in the event that SNSP <=60%;

  or

- 6.2 in the event that SNSP >60% and <=70%;

  or

- 8.5 in the event that SNSP >70%;

The definition of POR Product Scalar has been amended to reflect an adjusted Reserve Trigger Scalar.

3.23.3 SOR Payments (Section 4.2)

The SOR Scaling Factor has been amended to include a SOR Locational Scalar and a SOR Temporal Scarcity Scalar.

The SOR Locational Scalar has a minimum value of 1 and takes the value defined in Schedule 9.

The definition of the SOR Temporal Scarcity Scalar will depend on the outcome of the Enduring Scalar consultation and subject to that provisionally holds the following values:

- 1 in the event that SNSP <=60%;

  or

- 6.2 in the event that SNSP >60% and <=70%;

  or

- 8.5 in the event that SNSP >70%;

The definition of SOR Product Scalar has been amended to reflect an adjusted Reserve Trigger Scalar.

3.23.4 TOR1 Payments (Section 5.2)

The TOR1 Scaling Factor has been amended to include a TOR1 Locational Scalar and a TOR1 Temporal Scarcity Scalar.

The TOR1 Locational Scalar has a minimum value of 1 and takes the value defined in Schedule 9.

The definition of the TOR1 Temporal Scarcity Scalar will depend on the outcome of the Enduring Scalar consultation and subject to that provisionally holds the following values:

- 1 in the event that SNSP <=60%;

  or

- 6.2 in the event that SNSP >60% and <=70%;

  or

- 8.5 in the event that SNSP >70%;

The definition of TOR1 Product Scalar has been amended to reflect an adjusted Reserve Trigger Scalar.

3.23.5 TOR2 Payments (Section 6.2)

The TOR2 Scaling Factor has been amended to include a TOR2 Locational Scalar and a TOR2 Temporal Scarcity Scalar.

The TOR2 Locational Scalar has a minimum value of 1 and takes the value defined in Schedule 9.

The definition of the TOR2 Temporal Scarcity Scalar will depend on the outcome of the Enduring Scalar consultation and subject to that provisionally holds the following values:

- 1 in the event that SNSP <=60%;

  or

- 6.2 in the event that SNSP >60% and <=70%;

  or

- 8.5 in the event that SNSP >70%;

The definition of TOR2 Product Scalar has been amended to reflect an adjusted Reserve Trigger Scalar.

3.23.6 Replacement Reserve - (Section 7)

The definitions of RRD and RRS have been amended to reflect modified definitions with respect to those specified in the Interim Arrangements.

Historically, in circumstances where the vast bulk of Replacement Reserve was provided by conventional generators, higher payments were made to units that could provide the service from an off-line desynchronised state (such units would have received the RRD rate) relative to units that needed to be synchronised to the system (such units would have received the RRS rate). To align with the principle of valuing Replacement Reserve service provision from Providing Units that do not need to be exporting active power at the time of service provision, and therefore that do not take up ‘headroom’ on the system that could be used to integrate renewables, we are proposing the following:

- DSUs will be eligible to provide the RRD service rather than the RRS service; and

- Energy Storage Units will be eligible to provide the RRD service when providing replacement reserve from a 0 MW position or when importing. When exporting, Energy Storage Units will be eligible to provide the RRS service.

This has been translated to the proposed legal drafting as follows:

"RR (De-synchronised)" means Replacement Reserve provided by the Providing Unit

when

(i) not Synchronised to the Power System in the case of a Synchronous Providing Unit,

or

(ii) when connected to the Power System and operating at a level less or equal to 0 MW in the case of an Energy Storage Providing Unit

or

(iii) when connected to the Power System in the case of a Demand Side Unit;

"RR (Synchronised)" means Replacement Reserve provided by the Providing Unit

when

(i) Synchronised to the Power System in the case of a Synchronous Providing Unit,

or

(ii) when connected to the Power System and operating at a level greater than 0 MW in the case of an Energy Storage Providing Unit or Power Park Module;

3.23.7 RR Payments (Section 7.2)

The RR Scaling Factors for both RRS and RRD have been amended to include an RRS Locational Scalar, RRS Temporal Scarcity Scalar, RRD Locational Scalar and RRD Temporal Scarcity Scalar respectively.

The RRS Locational Scalar has a minimum value of 1 and takes the value defined in Schedule 9.

The definition of the RRS Temporal Scarcity Scalar will depend on the outcome of the Enduring Scalar consultation and subject to that provisionally holds the following values:

- 1 in the event that SNSP <=60%;

  or

- 6.2 in the event that SNSP >60% and <=70%;

  or

- 8.5 in the event that SNSP >70%;

The RRD Locational Scalar has a minimum value of 1 and takes the value defined in Schedule 9.

The definition of the RRD Temporal Scarcity Scalar will depend on the outcome of the Enduring Scalar consultation and subject to that provisionally holds the following values:

- 1 in the event that SNSP <=60%;

  or

- 6.2 in the event that SNSP >60% and <=70%;

  or

- 8.5 in the event that SNSP >70%;

3.24 SCHEDULE 3 Steady-State Reactive Power

The SSRP Schedule has been amended to reflect the inclusion of three new scalars, namely the SSRP Wattless Scalar, the SSRP Locational Scalar and the SSRP Temporal Scarcity Scalar.

3.24.1 Steady-State Reactive Power Payment (Section 3.2)

The definition of the SSRP Wattless Scalar will depend on the outcome of the Enduring Scalar consultation and subject to that provisionally holds the following values:

- 2 in the event that the Providing Unit has been instructed by the Company to provide Reactive Power Control at a zero MW output level;

  or

- 1 otherwise;

The SSRP Locational Scalar has a minimum value of 1 and takes the value defined in Schedule 9.

The definition of the SSRP Temporal Scarcity Scalar will depend on the outcome of the Enduring Scalar consultation and subject to that provisionally holds the following values:

- 1 in the event that SNSP <=60%;

  or

- 6.2 in the event that SNSP >60% and <=70%;

  or

- 8.5 in the event that SNSP >70%;

3.25 SCHEDULE 4 Part A - Synchronous Inertial Response

3.25.1 SIR Payment (Section 3.2)

The SIR Schedule has been amended to reflect the inclusion of two new scalars, namely the SIR Locational Scalar and the SIR Temporal Scarcity Scalar.

The SIR Locational Scalar has a minimum value of 1 and takes the value defined in Schedule 9.

The definition of the SIR Temporal Scarcity Scalar will depend on the outcome of the Enduring Scalar consultation and subject to that provisionally holds the following values:

- 1 in the event that SNSP <=60%;

  or

- 6.2 in the event that SNSP >60% and <=70%;

  or

- 8.5 in the event that SNSP >70%;

3.26 SCHEDULE 4 Part B - Fast Frequency Response

3.26.1 FFR Payments (Section 3.2)

The FFR Scaling Factor has been amended to include four new scalars, namely an FFR Continuous Scalar, an FFR Fast Response Scalar, an FFR Locational Scalar and an FFR Temporal Scarcity Scalar.

The definition of the FFR Continuous Scalar will depend on the outcome of the Enduring Scalar consultation and subject to that provisionally holds the following values:

- 1.5 in the event that the Providing Unit is available to provide FFR, POR, SOR and TOR1 during the Trading Period;

  or

- 1 otherwise;

The definition of the FFR Fast Response Scalar will depend on the outcome of the Enduring Scalar consultation and subject to that provisionally holds the following values:

- 3 in the event that the FFR Response Time is ≤ 0.15 seconds;

  or

- ((0.5 - FFR Response Time)/(0.35)) +2 in the event that 0.15 < FFR Response Time <0.5 seconds;

  or

- ((2 - FFR Response Time)/(1.5)) +1 in the event that 0.5 seconds < FFR Response Time <2 seconds;

The FFR Locational Scalar has a minimum value of 1 and takes the value defined in Schedule 9.

The definition of the FFR Temporal Scarcity Scalar will depend on the outcome of the Enduring Scalar consultation and subject to that provisionally holds the following values:

- 0 in the event that SNSP <=60%;

  or

- 6.2 in the event that SNSP >60% and <=70%;

  or

- 8.5 in the event that SNSP >70%;

3.27 Defining the Provision of the FFR Service

The TSOs propose to use frequency response curves to define the provision of the FFR Service by diverse providing technologies. These frequency response curves will in turn inform the design of the product scalar for the enhanced provision of FFR specifically.

Our initial thoughts on these curves were proposed in the consultation on Enduring Scalar Design. Most respondents to the consultation were generally in favour of the proposals, while requesting further clarity on the nature of the parameters to be assigned to the curves and the composition of the product scalar for the enhanced provision of FFR.

The TSOs wish to take this opportunity to present our latest thinking on these matters in order to allow for further feedback from interested stakeholders. Our initial thoughts on these curves were proposed in the consultation on Enduring Scalar Design. Most respondents to the consultation were generally in favour of the proposals, while requesting further clarity on the nature of the parameters to be assigned to the curves and the composition of the product scalar for the enhanced provision of FFR. The TSOs wish to take this opportunity to present our latest thinking on these matters in order to allow for further feedback from interested stakeholders.

3.27.1 Consultation on Enduring Scalar Design

In the consultation paper on Enduring Scalar Design, the TSOs made proposals relating to the design of the product scalar for the enhanced provision of the FFR, POR, SOR and TOR1 Services.

With regard to POR, SOR and TOR1, the TSOs proposed 2 components for this scalar:

- A Trigger scalar, representing the frequency trigger capability of the providing unit; and
- A Type scalar, representing the type and profile of its response curve, where the TSOs defined the capability of a unit to respond in a dynamic or static manner.

With regard to FFR, the consultation paper proposed that, in addition to frequency trigger and response curve characteristics, further capabilities were under consideration by the TSOs to be included as components in this product scalar.

3.27.2 TSO Position for Regulated Arrangements

The TSOs are working to define the provision of the FFR Service through the utilisation of parametrisable frequency response curves: 1 curve to apply to units classified as having dynamic capability in response to a frequency event; 1 to apply to units classified 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. It is proposed that these curves will allow for the TSOs to define how each contracted unit is to provide FFR based on system requirements and a unit's confirmed capabilities

A set of criteria will be used to determine whether the dynamic or static curves, and their associated parameters, are to apply to a unit. The design of the product scalar for the Enhanced Provision of FFR will be underpinned by these curves; units with dynamic capability have the capacity to attract a higher scalar value.

Dynamic Capability:

The frequency response curve as illustrated in is to apply to units classified as having dynamic capability.

The curve shows 2 frequency triggers (F1 and F3) to provide a MW response. After the response is triggered, the unit must respond with a specified droop. The droop may be the same from both F1 and F3. The response to a frequency event and the recovery follow the same trajectory.

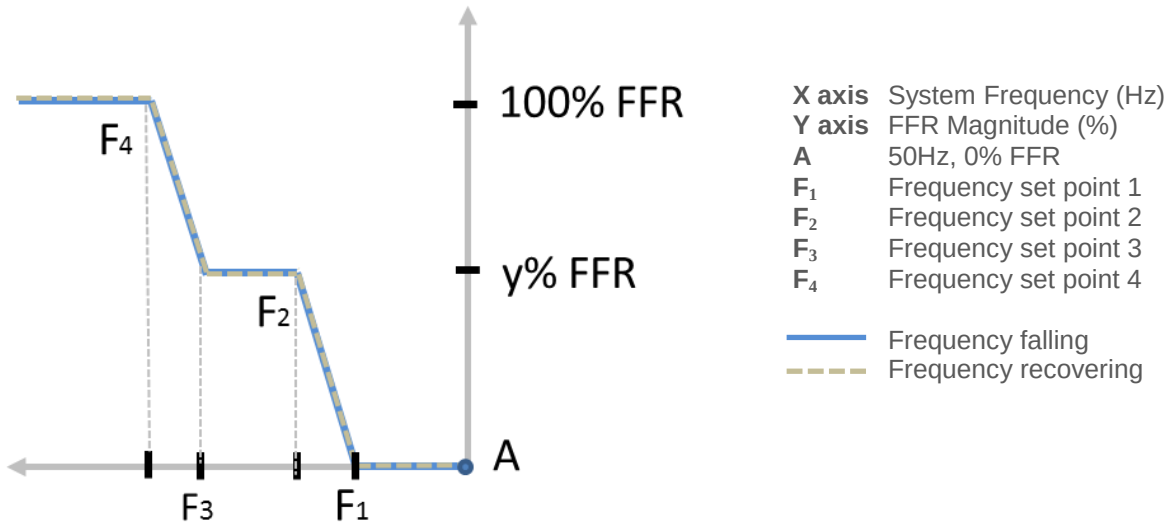

Figure 6: Frequency Response Curve - Dynamic Capability

It is proposed that the criteria used to determine whether a unit is eligible to be classified as 'dynamic' (and the dynamic curve applied) are as follows:

- The unit must be able to track changes in frequency dynamically;
- For units that provide responses to frequency events in discrete steps, the capability to provide at least 10 discrete steps, with no step greater than 5MW, is required;
- The frequency trigger setpoint, i.e. the frequency at which a unit is capable and willing to respond to a frequency event, is to be at least 49.8Hz;
- The unit must be able to provide a droop of at least 4% ;
- While the basic energy recovery requirement of the FFR product is to apply[11], to qualify as a dynamic provider, the unit must be able to operate without recovering its resource[12] until the system frequency has recovered to within 5% of the pre-event frequency in

[11] DS3 System Services Technical Definitions Decision Paper SEM-13-098 20/12/2013, page 10

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

[12] For example, a battery charging to its pre-event output

steady-state for a period of up to 5 mins (the exact timeframe is to be instructed by the TSOs);

- The unit's provision of POR, SOR and TOR1, if contracted for any of these Services, should mirror its FFR response characteristics.

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

The proposed components of the product scalar for the enhanced provision of FFR by a unit deemed to have met the minimum standards for dynamic capability, together with a proposal for the weightings of these components, are set out below:

- Dynamic trigger scalar, as graphically illustrated in Figure 7. The linear value range for this component scalar is proposed to be between 0.7 and 1, depending on the capability and willingness of the providing unit to respond to a frequency event at a frequency set point between 49.8Hz and 49.985Hz.

  Weighting: 60%

- Droop scalar, as graphically illustrated in Figure 8. It is proposed that the value of this component scalar is to be between 0.2 and 1, depending on the unit's capability to provide a response with a droop between 4% and 0.1% as required by the TSOs, and where a unit is to be incentivised to be capable of providing a droop above 2%.

  Weighting: 30%

- Response scalar. It is proposed that the value of this component scalar is to be 0.5 for units that are willing to provide a response at one frequency set point, and a value of 1 for units that are willing to provide a response at two frequency set points, as required by the TSOs.

  Weighting: 10%

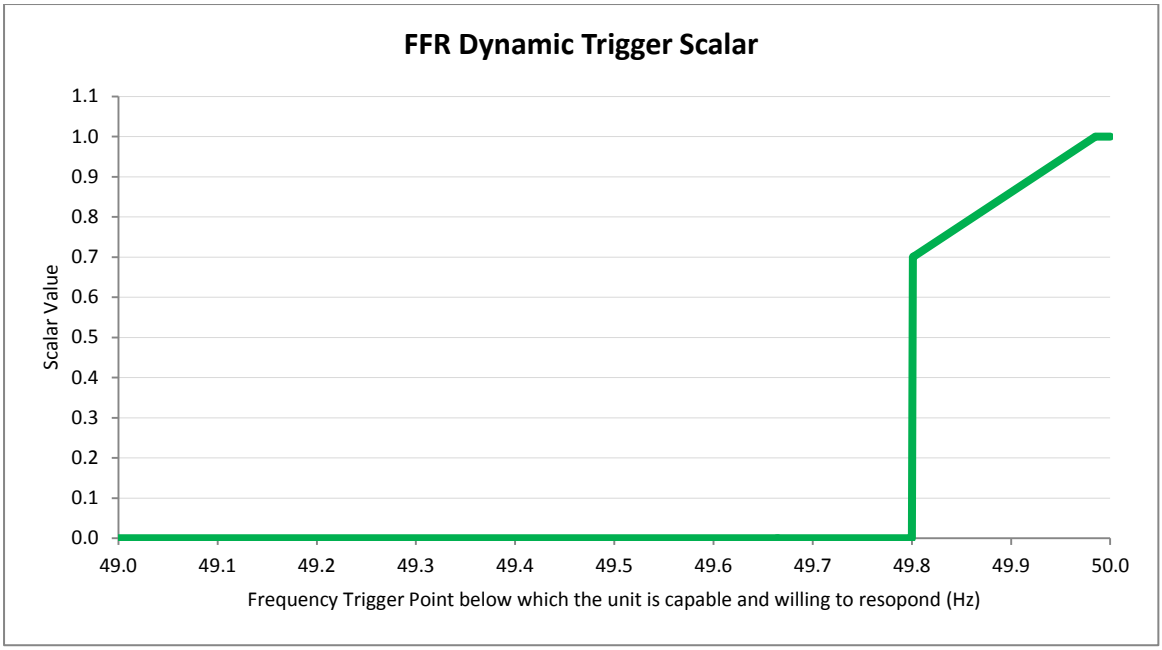

Figure 7: FFR Dynamic Trigger Scalar

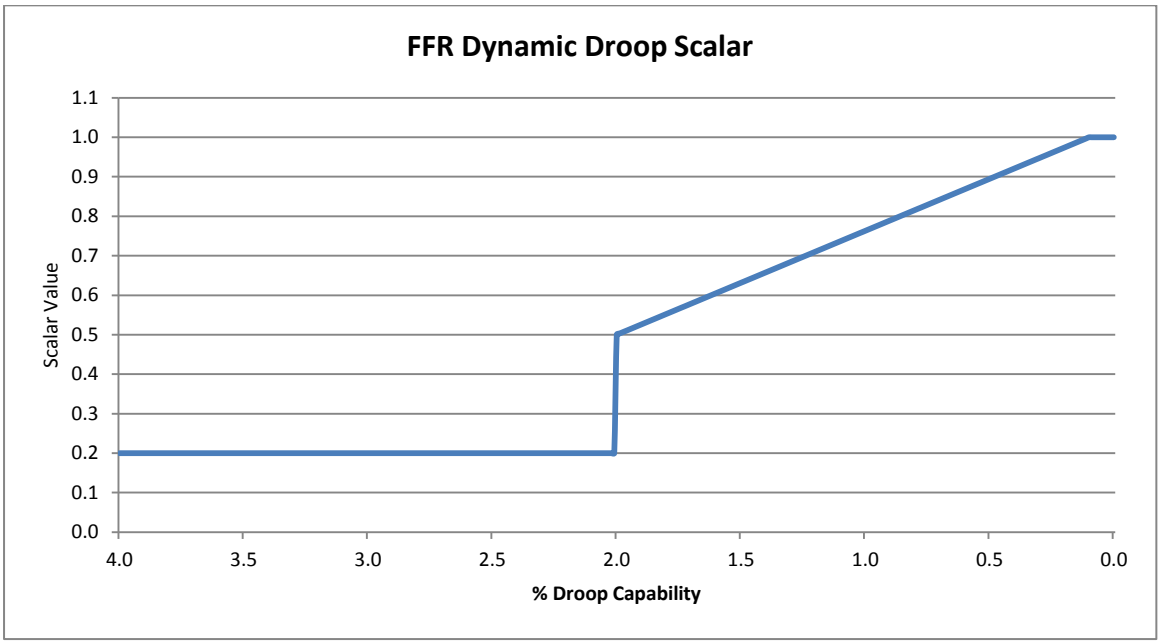

Figure 8: FFR Dynamic Droop Scalar

For example, a unit has the following capabilities:

Dynamic trigger:	49.9Hz	Scalar component value of 0.86
Maximum droop:	0.5%	Scalar component value of 0.89
Responses:	2	Scalar component value of 1

Calculation of overall scalar: (0.86 * 0.6) + (0.89 * 0.3) + (1 * 0.1) = 0.883

Note that the maximum value of the product scalar for the enhanced provision of FFR is 1 for a unit that has met the minimum standards for dynamic capability.

Static Capability:

The frequency response curve as illustrated in Figure 9 is to apply to units classified as having static capability.

The response to a frequency event and the recovery are implemented in multiple steps, i.e. there are multiple frequency trigger points. For the purposes of simplicity, the example shows 2 steps; a unit may wish to provide FFR in more than 2 steps. The example also shows recovery steps following a separate trajectory to the response (hysteresis), a capability that is to be incentivised by the TSOs.

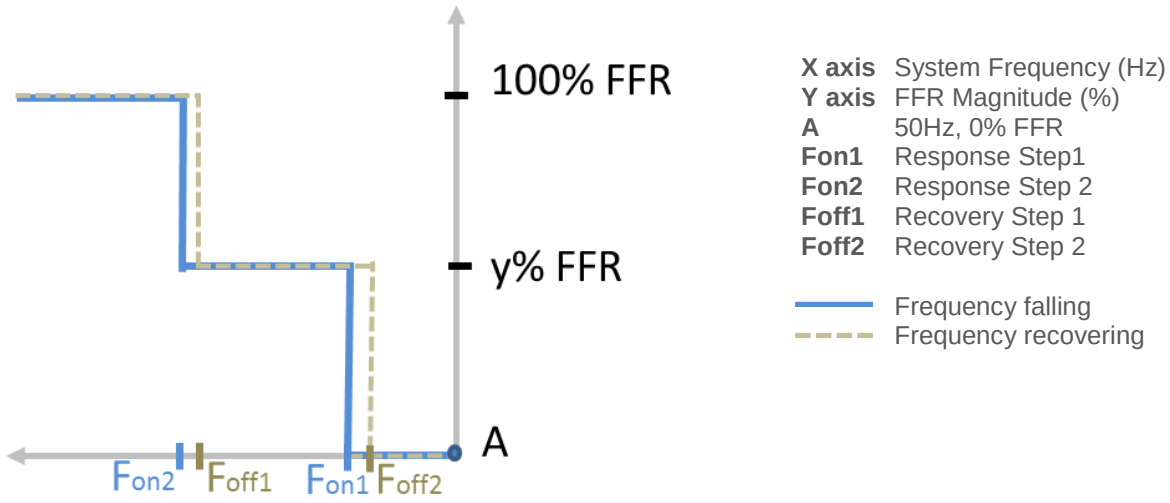

Figure 9: Frequency Response Curve – Static Capability

It is proposed that the criteria used to determine whether a unit is eligible to be classified as 'static' (and the static curve applied) are as follows:

- The frequency trigger setpoint, i.e. the frequency at which a unit is capable and willing to respond to a frequency event, is to be at least 49.3Hz;
- For units that provide responses to frequency events in discrete steps, the capability to provide steps not greater than 10MW is required; the TSOs must have the ability to choose to use the entire static response at one frequency trigger point;
- The basic energy recovery requirement of the FFR product applies; the Protocol Document will set out that a unit's recovery timeframe is to be agreed with the TSOs;
- The unit's provision of POR, SOR and TOR1, if contracted for any of these Services, should mirror its FFR response characteristics.

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

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

- Static trigger scalar, as illustrated in . The linear value range for this component scalar is proposed to be between 0.1 and 0.6, depending on the capability and willingness of the providing unit to respond to a frequency set point between 49.3Hz and 49.8Hz.

  Weighting: 60%

- Hysteresis scalar. It is proposed that a unit that can provide hysteresis control to its response to frequency events is to be rewarded with a component scalar of 1; a component scalar of 0.5 is to apply where no hysteresis capability is in place.

  Weighting: 20%

- Step scalar, as illustrated in Figure 11. The linear value range for this component scalar is proposed to be between 0.1 and 1, depending on the capability of the providing unit to provide between 1 and 9 discrete steps.

- Weighting: 20%

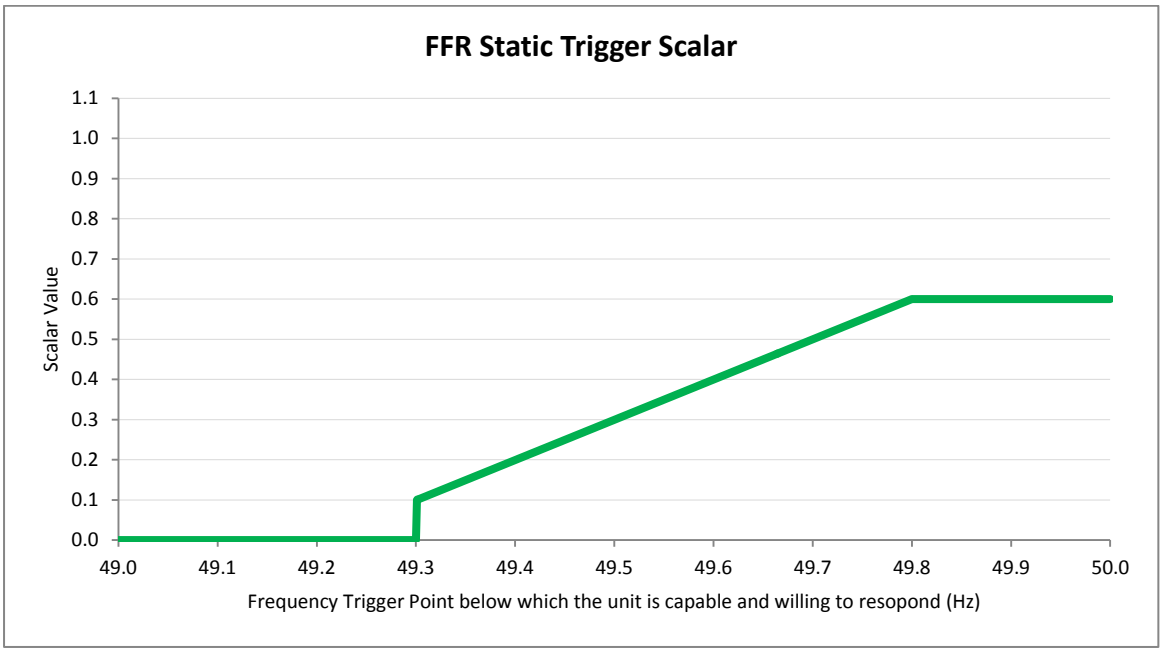

Figure 10: FFR Static Capability Trigger Scalar

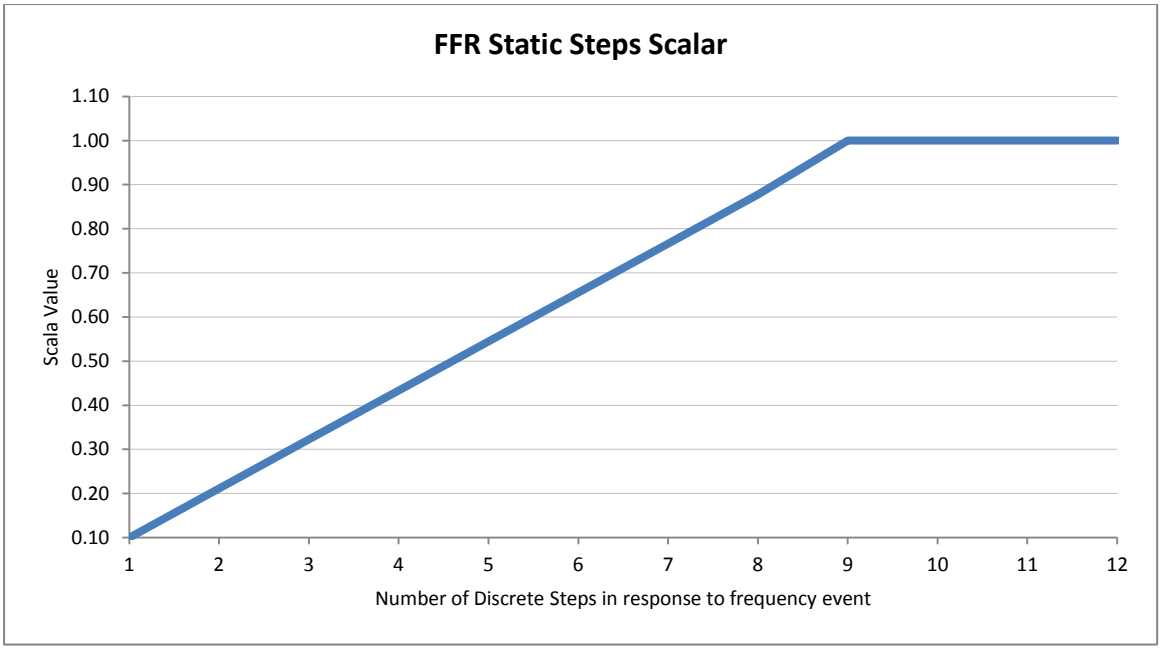

Figure 11: FFR Static Capability Steps Scalar

For example, a unit has the following capabilities:

Static trigger:	49.6Hz	Scalar component value of 0.4
Hysteresis:	No	Scalar component value of 0.5
Steps:	6	Scalar component value of 0.66

Calculation of overall scalar: (0.4 * 0.6) + (0.5 * 0.2) + (0.66 * 0.2) = 0.47

Note that the maximum value of the product scalar for the enhanced provision of FFR under this proposal is 0.76 for a unit that is deemed to have static capability.

Rationale for Scalar Values

With respect to the product scalar for the Enhanced Provision of FFR, dynamic and static provision of FFR is differentiated through the values assigned to the dynamic and static trigger scalar components described above. The difference in value between the components reflects the importance that the TSOs attach to the availability of dynamic capability at frequency set points between 49.8Hz and 49.985Hz.

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. This approach is described in detail in the Decision Paper on Enduring Tariffs.

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?

3.28 SCHEDULE 4 Part C - Fast Post-Fault Active Power Recovery

3.28.1 FPFAPR Payments (Section 3.2)

The FPFAPR Scaling Factor has been amended to include an FPFAPR Locational Scalar and a FPFAPR Temporal Scarcity Scalar.

The FPFAPR Locational Scalar has a minimum value of 1 and takes the value defined in Schedule 9.

The definition of the FPFAPR Temporal Scarcity Scalar will depend on the outcome of the Enduring Scalar consultation and subject to that provisionally holds the following values:

- 0 in the event that SNSP <= 70%;

  or

- 8.5 in the event that SNSP >70%;

3.29 SCHEDULE 4 Part D - Ramping Margin

3.29.1 RM1 Payments (Section 3.2), RM3 Payments (Section 4.2) and RM8 Payments (Section 5.2)

The RM1, RM3 and RM8 Scaling Factors have been amended to include two new scalars, namely a Locational Scalar and a Temporal Scarcity Scalar. The same scalars apply to all three ramping margin services, listed here as RM*.

The RM* Locational Scalars have a minimum value of 1 and take the values defined in Schedule 9.

The definition of the RM* Temporal Scarcity Scalars will depend on the outcome of the Enduring Scalar consultation and subject to that provisionally hold the following values:

- 1 in the event that SNSP <=60%;

  or

- 6.2 in the event that SNSP >60% and <=70%;

  or

- 8.5 in the event that SNSP >70%;

3.30 SCHEDULE 4 Part E - Dynamic Reactive Response

3.30.1 DRR Payments (Section 3.2)

The DRR Scaling Factor has been amended to include a DRR Locational Scalar and a DRR Temporal Scarcity Scalar.

The DRR Locational Scalar has a minimum value of 1 and takes the value defined in Schedule 9.

The definition of the DRR Temporal Scarcity Scalar will depend on the outcome of the Enduring Scalar consultation and subject to that provisionally holds the following values:

- 0 in the event that SNSP <= 70%;

or

- 8.5 in the event that SNSP >70%;

3.31 SCHEDULE 5 Billing and Payment Plan

It is not proposed to make any amendments to the Billing and Payment Plan relative to the Interim Arrangements.

3.32 SCHEDULE 6 Dispute Resolution Procedure

No amendments to the Dispute Resolution Procedure are proposed relative to the Interim Arrangements. Separate procedures will be maintained for Ireland and Northern Ireland.

3.33 SCHEDULE 7 Address Details and Billing Address

No amendments to Schedule 7 relative to the Interim Arrangements are proposed.

3.34 SCHEDULE 8 Banking Details of the Service Provider

No amendments to Schedule 8 relative to the Interim Arrangements are proposed. This schedule is included as optional in the existing Northern Ireland Interim Arrangements Framework Agreement.

3.35 SCHEDULE 9 Providing Units and Operating Parameters

A similar list of Operating Parameters to that used in the Interim Arrangements will be included in Schedule 9. In addition, parameterised frequency response curves will be included as discussed in Section 3.28 of this paper.

3.36 Arrangements for Intermediaries

In the existing Interim Arrangements, special arrangements have been implemented for intermediaries. While not explicitly accounted for in the draft contracts, provision will be made for intermediaries in the finalised contracts, subject to the approval of the Regulatory Authorities.

3.37 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.*"

The Regulatory Authorities' DS3 Project Board meeting on 4th July 2016 approved the TSOs' proposal to use the Final Physical Notification (FPN) as the appropriate market position in calculating a unit's available volume for system service provision.

Implementation of the proposed payment arrangements by the TSOs will require 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.

Figure 10 shows the TSOs' recommended high-level plan of action for development and implementation of the proposed new payment arrangements.

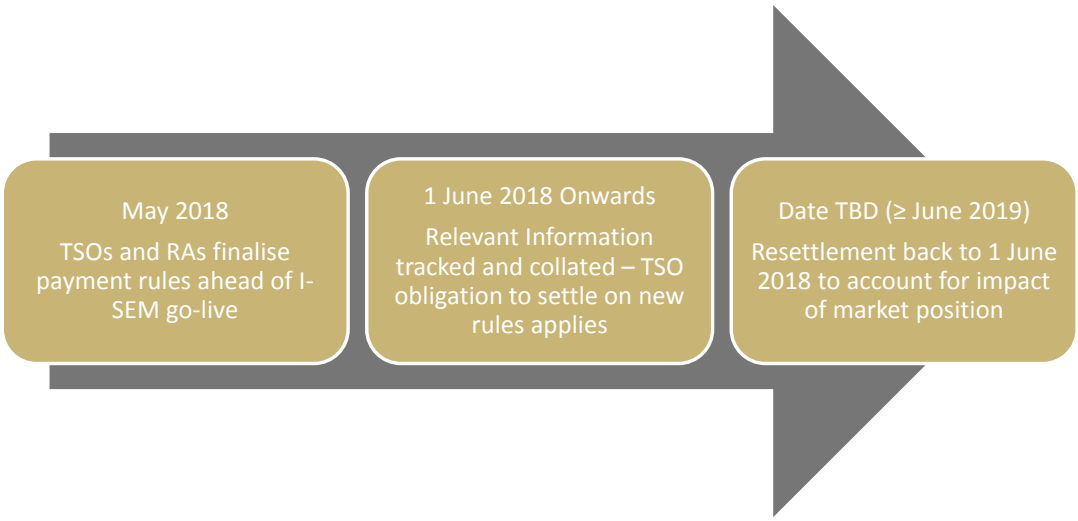

Figure 10: High-level plan for implementation of the payment ruleset

The TSOs will work with the RAs to develop the payment rules ahead of I-SEM go-live on 23 May 2018. A plan for this work is currently being developed. There will be a need for stakeholder engagement activities during the ruleset development. 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 endeavor 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 such a major change to settlement isn't possible to deliver mid-month (settlement is conducted on a calendar month basis).

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.

3.38 Price Certainty

In order to provide as much price certainty as possible while still ensuring appropriate expenditure controls are in place, the TSOs recommend that the tariff rates should be set once at the beginning of the regulated arrangements and only adjusted if specific conditions are met.

The TSOs consider it prudent that a conditional review of the tariff structure (and associated scarcity scalar structure) should be initiated during the term of the regulated arrangements under the following conditions:

- Subject to a tolerance, the TSOs would have the right to adjust tariffs and/or scarcity scalar values on a quarterly basis (i.e. every 3 months) if over-expenditure occurs for reasons other than high wind conditions subject to RA approvals;
- The TSOs would have the right to adjust tariffs and/or scarcity scalar values if there is significant under-expenditure in a particular tariff year as this may highlight a potential unbalanced tariff pricing or scarcity scalar structure.

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

3.39 Changes to the Protocol document

Changes to the Protocol document are currently under development. The following sections summarise the main areas of the document that will change.

3.39.1 Change in Governance of the Protocol document

It is proposed to change the Governance of the Protocol document so that it can be changed a maximum of once every 3 months, but the calendar for change will no longer be tied to specific months. The Protocol will still be subject to consultation and RA approval for a material change. This will 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 8: Do you have any comment on the proposed change to the Governance of the Protocol document ?

3.39.2 Performance Monitoring

As discussed in the Consultation on DS3 System Services Enduring Scalar Design and outlined in the earlier part of this paper, Performance Scalars will continue to be used to incentivise the reliable provision of DS3 System Services and details of the Performance Scalars will continue to be documented in the Protocol Document.

Performance reliability is a key aspect of the System Services arrangements. A unit that performs consistently when called upon to provide a DS3 System Service gives a greater degree of certainty to the TSOs than a unit that performs sporadically.

3.39.3 Certainty of Service Availability

The focus on performance to date has predominantly been on reliability of service provision. However, in the Consultation on DS3 System Services Enduring Scalar Design, we introduced a new concept that we propose to

integrate into DS3 System Services performance assessment, namely “Certainty of Service Availability”.

As certainty of service availability will become increasingly important as more Providing Units with greater variability in their service availability provide System Services, we propose that, for the Regulated Arrangements, the determination of the value of the Performance Scalar will include an additional measure to incentivise Providing Units to supply the TSOs with an accurate forecast of their availability to provide Reserve and Ramping Margin Services.

It is proposed that a Providing Unit contracted to provide any of POR, SOR, TOR1, TOR2, RRS, RRD, FFR, RM1, RM3 or RM8 services will be required to supply a forecast of availability of its availability to provide those services 6 hours in advance of a given Trading Period, where the submitted forecast covers a period of 6 hours.

Discount factors will apply where an ex-post evaluation of a Providing Unit’s declared forecasted availability against its actual availability shows an over-forecasting of availability.

It is not proposed to apply performance scaling to these declarations within the first 12 months of the Regulated Arrangements’ contract. This will allow time for Service Providers to develop their processes for providing accurate forecasting information.

In the interim period, a subset of Providing Units will be required to provide these forecasts. For providers who do not provide a forecast their current declared availability at the due time of forecast submission will be considered as their submitted forecast for scheduling and performance monitoring.

3.39.4 **Assessment of Events**

When called upon to provide a service it is proposed that a Providing Unit will be assessed in line with the following broad guidelines for calculating a Pass or Fail;

Service	Pass / Fail Criteria Proposal
SIR	No Performance Scalar proposed at this point in time. Assessment of compliance will be carried out from time to time, which, if a Providing Unit is found to be in breach of, could result in reduced payment until the TSO is satisfied that non-compliance issues are resolved.
FFR,POR,SOR,TOR1	• Retain existing design for CDGU units providing POR, SOR and TOR1. • For new providers partaking in the Qualification Trial Process (QTP) and those providing FFR, utilise the recommendations and learnings from the QTP to implement Pass/Fail standards.
TOR2,RRD,RRS,RM1,RM3,RM8	Assessment of dispatch up instructions against Sync Instructions, Load Up and Ramp Up rates where applicable. Dispatch down instructions are not proposed to be used for performance monitoring of these services.
SSRP	Assessment of the percentage time the reactive power output of a Service provider remains within a tolerance of their dispatched position, accounting for different modes of operation and AVR. When outside of this tolerance a “Fail” data record will be awarded.

FPFAPR / DRR	No Performance Scalar proposed at this point in time. Assessment of compliance will be carried out from time to time, which if a Providing Unit is found to be in breach of could result in reduced payment until the TSO is satisfied non-compliance issues are resolved.

3.39.5 DS3 System Services Performance Scalar

It is proposed that the Performance Scalar will consist of two components in the future;

a) Availability Discount Factor (P_A)
b) Event Response Factor (P_E)

The overall Performance Scalar will then be calculated as;

$$\mathbf{P = P_A * P_E}$$

The Availability Discount Factor will account for Service Providers' abilities to forecast their availability to provide a service within a tolerance for each Trading Period. As stated previously, it is proposed to retain this scaling element as "1" for the first year of the contracts (at a minimum) to allow time for Service Providers to develop accurate forecasting methods and allow the TSOs to better understand tolerance and scheduling requirements.

The Event Response Factor will be based on a comparison of a Providing Unit's expected response with its achieved response at the time of an event. As operating reserve service provision tends to be relatively data poor in terms of events, it is proposed to retain partial passes between achieved responses of 70% to 90% of the expected values, whilst applying binary pass/ fail criteria when the other units fall outside a tolerance.

Service	Pass / Fail Criteria Proposal
SIR	NA
FFR,POR/SOR/TOR1	Fail <70% Pass>90% Sliding Scale >70% but <90%
TOR2,RRD,RRS,RM1,RM3,RM8	Binary Pass/Fail
SSRP	Binary Pass/Fail
FPFAPR / DRR	NA

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

3.40 Operational Requirements

It is proposed to include a section in the Protocol Document in which the TSOs will set out the operational requirements applicable to individual DS3 System Services or categories of DS3 System Services. This section will be additional to the existing sections describing compliance and performance monitoring methodologies.

It is proposed that these operational requirements will include minimum standards that Providing Units must meet, as well as operational constraints and obligations in their provision of DS3 System Services.

These operational requirements are currently under consideration by the TSOs. Decisions will be reflected in the Protocol Document.

3.41 Provisional Timeline for Tender Submission and Contract Award

Table 2 below gives an overview of the provisional timeline for tender submission and contract award.

2017/2018 DS3 SS Central Procurement Timetable (provisional)	Issue of OJEU notice of tender	Tenders Receipt	Letters to tenderers informing them of outcome	Final date for contract signature
Phase 1 Volume Uncapped (11 Services)	30/11/2017	18/01/2018	02/04/2018	30/04/2018
Phase 2 Volume Uncapped (3 Services)	30/03/2018	18/05/2018	02/08/2018	31/08/2018
Volume Capped Category 1 (5 Services)	30/03/2018	18/05/2018	02/08/2018	31/08/2018
Volume Capped Category 2 (5 Services)	30/03/2018	18/05/2018	02/08/2018	31/08/2018

Table 2: Provisional Timelines for Tender Submission and Contract Award

4 Summary of Consultation Questions

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?

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

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

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

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?

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?

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

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

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

5 Next Steps

5.1 Consultation Responses

SONI and EirGrid welcome feedback on the questions posed within this paper and/or additional comments, which will be used to inform the development of the final contracts.

Responses should be submitted to DS3@soni.ltd.uk or DS3@EirGrid.com before 17 October 2017 (using the associated template spreadsheets for comments). It would be helpful if responses to the questions include justification and explanation.

It would be helpful if responses are not confidential. If you require your response to remain confidential, you should clearly state this on the coversheet of the response. We intend to publish all non-confidential responses. Please note that, in any event, all responses will be shared with the Regulatory Authorities to inform their approval of the final contracts.

5.2 Stakeholder Workshop

To facilitate stakeholder engagement on the proposed contracts and procurement process, we will host an industry workshop during the consultation period. This workshop, which is scheduled for 12 October 2017, will provide an opportunity for discussion on a range of contractual and procurement-related matters including the details of this consultation paper.

Should you wish to register, please contact DS3@soni.ltd.uk or DS3@EirGrid.com.