

Consultation on DS3 System Services Market Ruleset

DS3 System Services Implementation Project

15 March 2018

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Glossary of Terms

Availability: the payment basis for DS3 System Services. If a volume of a given system service, from a DS3 System Services contracted party, is technically realisable in a trading period, then that volume is deemed 'available' for that trading period and is eligible for remuneration. This applies irrespective of the TSOs' real-time requirement for that service.

Demand Side Unit (DSU): a demand side unit, i.e. a unit which can reduce its energy consumption in response to a relevant signal or event, e.g. a frequency deviation for Fast Frequency Response, or a dispatch instruction for energy provision.

Physical Notifications (PNs): a MW profile, generally submitted by generator units, which at all times should be the participant's best estimate of its intended generation and/or consumption, excluding any accepted offers or bids in the balancing market, i.e. these must be a best estimate of the Final Physical Notification. These must be physically feasible.

Final Physical Notifications (FPNs): for units which are mandated to submit a PN, the last PN profile submitted by a participant before the balancing market gate closure will become its FPN profile for the relevant trading period. This should reflect their position from ex-ante trades in those periods (within a certain tolerance), and must be physically feasible. For units which are not mandated to submit a PN, their availability profile in real-time operation of the system will become their FPN profile, regardless of whether they have submitted a PN profile.

Remuneration Volume: For a given system service, the volumes that are remunerated, i.e. these are the volumes following the application of all scalars (including product, performance and scarcity scalars).

Temporal Scarcity Scalar: A scalar which will be applied to System Services remuneration to create marginal incentives for providers to make themselves available during periods of scarcity, therefore enhancing the performance of the system where it is most needed.

Executive Summary

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

The SEM Committee 14-108 decision on the DS3 System Services procurement design decided that providers with a system services contract should be paid for the volume of the service that has actually provided or made available in that trading period to the TSO regardless of requirement for that service. In effect, the higher of a unit's market position or physical dispatch will be used to determine the available volume and as such, the remuneration for providers.

In the subsequent DS3 System Services Tariffs and Scalars SEM Committee Decision Paper SEM-17-080 it was noted that complexities existed with respect to the decision to pay the higher of Market or Physical Position and as such, it was requested that the Regulatory Authorities work with the TSOs to provide further clarity to industry on a ruleset for applying this principle to ensure sensible outcomes are achieved. This consultation represents the results of that further work and proposes the rules that will be used for settlement with respect to market versus physical dispatch position.

The proposals in this consultation are that the higher of market versus physical will only be paid for providers and for services for which such an approach is implementable and appropriate. This includes remuneration for I-SEM registered synchronous generators, for reserve-like services only (FFR, POR, SOR, TOR1, TOR2, RRS and RRD). Conversely, providers for which such an approach is not appropriate or implementable will be remunerated based on physical dispatch position only. This includes non-synchronous I-SEM units and non I-SEM units, as well as all providers for the system services which are not listed above. These proposed rules will be adhered to at I-SEM go-live and will be monitored on an ongoing basis with changes to the rules possible as needed.

Consideration is also given to the application of the scarcity scalar for units which are constrained on, with options presented.

Risks are highlighted with respect to management of expenditure and potential consequences of excess availability leading to overspend, with it proposed that these risks are monitored and acted upon on an ongoing basis post I-SEM go-live. The mechanism by which this ruleset will be monitored is proposed.

In this consultation, we are seeking stakeholders' views on the proposals. SONI and EirGrid welcome feedback on the questions posed within this paper, which will be used to inform the decision paper that will be submitted to the SEM Committee for approval.

Responses should be submitted to DS3@soni.ltd.uk or DS3@EirGrid.com before April 11th 2018 using the associated questionnaire template.

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1. Introduction and Background

1.1 The DS3 Programme

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.

We have a responsibility to enable increased levels of renewable sources to generate on the power system while continuing to ensure that the system operates securely and efficiently. Our Delivering a Secure Sustainable Electricity System (DS3) programme seeks to address the challenges of increasing the allowable System Non-Synchronous Penetration (SNSP) up to 75% by 2020, whereby the curtailment of wind would be reduced to approximately 5% per annum.

The results of the programme are now beginning to deliver benefits to the consumer. In recent months the maximum SNSP level allowable has increased to 65% (on an operational trial basis). 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.

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 these higher levels of non-synchronous generation.

1.2 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 products (POR, SOR, TOR1, TOR2, SSRP, RRS, and RRD) procured under these Harmonised Ancillary Services (HAS) arrangements.

New services are required to support a move to higher levels of non-synchronous generation. Four services (SIR, RM1, RM3, and RM8) were introduced from 1 October 2016 following the commencement of the new DS3 System Services arrangements. A further 3 services (FFR, DRR, FPFAPR) 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 products.

Table 1: Summary of DS3 System Services¹

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 MW output that can be delivered with a good degree of certainty for the given time horizon.
Ramping Margin 3	RM3	MWh	
Ramping Margin 8	RM8	MWh	
Fast Post Fault Active Power Recovery	FPFAPR	MWh	Active power (MW) >90% within 250ms of voltage >90%
Steady State Reactive Power	SSRP	Mvarh	(Mvar capability)*(% of capacity that Mvar capability is achievable)
Dynamic Reactive Response	DRR	MWh	MVAr capability during large (>30%) voltage dips

¹ Further detail on the DS3 System Services can be found at: <http://www.eirgridgroup.com/how-the-grid-works/ds3-programme/>

1.3 DS3 System Services Expenditure Cap

In its SEM-17-80 decision paper², the SEM Committee approved the expenditure cap for DS3 System Services of €235m/annum by 2020. In this decision, the SEM Committee also reaffirmed its view that the System Services arrangements should be consistent with the energy trading arrangements.

The SEM Committee’s annual cap “glide path” is shown in Figure 1 below. It should be noted that this represents a cap, and does not guarantee that these monies will be spent.

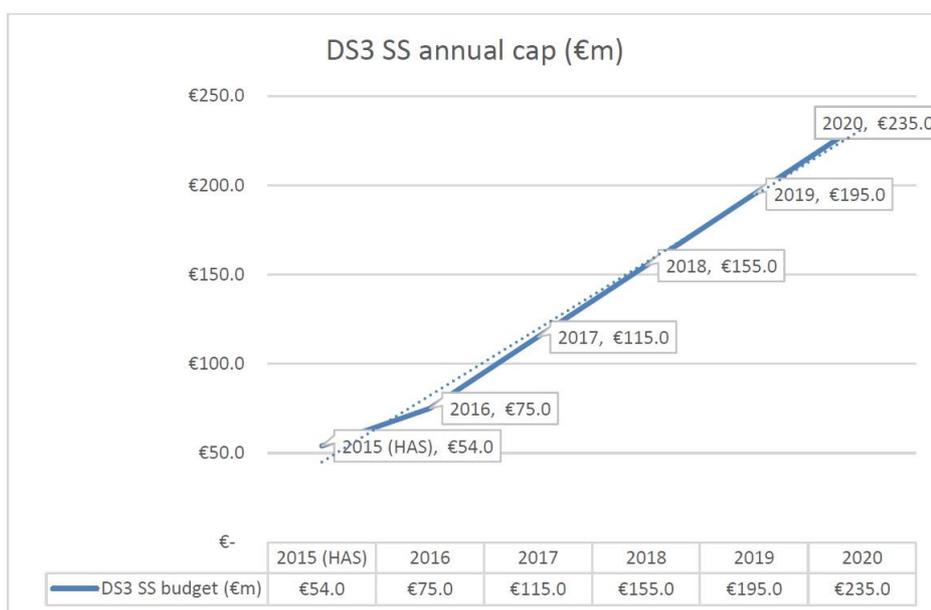


Figure 1: SEM Committee’s DS3 System Services Annual Cap³

1.4 Market versus physical dispatch position

A general principle for DS3 System Services is that they will be paid on an availability basis, and that tariffs are put in place to incentivise providers to provide this service availability. The SEM

² ‘DS3 System Services Tariffs and Scalars SEM Committee Decision’

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

Committee 14-108 decision⁴ on the DS3 System Services procurement design provided the following direction with regard to determining the amount that a 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 4 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

Figure 2 illustrates the impact of this decision on a service provider with a Final Physical Notification at T – 1 hour of 350MW, who is moved to a physical dispatch position of 370MW.

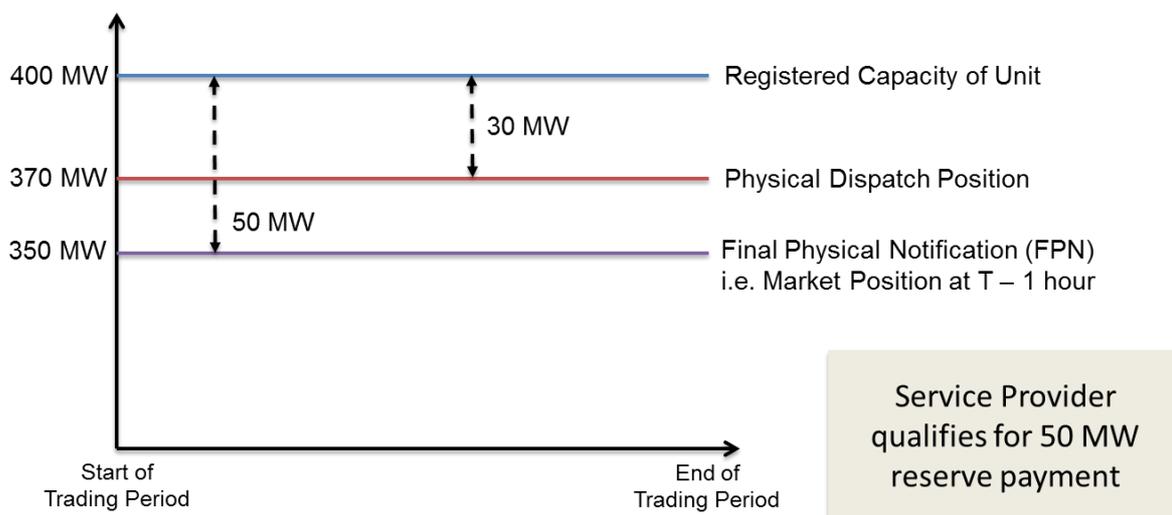


Figure 2: Example of impact of market versus physical dispatch position on provider which has output increased

Conversely, Figure 3 demonstrates this approach for a circumstance in which the output of a unit is decreased from its FPN to its physical dispatch position. It can be seen in this circumstance that the service provider also qualifies for 50MW reserve payment given that this figure represents the highest availability and therefore the highest remuneration.

⁴ ‘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>

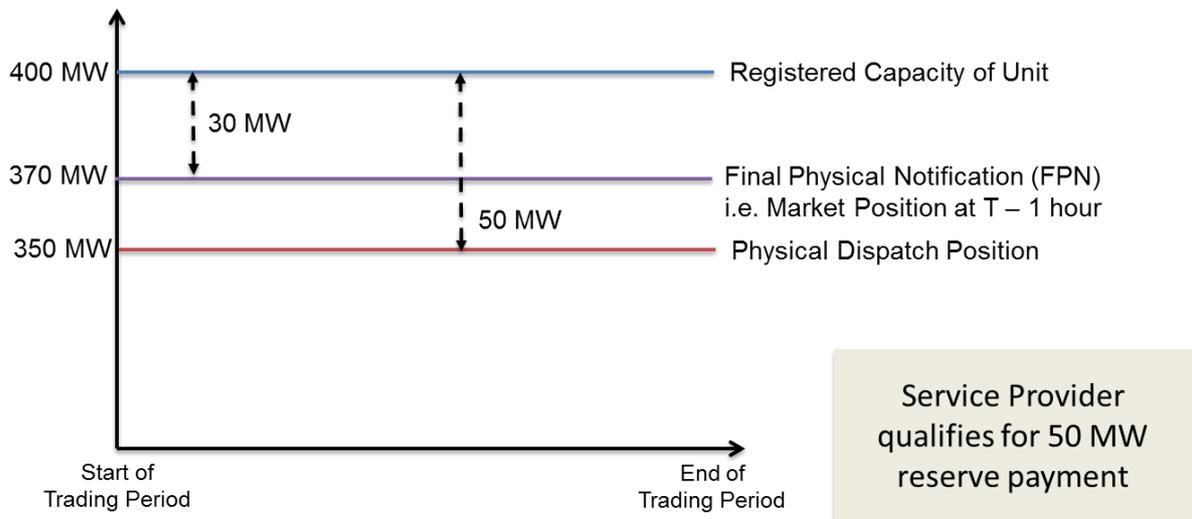


Figure 3: Example of impact of market versus physical dispatch position on provider which has output decreased

It can be seen from these two examples that the aim of applying this rule is to ensure that System Services payment (based on availability) is not negatively impacted as a result of TSO actions. Such an approach enables control over revenues for providers which in turn, can enable more certainty for investment.

It was subsequently noted that implementation of the proposed payment arrangements by the TSOs would 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. Specifically, in the subsequent DS3 System Services Tariffs and Scalars SEM Committee Decision Paper SEM-17-080⁵ several complexities were noted with respect to the decision to pay the higher of Market or Physical Position, particularly “in relation to the development of principles of availability for technology that are not explicitly energy market linked”.

A specific concern relating to application of the temporal scarcity scalar to units that are constrained on by the TSO was highlighted, with the SEM Committee agreeing “in principle that the temporal scarcity scalar should not apply to units that are constrained on. However, it is noted that there may be practical implications which would need to be considered prior to implementation”. The reasoning behind this and the practical considerations are explored in Section 3.5.3 of this consultation paper as well as options for implementation.

Overall, the SEM Committee noted their wish to see the market versus physical dispatch decision implemented “as soon as is practical and requests that the Regulatory Authorities work with the TSOs to provide further clarity to industry on the appropriate ruleset that needs to be

⁵ DS3 System Services Tariffs and Scalars SEM Committee Decision Paper SEM-17-080

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

applied to achieve sensible outcomes in this regard". This consultation represents the results of that further work, and proposes ahead of I-SEM a ruleset which will be used for settlement with respect to market versus physical dispatch position.

It should also be noted that as well as I-SEM go-live there are associated changes such as the replacement of the Bidding Code of Practice (BCOP) with the Balancing Market Principles Code of Practice (BMPCOP), along with the go-live of the new System Services contracts and tariffs. As such, a number of new complex areas are interacting with each other. The TSOs are aware of these interactions and complexities and intend to monitor these interdependencies on an ongoing basis after I-SEM go-live. The mechanism for this ongoing monitoring with respect to this ruleset is proposed in Section 4.2.

1.5 Purpose of the Paper

The purpose of this consultation paper is to propose a ruleset for the settlement of System Service availability with respect to market or final physical dispatch position, and set out the approach to further developing/modifying the ruleset in future.

Questions are provided for which the TSO requests responses for by **11th April 2018**.

1.6 Structure of the Paper

The remainder of this consultation is structured as follows:

Section 2 provides an overview of the background to the market versus physical dispatch position and the context within which the application of this should be considered.

Section 3 evaluates specific areas for which the application of the market versus physical dispatch ruleset should be considered and provides proposals.

Section 4 considered the next steps and briefly outlines the requirement for ongoing monitoring.

Section 5 summarises the questions posed in this paper.

2. Market versus Physical Dispatch Position: Principles and Recommendations

2.1 Background to market versus physical dispatch position

In 'DS3 System Services Procurement Design and Emerging Thinking' decision paper⁶ published in 2014, the SEM Committee decided that a provider with a System Services contract should be paid for the volume of the service that has actually been provided or made available in that trading period to the TSO regardless of the TSO's real-time requirement for that service. In effect, the higher volume of System Service availability arising from either the market or physical dispatch position would be remunerated.

To provide context to this approach, it is important to understand the traditional interaction between energy markets and service provision under the SEM arrangements (under which this 2014 paper was published). Historically the energy market has been predominately supplied by synchronous generators such as gas fired power plants. Reserves from synchronous generators generally represent a small percentage of their overall registered capacity for energy, with availability levels directly related to the physical position of the generator. In the central dispatch model used in Ireland and Northern Ireland under SEM, the TSO dispatches all providers to their market position or otherwise. Deviations made by the TSO away from a provider's output generally consisted of re-dispatch up and down from the market position to provide reserves as needed, or to manage operational constraints. In this world there is no major excess of the amount of reserve services, as there are natural limits on the output of synchronous generators.

Multiple changes have taken place and will continue to take place in the near future including:

- I-SEM market go-live, with associated uncertainty in market outputs (and the resulting levels of reserve availability and payments)
- Policy objectives requiring increasingly high levels of renewables
- Decreasing technology costs leading to large scale participation from new technologies
- The implementation of new System Services

Whilst under I-SEM the TSO will still dispatch units, the increased transparency as well as the market based mechanism for dispatching units from their positions means that in general, there is expected to be less TSO interaction (following the 'market first' approach of the European

⁶ 'DS3 System Services Procurement Design and Emerging Thinking'

<https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-14-108%20DS3%20System%20Services%20Decision%20Paper.pdf>

Target model). As the generation mix changes, more System Service providers are likely to have service availability which is not linked to their energy market position (and in some cases, may not have an energy market position). This is likely to increase in the future as further decentralisation of service provision takes place, in line with trends in other jurisdictions.

It should also be noted that this 2014 decision was made at a point in time where only 7 System Services existed, namely POR, SOR, TOR1, TOR2, SSRP, RRS, and RRD (i.e. more traditional 'reserve'-like products). As outlined in Section 1.2, new services are being implemented to manage the changing nature of the system and to facilitate a significant increase in renewable levels. These services do not necessarily have the same reserve-like characteristics or dependency on energy market position as the services listed above.

This change in the energy market, the interactions of this market with service availability, as well as the advent of new types of service providers and new System Services represents the landscape in which the implementation of the market versus physical dispatch ruleset must be considered.

2.2 Assessment of market versus physical dispatch and ongoing monitoring

With respect to the outlined reasoning for the market versus physical dispatch decision, we consider the most appropriate implementation mechanism post I-SEM go-live, assessed against the landscape outlined above.

The primary principle against which these rules will be assessed at this time is whether they are implementable and robust. With I-SEM go-live and the advent of new types of providers and new services, the application of the market versus physical dispatch payment may not be possible or implementable in all cases.

A second principle against which the ruleset for market versus physical dispatch position should be assessed is expenditure. Monitoring and assessment of this will be of particular focus on an ongoing basis, post I-SEM go-live, as we increase our understanding of market participant behaviour and the impact on service availability and remuneration.

In this regard, we see a general ongoing risk of I-SEM market positions resulting in excess service availability. The changing nature of the market and system could give rise to various scenarios which could lead to an excess of availability and as such, over-expenditure. One such example would be as follows.

- Where the energy market leads to a large scale reduction in the market position of conventional synchronous generation, the energy market may no longer fully meet the operational safety requirements of the system.
- In these high SNSP scenarios, the TSO may need to curtail wind generation in order to respect operational limitations. This could also result in additional System Service availability provision from curtailed wind generation (e.g. reserves, ramping) which will also need to be remunerated.

- In such a scenario the system resilience needs are likely to be provided by synchronous generators which the TSO will have to move from their market position i.e. by dispatching/constraining on. This will result in constrained synchronous generators receiving System Services payments for their service availability (e.g. reserves, ramping, etc.).
- In addition, new technologies have a capability to provide significant reserve services with little or no deviation from their inert market position, i.e. demand side units fully consuming and available for reserves, or energy storage devices not generating and available for high levels of reserves. These services would also need remuneration.
- The combination of these effects could lead to very high service availability, with the resultant System Services expenditure potentially excessive.

It should be noted that frameworks are in place to provide mechanisms via which both expenditure and incentives can be managed, including via the adjustment of tariffs allowable under the System Services Volume Uncapped regulated arrangements contracts. This will be vital since should such examples and practices become commonplace, the allowed System Services expenditure cap will likely be exceeded rapidly.

Whilst the application of the market versus physical dispatch remuneration will not resolve in itself the risks outlined above, it is critical that it is set out ahead of I-SEM go-live, and that remuneration based on System Service availability is monitored on an ongoing basis.

As such, we recommend strong ongoing monitoring as well as the potential evolution of this ruleset post I-SEM go-live (see Section 4.2).

2.3 Assessment overview

The following section provides an overview of a number of considerations which should be evaluated with respect to the market versus physical dispatch position, and the appropriate ruleset for its implementation.

The areas considered in the ruleset are:

- **Service basis** – the timescales and service basis over which the assessment of availability should be calculated
- **Treatment of providing units** – the correct application for different types of providing units and the appropriate arrangements in the case of non-market registered units
- **Nature of services** – the most appropriate approach for the different System Services
- **Scalar Framework** – interactions with calculation and application of scalars including scarcity scalar
- **Forced Outages** – Treatment of units who have System Service availability in their market positions but who are 'forced out'

3. Proposed Market Ruleset

3.1 Introduction

The objective of this section of the consultation is to outline a number of areas where evaluation is warranted with respect to the implementation of the market versus physical dispatch recommendation, and to propose rules for these areas. In certain areas it is necessary to evaluate whether the decision can be implemented initially, given specific complexities and/or concerns. In all circumstances it is proposed that the resultant ruleset will be monitored on an ongoing basis to ensure its effectiveness, with changes possible in the future. Specifically, the complexities identified in implementation for certain providers and services should be reviewed during the implementation period outlined in Section 4.1

3.2 Service Basis or Aggregated Solution

Whilst the overarching principle of paying the higher of market or physical dispatch is provided by the SEM Committee decision, one area in need of clarification is the resolution over which this principle is applied: both in time and across service portfolio.

Current settlement methodologies are based on settlement of System Services for a given trading period. The TSO proposes that to apply the remuneration rules over any other time resolution would add significant complexity and uncertainty and as such, we consider this the only viable option at present. By applying remuneration rules on a trading period basis this also better aligns with the energy market at large.

We also propose that the principle should be applied to each individual service in isolation. System Services will be settled on a per service basis, with the relevant tariff rates and scalars applied on a per service basis also. The ruleset regarding market versus physical can therefore be incorporated into the same remuneration calculation. To apply this higher of market or physical position principle to an aggregated service would require an entirely separate and new methodology for calculating System Service remuneration. We suggest that this would add significant complexity to the process and is likely to reduce transparency in the process.

TSO Proposal: Market versus physical dispatch approach will be applied on a per System Service basis and per trading period basis.

Question 1: Do you have any views in relation to the basis on which system service availability will be remunerated?

3.3 Treatment of providing units

Consideration must be given into how various types of technology should be treated, as well as the extent to which units registered in I-SEM reflect or match the units contracted for the provision of System Services. Whilst the principles of paying the higher of market or physical dispatch position can be readily understood for conventional synchronous generation, the same is not true for all types of providers. We examine the potential complexities for a number of technology types and propose the most appropriate rules for implementation. It is important to highlight that this represents a proposed ruleset for I-SEM go-live and that this ruleset can be modified in due course should the need to do so be identified as part of the proposed ongoing monitoring (proposed in Section 4.2).

Units not registered in I-SEM Energy Market

The market versus physical dispatch decision and subsequent TSO implementation recommendation is predicated on a unit having a market position in I-SEM and an associated Final Physical Notification (FPN). Without this market participation and associated FPN, it is not possible to remunerate for System Services based on their availability related to their market position. It should be noted that requirements in relation to registration in the Balancing Market under I-SEM is set out as part of Part B of the TSC, Section B.6.

An alternative indication of market position may be possible, but this is unlikely to be feasible ahead of I-SEM go-live. We therefore propose that for units which are not registered in the market, remuneration will be based on their physical dispatch position only.

TSO Proposal: Units which are not registered in the I-SEM energy market will be remunerated for System Services based on physical dispatch position only.

Synchronous Compensators

Synchronous compensators are service providers which are synchronised with the transmission network, operating as free spinning motors. Such service providers could provide a range of DS3 System Services as non-synchronous generation levels increase. It is not anticipated that these units will have a market position in the traditional sense, as the technology itself will not participate in the energy market given its function is to provide System Services. We anticipate that units may have a low FPN position (e.g. -1MW) needed to allow them to offer services. It is not envisaged that these units would be re-dispatched given this position is only to facilitate service provision. The TSO would therefore propose that these units are treated in line with those which are not registered in the I-SEM energy market, in that they will be remunerated based on a physical dispatch position. Given this type of technology is new; as synchronous compensators are deployed we will monitor this proposed rule to ensure it remains appropriate.

TSO Proposal: Synchronous Compensators will be remunerated for System Services based on a physical dispatch position only.

Demand Side Units

Demand Side Units (DSUs) with a registered capacity over 10MW must participate in the I-SEM energy market. Due to the nature of DSUs, their market position does not automatically provide the TSO with information which correlates to DS3 System Service availability. This is due to the nature of demand services, with availability for service provision depending on demand load at a given time. Whilst a forecast of demand load is provided via a unit's 'forecast availability', this does not correlate directly to system service availability. DSUs do not provide the TSO with declarations of specific service availability for a given trading period, with service availability supplied in real time only. The feasibility of implementing remuneration based on the FPN is therefore questionable, with any solution likely to be very complex.

It is the TSOs view that given these complexities for DSUs, remuneration can only take place based on the physical dispatch position. This approach will be monitored post I-SEM go-live to ensure its ongoing applicability.

TSO Proposal: Demand Side Units will be remunerated for System Services based on physical dispatch position only.

Battery Storage Units

Given the nature of battery storage units, it is anticipated that these providers will position themselves to provide maximum availability for System Services. There will therefore likely be minimal (if any) difference between a battery storage unit's market and physical dispatch position. Basing remuneration on physical dispatch position only will have minimal impact on payments, and will simplify the calculation of payments. This should be monitored on an ongoing basis as more battery storage units are deployed, as outlined in Section 4.2.

It is the TSOs view that given the lack of impact on battery storage units when remunerating based on physical dispatch position only, and in the interests of simplification, remuneration should take place based on the physical dispatch position.

TSO Proposal: Battery Storage Units will be remunerated for System Services based on physical dispatch position only

Wind Power

In I-SEM, the Final Physical Notification of wind generation is reflective of their output availability as defined in the TSC. Wind power units may provide a separate FPN but it is optional to do so. Similarly, the TSO may replace their forecast information for a wind provider with any FPN which is submitted by the wind generator, but this is also optional. Given that the FPN itself is only calculated ex-post, the TSO would propose that FPN also constitutes the market position and as such, is the basis on which wind power unit should be remunerated.

It should also be noted, if a wind power unit is dispatched away from its output, its ability to provide services will increase given that this dispatch will always be in the downward direction (given the lack of incentive for wind power units to constrain themselves from maximum output). Therefore, the remuneration for a wind power unit will only be increased due to the actions of the TSO.

For the sake of clarity, given the similarities between wind power units and solar power units, it is proposed that the same principle will be applied for any future solar power service providers.

TSO Proposal: Wind Power Units will be remunerated for System Services based on their outturn availability i.e. their physical dispatch position.

Interconnectors

Interconnectors have a number of properties which mean they are unlike other service providers. The market position of interconnectors is not determined by themselves, it being an implicit outcome of the Day-ahead and Intraday Market. This position is not within the control of either the TSO or the interconnector themselves and as such, cannot be incentivised in a certain way to provide System Services.

In most circumstances, the market position of an interconnector will match its physical dispatch position. However, the connecting TSO (at either end) may counter-trade across the interconnector in either direction, which in some instances may increase service availability whilst at other times may decrease availability.

Given the implicit nature of the market position itself, as well as the potential for third party TSOs to alter interconnector flows and potentially reduce service availability, physical dispatch position only should form the basis on which service availability is remunerated.

TSO Proposal: Interconnectors will be remunerated for System Services based on physical dispatch position only.

Synchronous Generation

As outlined in Section 2, the logic behind remunerating the higher volume of market or physical dispatch can be outlined for a typical synchronous generator, and the interactions between the energy and services market for such a unit.

For all synchronous units in the I-SEM energy market, an FPN must be provided. A synchronous unit may then be moved up or down to a new physical dispatch position. Such conditions align with the context and logic on which the market versus physical dispatch decision was made (as outline in Section 2.2). The provision of an FPN and the nature of synchronous generation (in that their capability to deliver services is known based on their technical parameters) means that it is possible to calculate a service availability based on market position. We therefore propose that synchronous generation will be remunerated for the higher volume of market or physical dispatch position.

However, other considerations exist with respect to synchronous generation, specifically risk of service availability excess and potential over-expenditure (as outlined in Section 2.3). The proposed approach should therefore be closely monitored subsequent to I-SEM go-live, as proposed in Section 4.2 of this consultation.

TSO Proposal: Synchronous units will be remunerated for System Services based on the higher of their market or physical dispatch position.

Question 2: What are your views on the remuneration of market versus physical dispatch position for each type of service provider? Please provide rationale/additional information.

3.4 Nature of Services

Another consideration with regard to application of the market versus physical dispatch decision is the extent to which this can be applied to all System Services. The 14 services are different in nature with a number that do not readily match the traditional characteristics of ancillary services.

Reserve Products (FFR, POR, SOR, TOR1, TOR2, RRS, and RRD)

For the more traditional System Services such as the reserve services, there is a trade-off between the level of energy provision and the level of reserve provided by some (e.g. conventional) service providers. This is the more traditional model on which the concept of market versus physical dispatch was based in the decision made in 2014 (as outlined in Section 2.1). The System Services that we consider falling within this category are those which were in place at this time i.e. POR, SOR, TOR1, TOR2, RRS, and RRD, as well as FFR which is similar in nature to POR (but faster). As such, we propose that the higher volume of market position or physical dispatch position will be paid for FFR, POR, SOR, TOR1, TOR2, RRS, and RRD (as appropriate for the type of service provider as outlined in Section 3.3).

Ramping Margin (RM1, RM3 and RM8)

These System Services are used to provide an increased MW output that can be delivered with a good degree of certainty for the given time horizon. The ability for a unit to provide these services are dependent on a number of factors with the settlement for these services the most complex to calculate. This includes the heat states of the unit, as well as the subsequent market positions and availability for future trading periods (given the timescale of the product). We therefore do not believe it would be possible at this time to implement remuneration based on availability at market position, and that these services should be based on physical dispatch position only.

Synchronous Inertial Response (SIR) and Steady State Reactive Power (SSRP)

These services do not necessitate the traditional energy market trade-offs between market position and service availability. These services are provided by a unit once it is synchronised i.e. it is provided whether operating at 20% output or 100% output. A TSO dispatching a SIR/SSRP-receiving unit up or down will have no impact on its payments. However, if market position is not taken into account, in a scenario where a providing unit is dispatched on in the market but is subsequently constrained off; this unit will not receive payments.

For such services where payment is based on an on/off status only, this does not align with the traditional market versus physical dispatch context outlined in Section 1.4. We consider it as

adding significant risk to expenditure to remunerate these services based on market position, and could result in significant payments for services which are unnecessary from providers who are fully constrained off. This contrasts with the reserve-type products for which the majority of divergences will be smaller variations in volume only and as such, differences in payments between physical dispatch and market position will be smaller.

Fast Post Fault Active Power Recovery (FPFAPR) and Dynamic Reactive Response (DRR)

These services provide active and reactive power respectively in response to faults/voltage dips. Similar to SIR and SSRP, these services do not necessitate the traditional energy market trade-offs between market position and System Service availability. It should also be noted that in the case of FPFAPR and DRR these System Services are not required at levels of SNSP below 70% and therefore payment will be zero until the system reaches 70% SNSP levels. It should be noted that given current SNSP timescales, 70% will not be reached until a reasonable time after I-SEM go-live. We therefore will have the opportunity to monitor the ruleset from I-SEM go-live and consider the most appropriate approach with respect to FPFAPR and DRR. At present we propose that physical dispatch position should be remunerated only, in line with the other non-reserve type services.

Summary

On assessment of the 14 System Services, we propose that the higher of market versus physical should be paid for those System Services for which a trade-off between energy market position and System Service availability exists. These services follow the traditional model outlined in the diagrams contained in Section 1.4 and the divergences in availability will in general be small variations in volume.

This approach would be extremely complex to implement in the case of Ramping services. In other instances, the rule would mostly only have an impact when units are constrained off only. Remunerating this availability where units are constrained off has the potential to significantly increase payments.

For the sake of clarity, the ongoing applicability of this approach will be reviewed as outlined in Section 4.2 with the approach to Ramping Margin products and other system services further explored for future ruleset changes.

TSO Proposal: The higher volume of market position or physical dispatch position will be paid for FFR, POR, SOR, TOR1, TOR2, RRS, and RRD.

The services RM1, RM3, RM8, SIR, FPFAPR, DRR and SSRP will be paid based on physical dispatch position only.

Question 3: What are your views on the proposed approach for remuneration with respect to the 14 System Services?

3.5 Scalar Framework

The interaction between scalars and the remuneration rules (whether based on market or physical dispatch position) must be evaluated. A number of these scalars (e.g. Performance, Scarcity) are based on conditions and availability at any given time. The appropriate point at which these scalars should be calculated and applied (whether market or physical dispatch) needs consideration.

3.5.1 Forecast Availability component of Performance Scalar

The ‘forecast of availability’ component of the Performance scalar is a scalar component proposed to incentivise providers to supply accurate forecasts of their System Services availability. When considering the appropriate application of market versus physical dispatch position it could also be considered on which basis this scalar should be calculated, considering the influence the TSO may have on the physical dispatch position (and a provider’s inability to forecast this).

This component of the scalar is subject to further consultation. At the earliest, the scalar component would go-live 1 year after the launch of regulated arrangements (1st May 2019 for the first 11 of the services). Further consultation will be scheduled on the design of the forecast availability component of this scalar as necessary.

The consultation proposes therefore that the appropriate calculation of this scalar component should be explored as part of future consultations on this scalar

TSO Proposal: Appropriate calculation of the ‘forecast of availability’ component of the Performance Scalar will be considered as part of any future consultation of the application of this scalar component.

3.5.2 Scarcity Scalar Calculation

As outlined in DS3 System Services Tariffs and Scalars SEM Committee Decision SEM-17-080⁷, temporal scarcity scalars were approved that increase remuneration at times of high SNSP. This scalar will therefore need to be applied (as required) to System Service remuneration, whether this remuneration is based on market or physical dispatch position (notwithstanding considerations regarding application to ‘constrained on’ units – see Section 3.5.3).

⁷ DS3 System Services Tariffs and Scalars SEM Committee Decision SEM-17-080

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

For the sake of clarity, it should be outlined that regardless of whether it is the market or physical dispatch position which is remunerated, the SNSP used to determine the application of the scalar will be that of actual physical (operational) SNSP levels only as approved by the SEM Committee in SEM-17-080.

3.5.3 Application of Scarcity Scalar

As outlined in Section 1.5, it was decided by the SEM Committee not to apply the Scarcity Scalar for 'constrained on' plant; however, it was noted that the practical implications of this would need further consideration. This was based on a view that "the arrangements should ensure that participants are incentivised to bid efficiently into the energy market", i.e. only units which are 'on' due to market output should be rewarded for service provision in times of high SNSP. If this were not the case, it could be viewed that there would be a risk that units which are 'out of merit' could receive higher payments for DS3 System Service provision with little incentive to provide an accurate reflection of System Service revenues in their energy market bids.

To enable market participants to bid efficiently into the market they are likely to need a view on the SNSP level ahead of real time. As such, it was decided by the SEM Committee in their 'DS3 System Services Tariffs and Scalars Decision SEM-17-080' decision that forecasts of the operational SNSP should be provided to DS3 System Services contracted parties (in the first instance at least 2 hours ahead of real-time). These forecasts will be provided by the TSO and are currently under development, with further details to be communicated to stakeholders in due course.

Whilst the TSO recognises the aims incentivising participants to bid efficiently into the energy market, in some instances a unit could be 'constrained on' in order to provide System Services and ensure system security at times of high SNSP. This is particularly true since during periods of high SNSP, the likelihood of TSO actions being necessary will be increased given it is less likely that a market output with high levels of wind power will implicitly meet all operational system needs. In these circumstances it may be appropriate that these providers should be remunerated in line with other System Service providing units at that time. However, if units are consistently constrained on for System Services this could suggest that tariffs/scalars (temporal and locational) may be too low and could need to be adjusted or implemented i.e. that they are not sufficient to incentivise units to ensure they are on in the market.

Several options are therefore present:

Option 1: Do not apply the scarcity scalar for constrained on units. This is in line with the SEM Committee decision. Consequently, units which are constrained on and are providing System Services at times of high SNSP would be remunerated at a significantly lower value than other providers.

Option 2: Apply to scarcity scalar for all units, including those which are 'constrained on'. This will provide consistency in remuneration for System Service providing units. The scalar will be applied to units which have been constrained on for all reasons.

Option 3: Apply the scarcity scalar for units which are constrained on for the provision of System Services, and not for those which have been constrained on for other reasons (e.g. energy imbalance, to relieve congestion management etc.). This will provide consistency in remuneration for System Service providing units. However, it would be complex to strictly disaggregate the reasons for constraining on plant and that this could cause significant confusion for market participants and negatively impact transparency.

The TSO believes that with respect to being implementable and robust, Option 3 does not represent a viable option at present given the extensive complexities represented and has the potential to decrease transparency for providers. As such we present two options – to apply the scarcity scalar for constrained on units or not.

This approach should be monitored (as proposed in Section 4.2) to ensure it remains appropriate, particularly as more experience is gained post I-SEM go-live into market outputs and interactions with System Services remuneration.

Option 1: Do not apply scarcity scalar to ‘constrained on’ units

Option 2: Apply to scarcity scalar to ‘constrained on’ units

Question 4: Do you have a preferred option (with rationale) regarding the application of the scarcity scalar for ‘constrained on’ units?

3.6 Forced Outages

Consideration is needed on how to treat a unit whose market position shows availability but the unit is subsequently “forced out” for the actual physical dispatch trading period, and whether the service provider should still be paid. By ‘forced out’ we mean circumstances in which the providing unit themselves experience an issue with their apparatus such that they can no longer fulfil their position. It should be noted that in all cases, units will be expected to declare themselves ‘forced out’ immediately and to change their market position to reflect this as soon as possible.

It is assumed that such instances and such time periods will be infrequent and as such, it may not be necessary to create specific arrangements for this circumstance. Any such arrangements would likely be complex and require ex-post recalculation, which may be inordinate given the relative infrequency and low size of these events. However, the frequency of these types of events could be higher than anticipated, and therefore this topic should be monitored after the I-SEM energy market has gone live

At this moment we would propose that remuneration will follow the proposed ruleset outlined in this document in circumstances where a provider is forced out and that no specific arrangements are needed.

TSO Proposal: Units which are ‘forced out’ will be remunerated in line with the proposals laid out in this consultation but will be expected to declare themselves ‘forced out’ immediately and to change their market position to reflect this as soon as possible.

Question 5: Do you have any view on the proposed treatment of forced outages?

3.7 Summary of Proposed Ruleset

The table below provides an overview of the proposed ruleset for application of market or physical dispatch based remuneration with respect to types of providers and types of service.

	Reserve Services (FFR, POR, SOR, TOR1, TOR2, RRs, RRD)	Ramping Margin (RM1, RM3, RM8)	Synchronous Internal Response (SIR) and Steady State Reactive Power (SSRP)	Fast Post Fault Active Power Recovery (FPFAPR) and Dynamic Reactive Response (DRR)*
I-SEM registered synchronous generators	Higher of Market or Physical Dispatch Position Paid	Physical dispatch position paid	Physical dispatch position paid	Physical dispatch position paid
I-SEM registered non-synchronous providers (inc. wind, batteries, DSUs, I/Cs etc.)	Physical dispatch position paid	Physical dispatch position paid	Physical dispatch position paid	Physical dispatch position paid
Units not registered in I-SEM	Physical dispatch position paid	Physical dispatch position paid	Physical dispatch position paid	Physical dispatch position paid

* System Services are not required at levels of SNSP below 70% and therefore payment will be zero for FPFAPR and DRR until the system reaches 70% SNSP levels

4. Ruleset and Monitoring

4.1 Ruleset

Based on the responses to the proposed ruleset, a version will be finalised ahead of I-SEM go-live, to enable transparency for participants of how the market versus physical dispatch decision will take effect. This ruleset will provide clear guidelines to all market participants regarding how System Services will be settled with respect to market or physical dispatch position. A timeline showing the development of these rules is provided in Figure 4.

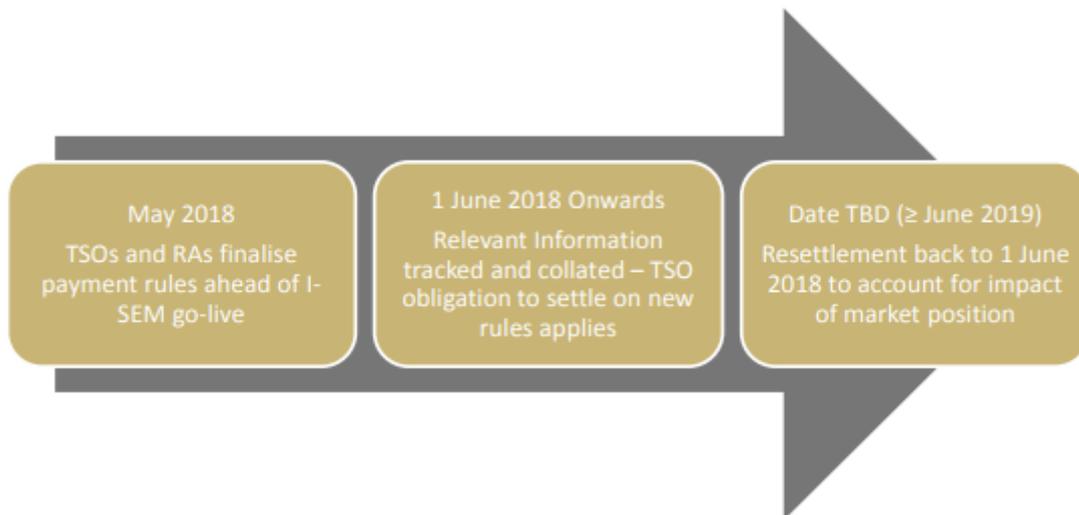


Figure 4: Timelines for payment ruleset

As outlined in the Recommendations Paper⁸ the purpose of this ruleset is that market participants will know the System Service payment rules ahead of I-SEM go-live and will be able to reflect the impact of these rules when formulating their energy bids.

Once the ruleset is finalised, it will be implemented as per the timeline in Figure 4 with the TSOs tracking and collating all relevant information needed to implement the ruleset.

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 which is expected to occur before June 2019. The plan for resettlement will be communicated to stakeholders when the ruleset is finalised ahead of I-SEM go-live.

⁸DS3 System Services Tariffs for Regulated Arrangements Recommendations Paper

http://www.eirgridgroup.com/site-files/library/EirGrid/OPI_INV_DS3-System-Services-Tariffs-for-Regulated-Arrangements-FINAL-23.10.2017.pdf

4.2 Ongoing Monitoring

As highlighted throughout this consultation, the ruleset for System Services remuneration will be based in part on assumptions regarding market participant behaviour relative to both DS3 System Services and I-SEM markets. As these assumptions have been developed prior to I-SEM go-live, they may prove invalid on the establishment of I-SEM, the introduction of the BMPCOP, and as understanding of unit bidding behaviour develops post go-live (as outlined in Section 1.5)

It is therefore critical that the effectiveness of the ruleset is monitored on an ongoing basis and that should adjustments need to be made in the interests of market effectiveness or consumer expenditure, these can be made in a timely manner.

The ongoing effectiveness of the ruleset can be monitored, in part, by the expenditure monitoring which will be undertaken in order to manage DS3 System Services expenditure at large. This will include the ongoing monitoring of System Services spend by the TSO for the purposes of evaluating adherence to the spend glide path and proposing changes to tariffs etc. if necessary (with SEM Committee approval). This monitoring can include continuing assessment regarding the impact of the proposed market ruleset as well.

Behaviour and rules with respect to I-SEM participation however are likely to have their own post go-live monitoring structure. Whilst such monitoring sits outside the scope of this consultation, it is assumed that market behaviour in relation to System Service availability and remuneration will be considered within this context. As the structure of this monitoring is clarified, interdependencies between I-SEM participation and System Service expenditure will be monitored by the TSO and RAs with frameworks put in place where needed.

It is important to note that ongoing monitoring will also look at expanding and improving the ruleset proposed in this document. As outlined in Section 3.1, this will include consideration of the rules in place for different services and types of technology, reviewing the complexities that have been set out in this consultation in support of the recommended ruleset, and whether any changes are necessary. An initial review will take place during the anticipated 12 month implementation period outlined in Figure 4.

Question 6: Do you have any comments in relation to the proposed ongoing monitoring of this ruleset?

5. Consultation Questions

Question 1: Do you have any views in relation to the basis on which system service availability will be remunerated?

Question 2: What are your views on the remuneration of market versus physical dispatch position for each type of service provider? Please provide rationale/additional information.

Question 3: What are your views on the proposed approach for remuneration with respect to the 14 System Services?

Question 4: Do you have a preferred option (with rationale) regarding the application of the scarcity scalar for 'constrained on' units?

Question 5: Do you have any view on the proposed treatment of forced outages?

Question 6: Do you have any comments in relation to the proposed ongoing monitoring of this ruleset?