

EirGrid and SONI Consultation

DS3 System Service Tariff Rate Review

28th May 2021

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Executive Summary

The DS3 System Services arrangements have been designed to facilitate new and existing technologies and participants to provide services required to facilitate the operation of a resilient power system when up to 75% of demand is met by non-synchronous technologies. It is an essential and critical pillar of the DS3 programme.

DS3 System Services expenditure has a budgetary allowance of €235M¹. This budgetary allowance is designed to include expenditure related to the DS3 Qualification Trial Process, DS3 Volume Uncapped Arrangements (including market to physical) and the DS3 Volume Capped competition. In September 2020, the TSOs published a [note](#) on System Services expenditure, outlining its concerns with regard to significant increases in expenditure arising due to high volumes of fast acting technologies providing system services. Following DS3 System Services Gate 4, an additional 128.5MW of system services provision from fast acting technology has been procured; this is expected to increase again significantly following Gate 4B and also in subsequent gates. These significant additional increases in system services volumes are likely to drive an increase in expenditure to a level that may exceed the regulatory guideline of €235M.

SEM Committee Decision SEM-17-080 outlines the measures to be taken in the event that the annual expenditure is forecast to exceed this guideline. In that context, the TSOs submitted a report to RAs highlighting the trend in expenditure that will ensue as a result of the aforementioned increase in volumes and, upon request from the regulatory authorities, the TSOs are now consulting on proposals for revised system service rates.

In this paper, we outline the assumptions upon which the budget of €235M was based and contrast this with the volumes of fast acting technologies forecast to provide System Services in the near future. The implications for System Services expenditure due to new fast acting

¹ 2017 Consultation on DS3 System Services Enduring Tariffs
<http://www.eirgridgroup.com/site-files/library/EirGrid/DS3-System-Services-Enduring-Tariffs-Consultation-Paper.pdf>

2016 Decision on Calculation Methodology and Portfolio Scenarios
<http://www.eirgridgroup.com/site-files/library/EirGrid/DS3-System-Services-Decision-Paper-on-Volume-Calculation-Methodology-and-Portfolio-Scenarios-FINAL.pdf>

2015 Consultation on Volume Calculation Methodology and Portfolio Scenarios
<http://www.eirgridgroup.com/site-files/library/EirGrid/DS3-System-Services-Consultation-on-Volume-Calculation-Methodology-and....pdf>

technologies are also shown; this analysis highlights the requirement for mitigation measures to be put in place to avoid breaching of the budgetary allowance of €235M.

Several options for reducing System Services expenditure are then proposed and outlined by the TSOs. Feedback on the questions and any other general comments are welcome. It is the intention of the TSOs to publish all responses and hence please mark your response as Confidential if you do not wish your response to be published.

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1 Rationale for Consultation

Introduction

EirGrid and SONI are the Transmission System Operators (TSOs) in Ireland and Northern Ireland. It is our responsibility 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%.

The programme is delivering real benefits to the consumer. In recent months, the maximum SNSP level allowable has increased to 70%. We recently started a 75% SNSP operational trial and, in the coming months, we expect to achieve the DS3 Programme's overall goal of being able to operate the power system to a 75% SNSP limit.

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

System Services Expenditure

In its SEM-17-80 Decision Paper², the SEM Committee approved an expenditure “glide path” budget for DS3 System Services, with the budget ultimately rising to €235m per annum by 2020. The publication also details the SEM Committee's decision to allow for a budget increase of €20M in the event of a high-wind year.

At the time of this decision, analysis was undertaken¹ so as to reflect a number of potential scenarios that ensured 2020 Government targets could be met; this led to the determination of a suitable budget for System Services expenditure which, in turn, feeds into the tariffing arrangements that fund system services. Underpinning this analysis was an assumption that storage and fast-acting DSM would account for no more than 400 MW of the procured service volumes. Prior to commencement of Gate 4 the level of fast acting service providers

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>

including demand side and existing storage (but excluding the 110MW storage from the volume capped competition) was of the order of 300 MW. In section 3 of this paper, we show how the volume of fast acting technologies now forecast to join the system services market far exceeds this and, hence, this assumption is no longer fit for purpose.

In accordance with SEM 17-080, the TSOs have engaged with the Regulatory Authorities outlining both the incurred expenditure on system services and emerging trends that could generate a need to revise the tariff rates. Building on last year's publication in relation to system services expenditure, and in accordance with the process outlined by the SEM Committee, the TSOs consider it necessary to instigate this process set out in SEM 17-080 to determine and consult upon revised tariffs.

Scope of Consultation

This consultation applies to the DS3 System Services Regulated (Volume Uncapped) Arrangements. For the avoidance of doubt, the DS3 System Services Fixed Contracts (Volume Capped) Arrangements are not in scope for this consultation.

2 Overview: DS3 System Services Volume Uncapped Arrangements

Under the Volume Uncapped (Regulated Tariff) arrangements, 14 System Services in total are covered. These are set out in in table 1 below. 12 services have been procured to date, while the two additional services – DRR and FPFAPR – may be procured at a future date.

Service	Service Name	Procured to Date
SIR	Synchronous Inertial Response	Yes
FFR	Fast Frequency Response	Yes
POR	Primary Operating Reserve	Yes
SOR	Secondary Operating Reserve	Yes
TOR1	Tertiary 1 Operating Reserve	Yes
TOR2	Tertiary 2 Operating Reserve	Yes
RRD	Replacement Reserve (De-Synchronised)	Yes
RRS	Replacement Reserve (Synchronised)	Yes
RM1	Ramping Margin 1 Hour	Yes
RM3	Ramping Margin 3 Hour	Yes
RM8	Ramping Margin 8 Hour	Yes
SSRP	Steady State Reactive Power	Yes
DRR	Dynamic Reactive Response	No
FPFAPR	Fast Post Fault Active Power Recovery	No

Table 1: DS3 System Services³

Under the Volume Uncapped arrangements, the means by which Providing Units may tender and contract for the provision of System Services is through a Qualification System.

The Qualification System refers to the system that is in place to enable interested parties to submit a tender and subsequently qualify for award of contract for the provision of services. The Qualification System was originally envisaged to last until 30 April 2023. There was also an option to extend the arrangements, at the TSOs' discretion and subject to the approval of the Regulatory Authorities (RAs), for two periods of up to 18 months apiece. The SEM

³ Further detail on the DS3 System Services can be found at: <http://www.eirgridgroup.com/how-the-grid-works/ds3-programme/> <https://www.soni.ltd.uk/how-the-grid-works/ds3-programme/>

committee recently decided that the current arrangements for DS3 System Services would be extended by 12 months⁴.

Under the Qualification System, interested parties must demonstrate the capability to provide a service, via an established testing process, in order to be eligible to be contracted for the provision of the service. It is not possible to be issued with a contract for the provision of services prior to having demonstrated the capability to do so.

The Qualification System was established in May 2018 when the TSOs contracted with service providers for the provision of 11 services, excluding FFR. The TSOs began contracting for FFR in September 2018.

A Gate process allows for prospective service providers to tender and contract for the provision of System Services, or for existing providers to amend their contracted services or capabilities, at periodic intervals.

Contractual arrangements relating to system services are housed in three key documents as illustrated in Figure 1. Individual agreements issue to system service providers upon commencement of provision of system services. Should a providing unit tender to increase or decrease a particular system service volume at a Gate, a side letter to the original agreement is issued. The agreement contains information relating to:

- Standard contractual provisions
- Term
- Schedules for 14 DS3 System Services
- Scaling Factor details
- Product Scalars
- Locational Scalar

This DS3 System Services Protocol document is supplementary to the DS3 System Services Agreement. It provides information on Operational Requirements and Performance Monitoring requirements that need to be satisfied by Service Providers and their respective Providing Units as part of the DS3 System Services contractual arrangements. The latest version (version 3) was published in October 2020. It is one of two supplementary documents referenced in the main Agreement, the other being the DS3 System Services Statement of Payments which contains information on tariffs.

⁴ 2021 System Services Future Arrangements SEM-21-021
<https://www.semcommittee.com/sites/semc/files/media-files/SEM-21-021%20System%20Services%20Future%20Arrangements%20-%20Decision%20Paper%201.pdf>

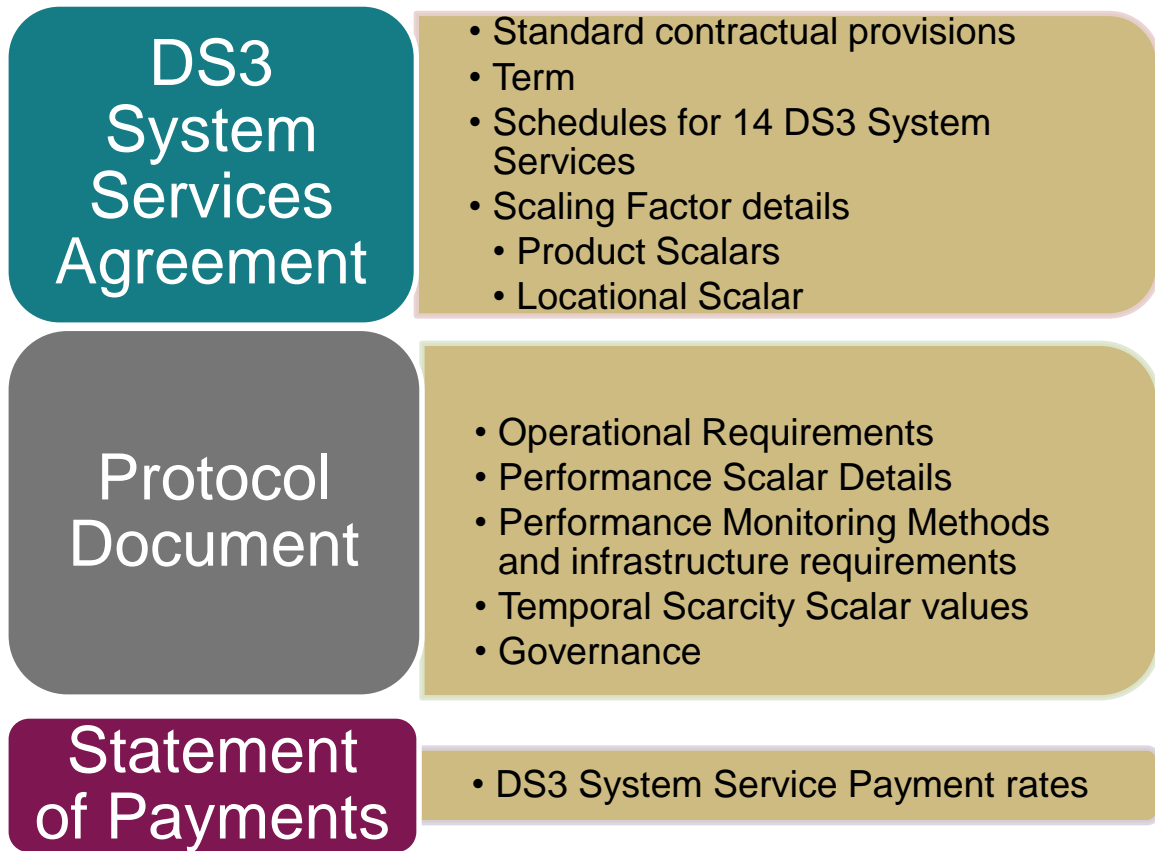


Figure 1: Contractual arrangements for Volume Uncapped Process

3 Tariff Rate Analyses

In this section, we outline the significant increase in expenditure we anticipate could materialise should mitigation measures not be implemented.

Model Forecast Assumptions

Some technologies have greater potential to increase the System Services expenditure. Where technologies are providing high-value fast frequency services, combined with high levels of availability, the impact is significant. Batteries and DSUs generally have these characteristics. Where there is new conventional plant, the net cost to system services is less than anticipated. This is because the conventional plant will likely displace another conventional plant in the energy market along with that unit's reserves. The incremental costs to the system arise for increased ramping capabilities which have lower associated tariffs than the faster services. Finally, wind farms are increasingly coming in to contract for high value reserve services but are only available to provide these services when curtailed. In this way, wind is not yet contributing a significant cost to system services.

Figure 2 below illustrates a forecast of fast acting technology volumes relevant to DS3 System Services at future DS3 Gates; this is shown for volumes forecast for DS3 System Service provision at individual gates as well as cumulative volumes for each Gate. From this, it is evident that in excess of 800MW of fast acting technology could be providing System Services at the commencement of Gate 7. It should be noted that for Gate 4, the volume is based on the outcome of Gate 4 and is therefore an actual volume, rather than a forecast.

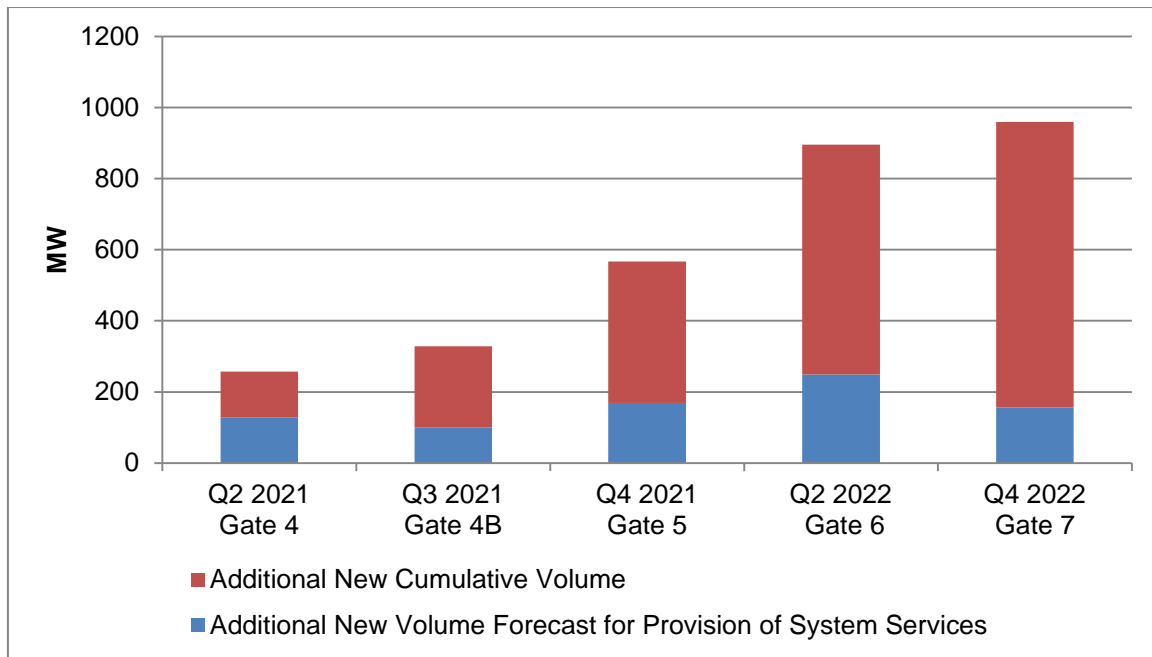


Figure 2: Forecast of Fast Acting Technologies for Future Gates

For different technology types the annual system services revenue is estimated based on current tariff rates for the products. For the analysis conducted, some key assumptions are outlined below:

- Performance Scalars are set to 1.
- Fast Delivery Scalar of 3 is used for FFR.
- Battery availability is ~ 100%
- Demand Side Units availability is ~50%
- Wind: Reserve payments are made only when wind is curtailed which is assumed to be 6% of the time.
- Conventional: It is assumed that a new conventional unit would displace an existing one and not receive payments for reserve when not synchronised. Payments would therefore only be received for RRD and Ramping in this scenario.

For a regular wind year, it is assumed that SNSP exceeds 60% for approximately 20% of trading periods per year. For the high wind scenario, this increases to approximately 25% of trading periods per year.

Model Forecast Results

Based on the assumptions outlined in the previous section, from calendar year Q2 2021, the analysis suggests a possible increase to system services expenditure due to fast acting technologies from €8M per quarter up to circa €40M every quarter by end of 2022. This is shown below in Figure 3.

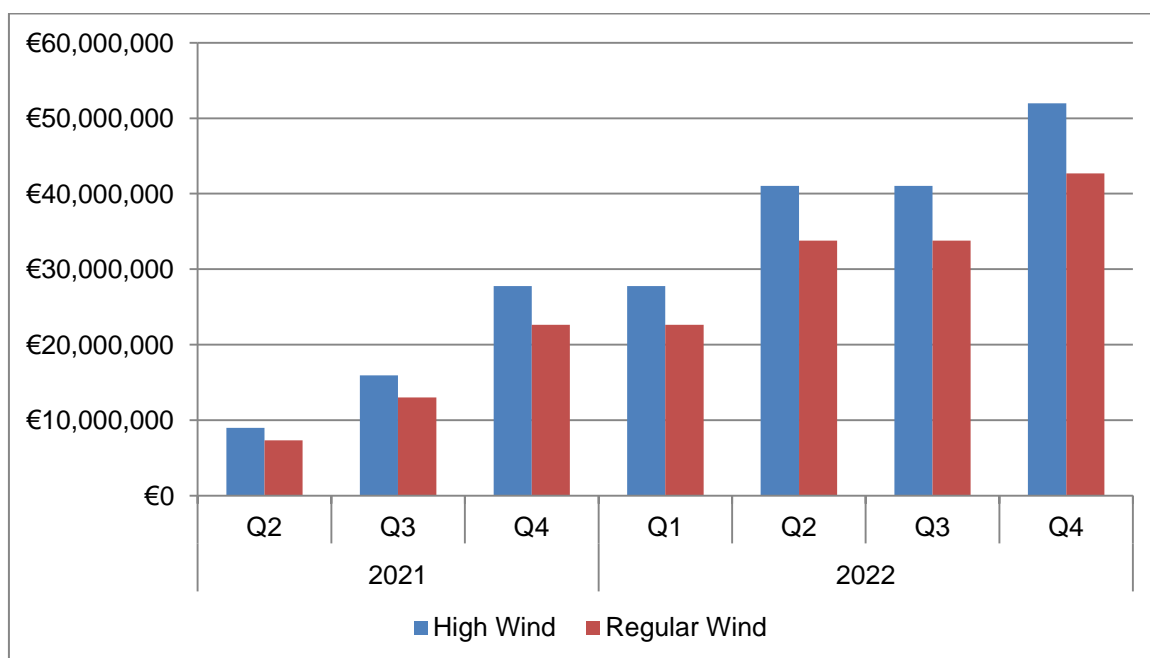


Figure 3: Forecast system service expenditure on fast acting technologies for various wind scenarios

It should be noted that the difference between a regular or normal wind year and a high wind year is material due to the impact of the Temporal Scarcity Scalars (TSS). When System Non-Synchronous Penetration levels are between 60% and 70%, payments are multiplied by 4.7, this increases to 6.3 for periods when SNSP exceeds 70%.

Based on the growth in units providing fast acting services, it is forecast that total DS3 System Services expenditure could increase to levels in excess of €300M in calendar year 2022 for a regular wind year as shown in Figure 4 below. It is also evident that the key driver for the increase in expenditure is the addition of units providing fast acting services (in red).

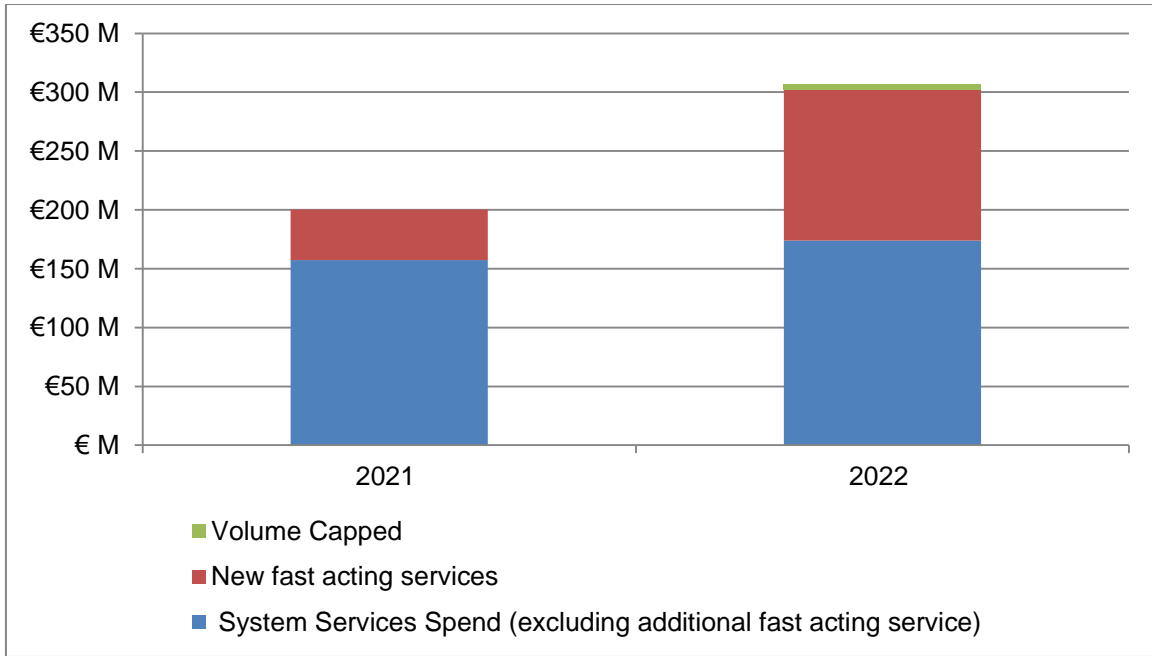


Figure 4: DS3 SS Expenditure Forecast for Regular Wind Scenario

For a high wind scenario DS3 System Services Expenditure could increase to almost €380M in 2022 as shown in Figure 5 below.

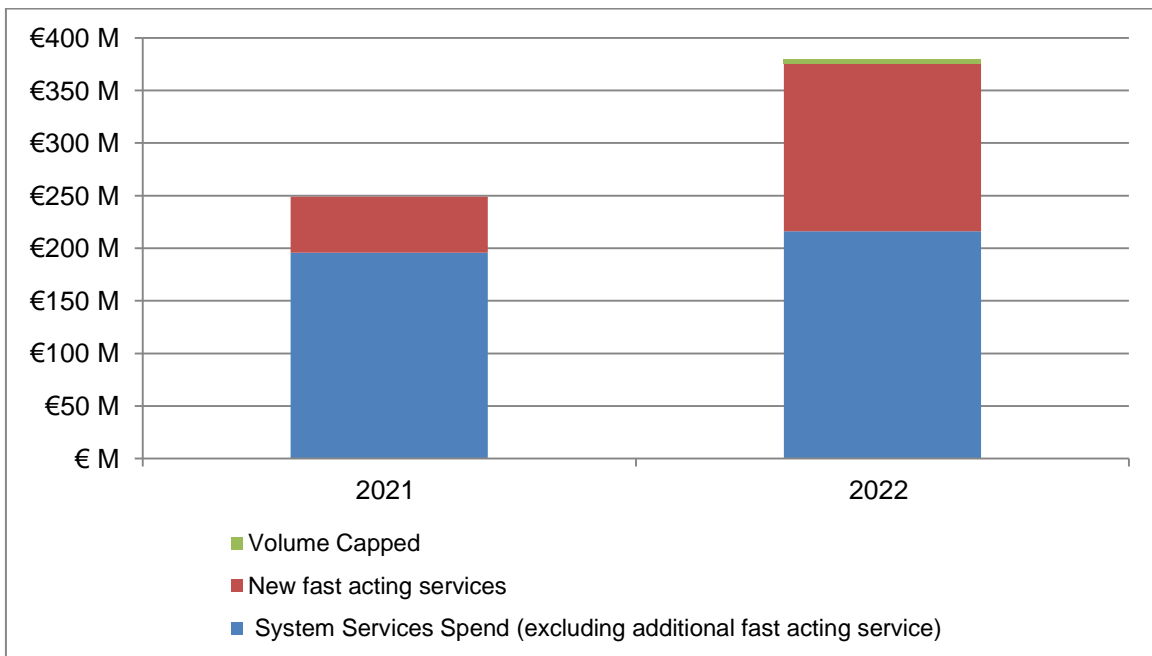


Figure 5: DS3 SS Expenditure Forecast for High Wind Scenario

By way of summary, the TSOs have identified a risk that the €235m budget will be exceeded in a normal or high wind year in calendar year 2022. In response to this risk, the TSOs are required to explore measures that will result in the budget not being exceeded. In the following section, we use this analysis to propose options for reducing future System Services Expenditure.

4 Proposed Options for Rate Reductions

There are various options to manage the budget and the TSOs present the following options for comment. The TSOs welcome responses to the questions and any other general comments as part of this consultation. It is the intention of the TSOs to publish all responses and hence please mark your response as Confidential if you do not wish your response to be published.

While it is evident that the main driver for significant increases in expenditure is the additional volumes associated with fast acting technologies, reducing tariffs solely for new fast acting units is not a feasible option. Given that the TSOs adopt a technology neutral position, a reduction in rates for only one technology type would be clearly discriminatory and is therefore not presented as an option.

Option 1: Reduce Tariffs for FFR, POR, SOR, TOR1 and TOR2 across all System Service Providers

The impact per additional 100 MW of fast acting technology on the rate reductions required for all technologies for a regular wind scenario for calendar year 2022 is shown below in Figure 6. It is evident that up to 200 MW of additional fast acting technology can be added without breaching the regulatory budget. However, rate reductions in excess of 30% are required should 700 MW of storage technology be available for the provision of system services.

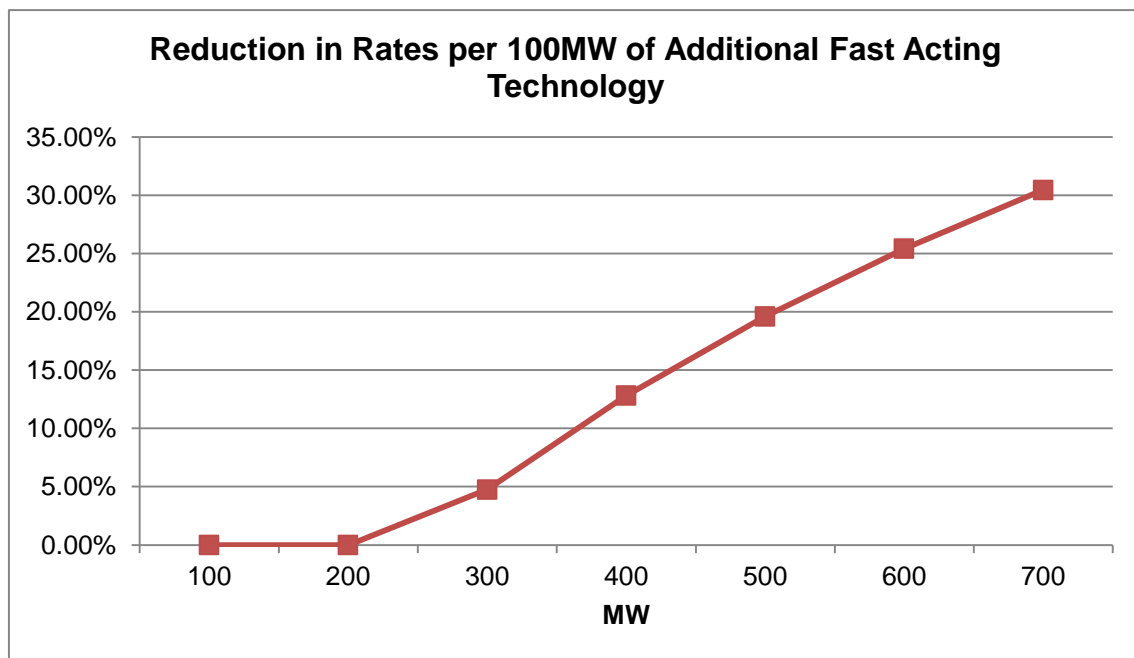


Figure 6: Reduction in rates required per 100MW of additional fast acting technology for a regular wind scenario for calendar year 2022

The impact per 100 MW of additional fast acting technology on the rates reductions required for all technologies for a high wind scenario for calendar year 2022 is shown below in Figure 7. It is evident that with only 100 MW of additional capacity a reduction in rates of less than 5% is required. This however is in the region of 43% for in excess of 700MW of additional fast acting technologies.

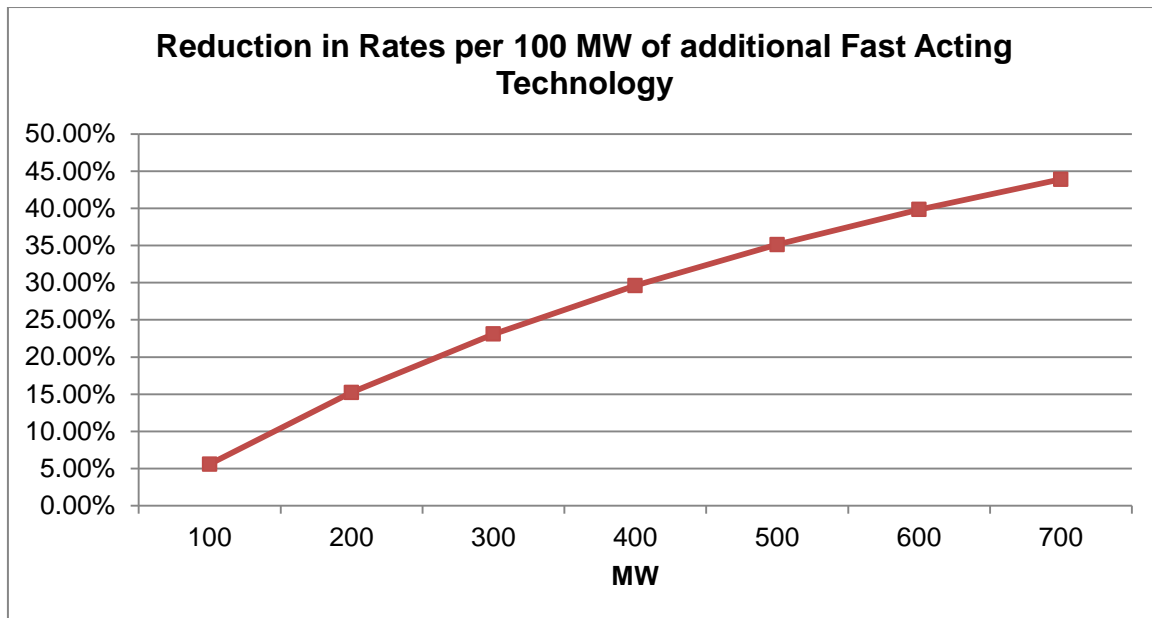


Figure 7: Reduction in rates required per 100MW of additional storage capacity for high wind scenario for calendar year 2022

In summary, given the additional fast acting technology volumes forecast for the provision of system services, it is estimated that a rate reduction of approximately 30% could be required for a regular wind scenario. For the high wind scenario this increases to almost 45% for an additional 700MW of new Fast Acting Technology.

	2021	2022
High Wind	4.8%	45%
Regular Wind	0.0%	30%

Table 2: Potential rate reductions required due to additional Fast Acting Technologies

As part of this approach, a 10% reduction would be imposed on FFR, POR, SOR, TOR1 and TOR2 per 100MW of additional volume of fast acting technology. The required reduction could be implemented on a pro rata basis following each System Services Gate e.g. should only 50MW of additional fast acting technology be awarded system services following a Gate, rates would be reduced by 5%. This process would also need to be monitored carefully to ensure that for a particularly high wind year, system services expenditure remains under the €235M budget. This approach also has the benefit of not reducing rates unduly should some fast acting units no longer become available to provide system services at future gates.

Option 2: Cease Procurement for Fast Acting Services from Gate 5

The analysis in section 3 shows that for 2022 the volumes of fast acting services are such that the budget allowance will be breached even for a regular / normal wind year. In order to reduce expenditure, the TSOs could opt not to procure any additional fast acting system services.

The TSOs are minded not to support this position as system service providers are in some cases currently in construction or well advanced in the planning process.

Option 3: Reduce Tariffs and Temporal Scarcity Scalars for all System Service Providers

The analysis shows that there is a material difference in expenditure when comparing a regular wind year with a high wind year. One option available is to remove or reduce the impact of the Temporal Scarcity Scalar (TSS) which rewards service providers in periods when System Non-Synchronous Penetration (SNSP) exceeds 60% so that the difference between a low, regular or high wind year is not as pronounced and overall expenditure is reduced. The TSOs are not minded to adjust the TSS as one of the drivers is to incentivise system service providers to be available at times of high levels of generation from renewable sources.

5 Consultation Questions

Question 1

From the analysis presented, are there any areas that you consider the TSOs have not addressed adequately?

Question 2

From the options presented in this consultation, what is your preferred approach?

Question 3

Do you agree that TSOs should focus on rate reductions rather than a hybrid of rates and adjustment of Temporal Scarcity Scalars?

Please mark any response as confidential if you do wish them to be published. All responses will be shared with Regulatory Authorities.

6 Next Steps

Responses to Question 1 - 4 are invited from all interested stakeholders. Responses should be submitted by email to either DS3@eirgrid.com or ds3@soni.ltd.uk on or before Friday 2nd July 2021.

We request that respondents use the following text in the subject of the email: Response to DS3 System Service Tariff Rate Amendments

Please indicate clearly whether the response is to be considered confidential.

Responses will be collated and reviewed, before a final recommendation is made by the TSOs for Regulatory Approval.