# DS3 System Services Interim Performance Scalar Calculation Methodology Consultation Paper

DS3 System Services Implementation Project

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EIRGRID SONI

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## Introduction

The DS3 System Services Interim Arrangements went live in October 2016 followed by application of the new DS3 System Services Interim Performance Scalar methodology in December 2016. Full details on the methodology are explained in the DS3 System Services Protocol Document which forms part of the DS3 Interim contractual arrangements alongside the Framework Agreement and Statement of Payments.

To date a large volume of feedback has been received in relation to performance scalar methodologies through a number of channels including;

- the interim contract consultation responses;
- the interim performance query management process;
- the Industry Information Session held on 08 December 2016.

In addition, there is now a better understanding of the implications of the current methodology gained through continuous learning post go-live of the interim performance scalar methodology.

This consultation paper is in response to the feedback received to date. It summarises the main industry concerns in relation to the Interim performance scalars and outlines a number of proposals by the TSOs to address these concerns.

Following a decision on the various aspects consulted on in this paper, it is proposed to make the relevant changes to the Protocol Document by End June 2017 in line with the contractual governance process outlined in the Protocol Document, unless otherwise stated in this consultation paper.

## Stakeholder Engagement

Views and comments are invited on all aspects of this document. Responses to the consultation should be sent to:
DS3@eirgrid.com or DS3@soni.ltd.uk by 10 May 2017

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.

## DS3 System Services Performance Scalar Philosophy

System scarcities due to operating the power system at times with up to 75% System Non-Synchronous Penetration (SNSP) will result in an increased need for system services. This increased need is twofold; firstly, the need for increased volume of service provision across a broader range of technologies and services, and secondly, the need for greater reliability of the service provision.

Achieving an enhanced portfolio of service providers requires appropriate market signals for new providers to invest, or for existing providers to enhance their capabilities. Performance scalars can influence this through assumptions used in calculation of tariff rates. Higher rates may then be possible as the threshold required to achieve a good performance scalar increases. This should then result in providing units with excellent performance earning more money with poorer performers seeing a reduction in their revenues accordingly.

Incentivising increased reliability is achieved through the application of appropriate performance scaling methodologies. The TSOs believe an effective performance scalar methodology should have the following characteristics in order to influence appropriate service provider behaviour:

1. Performance scalars should incentivise reliability and certainty of service provision. This requires service providers to declare values they have a high certainty of achieving and any variances in response from what was scheduled or declared, particularly close to real-time, needs to be accounted for also.
2. Performance scalars should be transparent and representative of what each Service Provider is expected to do per service.

3. Performance scalars should be dynamic so that service providers who perform poorly will quickly see decreases in their revenue. Similarly, those whose performance improves should also see their revenues quickly increase.
4. Performance scalars should be inclusive to all service providers. As we move to a more distributed enhanced suite of service providers, some of the emphasis will shift from incentivising the performance of large service providers to incentivising performance from a larger number of smaller service providers. In consideration of this, any performance scalar methodology needs to be applicable to all providers.

## Background

This section details at a high level the key features of the current interim performance scalar methodology. Full details of the current methodology are outlined in the DS3-System Services Protocol Document, including explanations of all of the technical terms used in this document.

### 1.1 Pass - Fail Assessment Methodology

- Performance scalars currently apply to 9 of the 11 services which went live in October 2016. Steady State Reactive Power (SSRP) and Synchronous Inertial Response (SIR) have no performance scaling applied.
- Primary, Secondary and Tertiary 1 Operating Reserves (POR, SOR and TOR1) carry over the performance assessment methodologies used under Harmonised Ancillary Services (HAS) previously. A binary result (1 or 0) is calculated per event. If a unit fails to achieve performance within 90% or 1 Megawatt (MW) of its expected value for frequency events where the frequency nadir dropped below 49.5 Hertz (Hz), this is deemed a fail and the service provider is allocated a value of 0 for this event. If a service provider's expected response is less than 0 MW following the subtraction of applicable tolerances then the providing unit is not assessed for that event, i.e set as Not Applicable (N/A).

- For the Tertiary Operating Reserve 2 (TOR2) and Replacement Reserve Synchronised (RRS) services, the TOR1 performance scalar value for that providing unit is applied to these services.
- For Replacement Reserve De-synchronised (RRD) and Ramping Margin 1, 3 and 8 hours (RM1, RM3 and RM8), performance is assessed against whether a unit fails to synchronise in the expected timeframe and is based on the existing Fail to Sync process. A binary result (1 or 0) is calculated per event. DSUs are the only exception to this. They are assessed against the performance compliance requirements specified in both the SONI and EirGrid Grid Codes.

## 1.2 Performance Scaling

A performance scaling value is calculated monthly for each service provider, based on its performance against the pass – fail assessment methodologies summarised above. The value is calculated through assessing their performance over a number of their most recent events. This is calculated as follows;

Reliability equals the sum of passed events / total number of assessable events:

- If Reliability <50%, the performance scalar equals 0;
- If Reliability >90%, the performance scalar equals 1.

Otherwise, the performance scalar is calculated using the equation shown in Equation 1 below. This gives a straight line increase from 50% up to 90%.

$$((\text{Reliability} - 0.5) / 40) * 2.5$$

**Equation 1: Performance Scalar Reliability Calculation**

As performance scalars are based over a number of events, consideration needs to be given to the approach to take when there is too much or too little data to assess performance. Under the DS3 System Services Performance Scalar methodology there are four categories of data richness as shown in Table 1. To summarise, if a unit does not have at least 5 assessable events over a two year timeframe to assess performance a modified calculation approach is applied. This approach uses the unit's own performance data where available. Where this is not available, a calculated industry average performance scalar value is used to artificially create additional data records to

give them an equivalent of five performance events to assess performance against. The industry average performance scalar is calculated as the summation of all passes divided by the summation of all performance assessments over all contracted providing units, irrespective of their technology classification.

| Category | Trigger |
|---|---|
| **Weighted Industry Average** | > 5 Events over 24 Month Assessment Period |
| **Own Data** | 5-10 Events over 24 Month Assessment Period |
| **Last 10 Events** | > 10 Events over 24 Months AND<br>< 10 within Assessment Month |
| **Last Month** | > 10 Events within Assessment Month |

**Table 1: Data Categorisation**

## 1.3 Performance Scalars and Data Packs

The first set of data packs was issued to service providers in November 2016. Data packs are issued to service providers on a monthly basis to provide details on a unit's performance scalar values for each month.

Performance data is integrated into the existing settlement timelines and applied monthly in arrears. For example, performance data up to end of November is used to create performance scalar reports for the December settlement month. The resultant payment (including a reduction should a performance scalar of less than 1 apply) will appear in the Service Providers' invoice in early February.

The current arrangement is that at the end of each calendar month, the TSOs issue performance scalar data packs to individual service providers. Should a service provider seek to challenge its performance scalars, they have 10 days from the date of issuance to do so. After this point a data freeze date is reached and the performance scalar values are used to settle for the month in question.

Process timelines are outlined in Table 2 below.

| Acronym | Meaning |
|---|---|
| $D_E$ | Date of Performance Event |
| $D_E + 3$ | Date Operating Reserve report due to issue (details Pass / Fail outcome) |
| D | Last day of a calendar month |
| $D +10_{WD}$ | Date of Performance Scalar Data Pack release |
| $D +20_{WD}$ | Date that Data Pack Queries / Challenges must be raised by |

**Table 2: Key Dates for Monthly Performance Scalar Process**

### 1.4 Performance Testing

From time to time, a performance test can be requested by service providers. Its purpose is twofold:

1. *Performance Rectification* – units that had poor historical performance but carry out significant changes to their plant to rectify the issue require a mechanism to improve their performance scalar upon completion of this work.
2. *Performance Data Supplementation* – units considered as 'data poor' with little or no performance data require an alternative mechanism to demonstrate their performance and move off of an industry average performance scalar value.

Upon completion of the relevant performance testing procedures, and submission and approval of relevant reports and documentation, two pass data records can be assigned to adjust a unit's performance scalar value.

## Performance Scalar Proposals

Given the feedback received to date from different service providers in relation to performance scalar methodologies, this section outlines common issues which have been raised along with the TSOs' proposed approach for each one. The issues raised can be split across the following four categories;

- Pass / Fail Assessment Methodology;
- Performance Scalar Calculation Methodology;
- Performance Scalar business process;

- Performance Testing process;

Respondents are asked to express their views on these proposals outlined below.

## 2.1 Pass / Fail Assessment Methodology

### 2.1.1 Reserve: Use of N/A when Tolerances exceed initial Expected Value

Applicable tolerances for reserve services relating to either a unit's Inertia Credit tolerance or the greatest of 10% or 1 MW tolerance are netted off a Service Provider's expected response. This method was applied under HAS and was carried over for DS3 System Services.

However, due to the pass-fail event-based scalar approach introduced for DS3 System Services, in scenarios where the unit's expected response became less than 0 MW due to the application of tolerances the question as to whether this is deemed a pass arose given the unit is not expected to provide a positive response (and hence is unable to fail the event). With this in mind the TSOs opted to treat situations where this occurs as a Not Applicable event (N/A). As a result, no performance record is associated, i.e. the unit does not pass or fail.

The problem with this approach is that it further reduces the number of data records available to assess performance in an already relatively data poor environment. The benefits are that it protects the TSOs from constantly awarding passes to service providers who can never fail based on the process applied.

The fundamental cause of this problem, which lies within the assessment method, is the size of the tolerances applied and this is something the TSOs will look to investigate further in the enduring arrangements as service providers become more dispersed and distributed and more data becomes available. However, in the short term we do not propose to adjust these tolerances.

Industry has requested the applicable tolerances should instead apply against the service provider's achieved response. The TSOs' view is that this would essentially result in some units constantly passing performance based on the size of their tolerances which is not consistent with what we are trying to achieve. However, there are also cases where units have clearly responded as expected but are not receiving a pass record due to process also.

With this in mind, the TSOs propose to award a pass data record where a unit's achieved response is larger than its initial expected response before the application of any tolerances and retain the application of N/A for other scenarios where this is not the case. The key benefits of this approach are that it will increase the number of data records available while not unduly awarding units pass records based purely on process.

Additionally, it is worth noting that the impact of the use of N/A greatly decreases when combined with the proposed changes to the performance scalar methodology proposed in Section 2.2 of this document.

**Question 1: Do you agree with the TSOs' proposal to award a Pass when a unit's achieved response is greater than the initial expected response (ignoring tolerances) in cases where the overall expected values is less than 0 MW?**

### 2.1.2 Calculation of Achieved SOR and TOR1

At present the calculations of Achieved SOR and TOR1 are based on the time-weighted average deficit of all sample points over the respective duration windows. This methodology penalises at times where under provision occurs and does not take account of times where overprovision of service occurs (where achieved values exceed expected values).

There will always be some time lag between the frequency deviating on the system and the generator governor sensing the changes and responding accordingly. The current assessment methodology used for SOR and TOR1 however assumes an ideal governor response (i.e. this time lag is zero). A number of service providers have pointed out that the frequency event profiles experienced nowadays generally have higher RoCoF (Rate of Change of Frequency) and also tend to oscillate more during the SOR timeframe in particular. It is therefore becoming increasingly difficult for units to respond to these frequency swings by ramping up and down their MW output, leading to moments where they will over provide and times where they will underprovide as a result. It was proposed that a time weighted average approach of all samples, as opposed to just the deficits, would be a fairer assessment method with this in mind.

The TSOs acknowledge the difficulties experienced by generators in providing governor control in response to oscillating frequencies and these difficulties will be explored more in the enduring performance assessment methodologies.

For the interim arrangements, the TSOs propose to move the current methodology to a time weighted average approach for SOR and TOR1. This approach will address industry concerns in the short term while a more comprehensive assessment methodology is considered for the enduring arrangements. However, due to expected lead times required to update the relevant systems and tools used to assess SOR and TOR1 the implementation of this change may not take place until sometime in Quarter 3 of 2017.

**Question 2: Do you agree with the TSOs proposal to utilise a time weighted average approach for the calculation of SOR and TOR1?**

### 2.1.3 Governor Droop Demanded Response

At present expected response for reserve is calculated as the lesser of the unit's declared value, its contracted reserve curve value and its Governor Droop demanded response. Governor droop demanded response is calculated based on the difference between the frequency recorded at each sample point and the pre-event system frequency (calculated as the average frequency 30 to 60 seconds prior to the event).

Most governors are set up to regulate system frequency to 50Hz. At times when the pre-event system frequency is below 50Hz (nominal) the current assessment methodology is favourable for units as their expected response is slightly reduced compared to nominal. However, occasionally the pre-event system frequency can be slightly higher than 50 Hz. During such scenarios, the current assessment methodology expects generators to provide a response which exceeds what their governor is setup to provide.

Service Providers have noted that given this, the pre-event system frequency for the purposes of performance monitoring should be considered as the lesser of:

1. the pre-event system frequency; or
2. 50 Hz.

The TSOs acknowledge the issues raised by industry. However, the TSOs also note the following points in relation to this issue:

1. In general, the pre-event system frequency tends to be less than 50 Hz. With 7 – 8 events in total per annum generally, the number of times this issue will arise between now and the end of the interim arrangements is likely to be low.
2. Governor response should always be attempting to return the frequency to 50Hz. Hence, at times when the pre event frequency is below 50 Hz it could be argued that the assessment methodology for governor droop demanded response calculation should be assessed against 50 Hz in these scenarios also, which would likely be more penal for industry as a whole.
3. The difference in expected governor droop response in high pre-event frequency scenarios when compared to nominal frequency is marginal. This has become an issue for industry now due to the binary nature of pass / fail implemented for reserve under the DS3 System Services interim arrangements. In line with the proposal to introduce partial fails for reserve outlined in Section 2.1.5 below, this results in this no longer being a major issue.

With all of this in mind and given the time and effort required to update the relevant tools and systems with changes to this calculation, the TSOs are not proposing to make any changes to this calculation methodology at present.

**Question 3: Do you agree with the TSOs' proposal to retain the existing calculation of Governor Droop demand expected response?**

### 2.1.4 Use of Failure to Synchronise Data

Currently, performance assessment of ramping services (RM1, RM3, and RM8) and Replacement Reserve De-synchronised uses the data from the existing Fail to Sync process, for all providing units which are not DSUs.

Concerns have been raised that a unit's performance for these services should be measured against all dispatch instructions issued and not solely instructions to synchronise. The TSOs are currently working on implementation of an automated system which could potentially account for all dispatch instructions as an enduring

solution. However, until such a system is in place Synchronisation Dispatch instructions are deemed to be the most suitable proxy readily available to assess ramping services.

**Question 4: Do you agree with the TSOs proposal to continue assessing ramping services based on the Fail Sync process for the duration of the interim arrangements, for all providing units which are not DSUs?**

### 2.1.5 Binary Nature of a Pass Fail Assessments

Under HAS, reserve performance charges were applied based on the number of MW below a 90% threshold a unit failed by. For DS3 System Services Interim Arrangements, the outcome is recorded as a fail regardless of by how much below this 90% threshold a unit fails by.

A number of service providers expressed the view that a marginal fail should be treated differently to one where the unit has not responded to a frequency event at all. Service providers highlighted that there is still some benefit to the system where a unit provides a partial response. The TSOs accept the merits of this argument; however it is also important to note that, there is a point beyond which reserve provided becomes of little or no realisable benefit to a system operator as they require certainty of service provision in order to ensure appropriate levels of reserve are scheduled.

In a data rich environment the use of binary pass – fail outcomes is appropriate as it is both simple to understand and implement. However, where there is not a data rich environment consideration needs to be given to a more bespoke approach looking at the specifics of each event and assessing each unit' performance accordingly. In this regard, the use of partial fails or categorisation of fail is more appropriate.

For the case of reserve data, there is in general around 7-8 events per annum below 49.5 Hz, meaning it is not data rich in nature. The TSOs have looked at increasing the number of events by increasing the threshold up to 49.7 Hz which could give in the region of 15 -20 events per annum. However, given the current tolerances applied and operating schedules this will only result in providers who currently have adequate amounts of data having more performance records but does little to help those with little or no performance records currently.

Synchronisation instruction data is more data rich in general for industry. Additionally, the outcome of the Fail to Sync process is already binary in nature where either a pass or fail is awarded. Therefore, the TSOs believe the use of a binary pass – fail result remains appropriate in this scenario.

For reserve performance the TSOs propose to retain the existing methodology including only assessing events below 49.5 Hz, but now propose to introduce a partial fail credit per event such that;

- If Achieved Response <70% of Expected => Complete Fail (Event Scaling Factor equals 0)
- If Achieved >90% of Expected => Pass (Event Scaling Factor equals 0)
- If the Achieved is between 70-90% of Expected => A Partial Fail is calculated based on Equation 2: Calculation of Partial Fails for Reserve Events below

**Equation 2: Calculation of Partial Fails for Reserve Events**

$$\text{Event Scaling Factor} = (90 - (\text{Achieved}/\text{Expected}))*5$$

It should be noted here that the scaling value of a passes and fails have switched meaning from the current performance scalar methodologies so that a Pass is now awarded as a 0 and a Fail is awarded as a zero. The reasoning for this is explained in Section 2.2 below.

**Question 5: Do you agree with the TSOs' proposal to introduce partial fails for performance between 70% to 90% of that expected for reserve events?**

## 2.2 Performance Scalar Calculation Methodology

Service providers have raised a number of concerns with the current performance scaling methodology. The main concerns expressed are as follows:

- The approach is overly penal on providers whereby two marginal fails could result in a significant loss of revenues for a sustained period of time;
- The trend-based approach over the last number of events is not appropriate given the lack of data richness. The time taken to rectify a unit's scalar following a period of poor performance is too long;

- The use of industry average scalars to account for the lack of data is unfair as service providers have little control over it. Additionally it sends no signal to a service provider to perform as its own performance has little impact on its performance scalar.

The TSOs acknowledge the issues highlighted above. To address these issues the TSOs propose to introduce time-based dynamic scaling of events so that more recent events have a greater impact on a unit's performance scalar. Details of this proposal are outlined below.

### 2.2.1 Performance Scalar Calculation Methodology Proposal

The TSO proposal for calculation of the performance scalar consists of two key components, the assessment of each event against Pass / Fail criteria and, the time between when the event occurred and the performance assessment month.

#### *Assessment of Pass / Fail per Event*

Under the assessment of the Pass / Fail per event the **Event Scaling Factor** '**$Q_i$'** is calculated for each assessable event (**i)** as an output between one and zero calculated based on the formulas below:

**For Reserve:**

**The Reserve Event Performance Factor 'S'** is defined as the Achieved Response divided by the sum of the Expected Response minus any Applicable Tolerances.

$$S = \frac{Achieved\ Response}{Expected\ Response - Applicable\ Tolerances}$$

**Equation 3: Calculation of Event Performance Scalar 'S'**

**S** is calculated for each Reserve Event below 49.5 Hz, where either of the following holds;

a) the Expected Response minus Applicable Tolerances is greater than 0 MW; or

b) the Achieved Response is greater than Expected Response.

**S** is then used to calculate the **Event Scaling Factor** '**$Q_i$'** based on the formulas below:

If S >= 90%, $\mathbf{Q_i}$ = 0,

If S <= 70%, $\mathbf{Q_i}$ = 1,

Otherwise, $\mathbf{Q_i}$ = ((90% – **S**)/100)*5.

**Equation 4: Calculation of Event Scaling Factor 'Q' for Reserve**

This results in a unit being awarded a Pass should they achieve greater than 90% of their expected response, a Fail if they achieve less than 70% expected and a sliding scale partial fail in between.

**For Ramping:**

If Sync Instruction = '**Fail**', $\mathbf{Q_i}$ = 1,

If Sync Instruction = '**Pass**', $\mathbf{Q_i}$ = 0.

**Equation 5: Calculation of Event Scaling Factor 'Q' for Ramping**

This results in a unit being awarded a Pass should they Pass a Synchronisation Instruction, and a Fail do not.

### *Assessment of Performance Scaling Factor per month*

Within each Assessment month multiple performance events may occur in some cases. In these scenarios a **Performance Scaling Factor 'K'** is calculated as the average of all the Pass / Fail assessments 'Q' within the assessment month.

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

**Equation 6: Calculation of Performance Scaling Factor 'K'**

where 'm' is the assessment month in question and 'im' refers to all performance records recorded within that assessment month which are averaged to produce '**K'**.

### *Dynamic Time Scaling Factor*

The second component of the new performance scalar calculation proposal in the introduction of time based dynamic scaling. This is proposed to replace the need for 10 system events utilised in the previous methodology.

The **Dynamic Time Scaling Factor 'Vm'** is a scaling component which adjusts the impact of each month's performance scalar based on the time difference between the

issuance of the Performance Scaling Factor 'Km' and the current assessment month and is calculated as follows:

**Table 3: Table of Dynamic Time Scaling Element 'V'**

| Time Differential (Months) 'm' | Dynamic Time Scaling Element 'V' |
|---|---|
| **0** | 1 |
| **1** | 0.8 |
| **2** | 0.6 |
| **3** | 0.4 |
| **4** | 0.2 |
| **5+** | 0 |

Within this the maximum duration a performance fail can be carried for is at most 5 months and the impact of a fail drops in discrete steps linearly over these months.

### *Performance Scalar Calculation:*

The **DS3 Performance Scalar 'P'** is subsequently calculated based on the product of the monthly **Performance Scaling Factor '$K_m$'** and the **Dynamic Time Scaling Element 'V' defined** already. It is calculated based on the formula outlined in Equation 7: Calculation of DS3 Performance Scalar as one minus the product.

$$P = MAX (1 – SUM (K_m * V_m), 0)$$

**Equation 7: Calculation of DS3 Performance Scalar**

Using this proposal, there is no need for 10 assessment events per providing unit and the use of industry averages as a resolution for data poor providers is no longer required. In the absence of no failed events a units performance scalar is considered to be 1.

**Question 6: Do you agree with the TSOs' proposed new Performance Scalar methodology?**

### 2.2.2 Performance Scalar Data Poor Resolution

Using the proposed new method outlined in Section 2.2.1 above the issue of units which are data poor becomes less important as multiple events are no longer required to carry out the assessments. However, there may still be a number of service providers who simply do not have any performance events or the frequency of their events is such that it is greatly in excess of the 6 months. The TSOs propose that a separate mechanism is required to ensure these units are also being put through some form of a performance mechanism, otherwise it would be constantly assumed that the unit has perfect performance despite not having demonstrated this against real system events to provide any confidence in this assumption.

The TSOs propose that in such scenarios, following a long duration without a performance event, a service provider's performance scalar would begin to trend downwards towards zero. To return its performance scalar to 1 a service provider has two options:

1) it can either wait until a performance event occurs to which it is expected to respond which subsequently will move it out of the data poor resolution; or
2) it can request to undertake a performance test. Upon successful completion of the test its performance scalar will return to 1 and the clock will reset on the time until it next enters into this data poor alternative resolution again.

The TSOs' proposal on how this data poor performance scalar changes overtime due to lack of data is shown in Table 4. Within this, all units remain within the method outlined in Section 2.2.1 for the first 8 months without any record of performance. Following 8 months, the scalar will drop by 0.3 over the space of the months 8 - 16 before dropping from 0.7 to 0 during the period from months 16 - 24 and remain at 0 thereafter until an event occurs.

Should this proposed process be implemented, the TSO anticipate that the start date from which the data poor assessment will begin is the go-live of this new process. In this case a unit which could potentially see itself in a data poor scenario from day one will be

set to a performance scalar of 1 and the 8 month timer to enter into the data poor resolution will commence from this date only.

This proposal is shown graphically in Figure 1.

**Table 4: Data Poor Configuration**

| Months without an event (M) | Performance Scalar Calculation (P) |
|---|---|
| < 8 Months (M) | MAX (1 – SUM($K_m$* $V_m$) , 0) |
| 8 <=Months (M)< 16 | 0.7 + ((16 – M)*(0.3/8)) |
| 16 <= Months (M) < 24 | (24 – M) * ( 0.7/8) |
| >24 Months (M) | 0 |

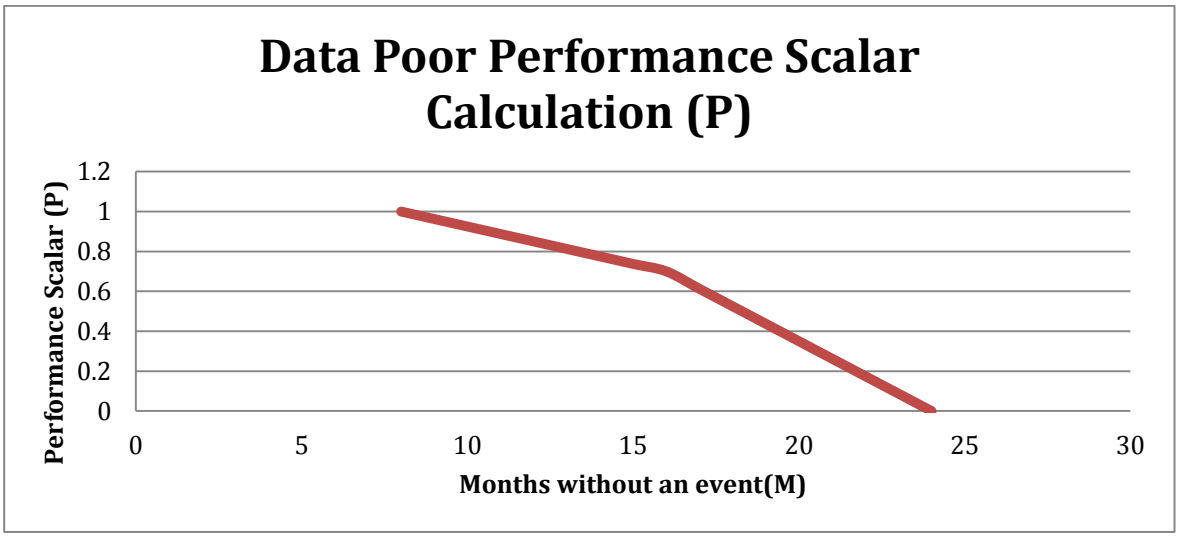


**Figure 1: Data Poor Performance Scalar Calculation**

Using this methodology, the use of an industry average calculation is no longer needed to assess performance in a data poor scenario.

**Question 7: Do you agree with the TSOs' proposed new Data Poor resolution methodology?**

### 2.2.3 Performance Scalar Reserve Worked Examples

Outlined in this section are a number of worked examples showcasing the proposed methodologies above.

#### *Example 1*

***Assessment Month - January***

**Table 5: Example 1 - Assessment Month January**

| Unit ID | Event Date – January | | | | | |
|---|---|---|---|---|---|---|
| | Expected | Achieved | Tolerance | S | Qim | Km |
| A1 | 10 | 10 | 1 | $= \frac{10}{10-1} = 1.11$ | 0 | 0 |

One event occurred in January. The dynamic time scaling for this therefore is $V_0$=1

**Performance Scalar (P) = 1 – (0* 1) = 1**

***Assessment Month – February***

No events occurred in February. The dynamic time scaling for the only applicable event from January therefore is $V_1$=0.8.

**Performance Scalar (P) = 1 – (0* 0.8) = 1**

***Assessment Month - March***

**Table 6: Example 1 - Assessment Month March**

| Unit ID | Event Date – March | | | | | |
|---|---|---|---|---|---|---|
| | Expected Response | Achieved Response | Tolerance | S | Qim | Km |
| A1 | 10 | 3 | 1 | $= \frac{3}{10-1} = .33$ | 1 | 1 |

One event occurred in March. The dynamic time scaling for this therefore is $V_0$=1. The previous event from January is now two months old and now time weighted as $V_2$=0.6. The units performance during the March event achieved less than 50% of what was expected and as a result their performance scaling factor for March is $K_0$ = 1.

**Performance Scalar (P) = 1 – (1* 1) – (0*0.6) = 0**

***Assessment Month - April***

No events occurred in April. The dynamic time scaling for the January event is now $V_3$ = 0.4 and the March event is $V_1$ = 0.8.

**Performance Scalar (P) = 1 – (1* 0.8) – (0*0.4) = 0.2**

***Assessment Month - May***

**Table 7: Example 1 - Assessment Month May**

| Unit ID | Event Date – May | | | | | |
|---|---|---|---|---|---|---|
| | Expected Response | Achieved Response | Tolerance | S | Qim | Km |
| A1 | 10 | 7 | 1 | $= \frac{7}{10-1} = .778$ | $= \frac{(0.9-0.778)}{1} * 5 = .61$ | - |

| Unit ID | Event Date – May | | | | | |
|---|---|---|---|---|---|---|
| | Expected Response | Achieved Response | Tolerance | S | Qim | Km |
| A1 | 10 | 10 | 1 | $= \frac{10}{10-1} = 1.11$ | 0 | $= \text{average}(0,0.61) = .305$ |

Two events occurred in May. The dynamic time scaling for these are now $V_0$ = 1 while the previous events in March and January are now $V_2$ = 0.6 and $V_4$ =0.2 respectively.

As two events occurred in May the unit's performance scaling factor $K_m$ is the average of its performance scalar assessment Q over both events i.e. $K_m$ = 0.305.

**Performance Scalar (P) = 1 – (.305* 1) – (1* 0.6) – (0*0.2)= 0.095**

***Assessment Month - June***

No events occurred in June. The dynamic time scaling for the May events is now $V_1$ = 0.8 while the March event is now time weighted as $V_3$ = 0.4. The event for January has exceeded the 5 month timeframe for time weighting and no longer affects the unit's assessment.

**Performance Scalar (P) = 1 – (.305* 0.8) – (1* 0.4) = 0.356**

***Assessment Month - July***

No events occurred in July. The dynamic time scaling for the May events is now $V_2$ = 0.6 while the March event is now time weighted as $V_4$ = 0.2.

**Performance Scalar (P) = 1 – (.305* 0.6) – (1* 0.2) = 0.617**

## *Example 2*

***Assessment Month - January***

**Table 8: Example 2 - Assessment Month January**

| Unit ID | Event 1 – Jan | | | | | |
|---|---|---|---|---|---|---|
| | Expected Response | Achieved Response | Tolerance | S | Qim | Km |
| B1 | 10 | 2 | 1 | $= \frac{2}{10-1} = .22$ | 1 | 1 |

One event occurred in January. The dynamic time scaling for the event is $V_0$ = 1.

**Performance Scalar (P) = 1 – (1* 1) = 0**

***Assessment Months – February - August***

In this example, no further events have occurred between February and August. Hence the performance scaling factor is being impacted solely based on the outcome from the initials event from January over these months. This can be seen in the Table below.

Table 9: Example 2 - Assessment Months Feb to August

| Month | Performance Scalar (P) |
|---|---|
| February | **0.2** |
| March | **0.4** |
| April | **0.6** |
| May | **0.8** |
| June | **1** |
| July | **1** |
| August | **1** |

***Assessment Month – September***

No event occurs in September. This providing unit has now exceeded 8 months without a performance event. The unit now falls into the data poor category and its performance scaling value now begins to be scaled based on the time from its last event.

**Performance Scalar (P)** **0.7 + ((16 – M)*(0.3/8))** **=** **0.9625**

***Assessment Month – October***

One event occurs in October. The unit performed adequately to pass the event. The dynamic scaling element for this event is now $V_0 = 1$ and the unit is no longer assessed based on the data poor category.

Table 10: Example 2 - Assessment Month October

| Unit ID | Event 2 – Oct | | | | | |
|---|---|---|---|---|---|---|
| | Expected Response | Achieved Response | Tolerance | S | Qim | Km |
| B1 | 10 | 9 | 1 | $= \frac{9}{10-1} = 1$ | 0 | 0 |

**Performance Scalar (P)** **=** **1 – (0* 1)** **=** **1**

Had an event not occurred in October the unit's performance scalar would have continued to tend towards zero over the space of the next sixteen months. During this time period the unit could request to undertake a performance test. Upon successful completion of the test, the performance scalar would be reset to 1.

### 2.3 Application of Performance Testing

As part of the current interim performance scalar methodology approach, a performance test can be applied for as a potential work around for data poor units, or units that have completed some form of work to rectify poor performance.

Under the current process the award of performance test credits can be allocated once all the necessary test work has been completed and any subsequent reports provided and approved by the testing teams within EirGrid and SONI.

The exact testing procedures for each performance test need to be agreed with the relevant testing teams within EirGrid and SONI in advance of conducting the test, and is determined on a case-by-case basis depending on what the unit is seeking to demonstrate performance of. As a result requirements can vary slightly depending on the unit type, the purpose of the test (is it to rectify Data Poor Scenarios or for Performance Rectification) and the services the allocation of the pass data records would be applied against.

At a high level the following test procedures may be required for each service:

- For POR, SOR, TOR1 and TOR2 – Frequency Injection Tests in line with current EirGrid or SONI test procedures as applicable compared against the unit's contracted Schedule 9 reserve curve parameters and / or minimum Grid Code requirements.
- For RRS/RRD/RM1/RM3/RM8 – A test assessing the unit's synchronisation and start-up through to ramp-up to full load output compared against the unit's TOD and contracted parameters.

Depending on the nature of each test applied for, only a subset of these requirements may actually be required. Should a service provider wish to use an existing scheduled

test to also demonstrate performance the TSO is open to considering this, but it can only be granted if the nature of the existing test will also demonstrate the required performance mechanism and the service provider has applied in advance through the test credit process to combine the tests.

To date, there have been few requests from service providers to partake in the test credit process. As such, the process for specifying the requirements for a performance credit test is yet to be undertaken.

**Question 8: Do you have any feedback on the type of tests to be undertaken through the performance testing process?**

### 2.4 Performance Scalar Business Process

The current performance scalar business process went live with the issuance of the first set of data packs in November. To date the process appears to be working effectively with industry well engaged with the process. The TSOs do not propose to change the current business process or timelines associated with query management. However, we do intend to include more detail on the process in an updated protocol document.

**Question 9: Do you agree with the proposal to retain the existing business process and timelines?**

# Consultation

We value the input of stakeholders on all aspects of DS3 and as part of the System Services detailed design and implementation project we will consult with industry across a variety of topics.

## 3.1 Responding to the Consultation

Views and comments are invited on all aspects of this document. Responses to the consultation should be sent to:

DS3@eirgrid.com or DS3@soni.ltd.uk by 10 May 2017

Responses should be provided using the associated questionnaire template. It would be helpful if answers to the questions include justification and explanation. If there are issues pertinent to System Services that are not addressed in the questionnaire, these can be addressed at the end of the response.

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.

# Appendix

## 4.1 Summary of questions proposed

**Question 1**: Do you agree with the TSOs' proposal to award a Pass when a unit's achieved response is greater than the initial expected response (ignoring tolerances) in cases where the overall expected values is less than 0 MW?

**Question 2**: Do you agree with the TSOs proposal to utilise a time weighted average approach for the calculation of SOR and TOR1?

**Question 3**: Do you agree with the TSOs' proposal to retain the existing calculation of Governor Droop demand expected response?

**Question 4**: Do you agree with the TSOs proposal to continue assessing ramping services based on the Fail Sync process for the duration of the interim arrangements, for all providing units which are not DSUs?

**Question 5**: Do you agree with the TSOs' proposal to introduce partial fails for performance between 70% to 90% of that expected for reserve events?

**Question 6**: Do you agree with the TSOs' proposed new Performance Scalar methodology?

**Question 7**: Do you agree with the TSOs' proposed new Data Poor resolution methodology?

**Question 8**: Do you have any feedback on the type of tests to be undertaken through the performance testing process?

**Question 9**: Do you agree with the proposal to retain the existing business process and timelines?