

# Proposals for Future DS3 System Services Protocol Updates

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# Agenda

- Introduction
- Changes to the POR Assessment Method
- Ramping Margin Performance Assessment Proposal
- Reduction in FFR and OR Assessment Threshold
- Data Poor Process



# Introduction

- The Recommendation on DS3 System Services Protocol – Regulated Arrangements was published on June 12<sup>th</sup> 2020.
- It was acknowledged in the Recommendation paper that the TSOs would engage with industry to discuss a number of the future proposals.
- The purpose of today's presentations is to provide further information on proposed changes to the DS3 SS Protocol – Regulated Arrangements and to discuss these proposals with industry.



## Changes to the POR Assessment Method



# Primary Operating Reserve (POR)

- POR is the additional MW output or reduction in demand required at the Frequency nadir, compared to the pre-incident output/demand, which is fully available and sustainable between 5 and 15 seconds after the Event.
- POR Inertia Credit:
  - In early 2015 a Joint Grid Code Review Panel(JCGRP) Working Group was tasked with assessing the inertia effect from Synchronous Generation Units post Frequency Event.
  - During 2015 the JGCRP carried out multiple inertia assessments for Synchronous Generators.
  - They concluded and in return proposed that the POR Inertia credit should be introduced to account for the initial inertial response being delivered by synchronous generating units in advance of the POR timeframe.
  - It was proposed pre-introduction of the DS3 System Services Synchronous Inertial Response(SIR) and Fast Frequency Response(FFR) services being available.



# POR Inertia Credit

- The POR inertia Credit is calculated as follows:

- Tolerance MW:

- H = Inertia Constant (MWs/MVA)
- MVA = Unit Size (MVA)

$$K = H \times MVA$$
$$\text{Tolerance MW} = K \times \frac{1.5}{K \text{ value from C10}^*}$$

\* K value for C10 is the agreed standard unit to be used in the above calculation.

- MW Inertia Calculation:

$$\frac{K \times (\text{RoCoF at } T_{+5})}{25}$$

- POR Inertia Credit:

$$\text{Tolerance MW} + \text{MW Inertia Calculation}$$



# POR Inertia Credit

- Performance Incident Scaling Factor  $Q_i$ :

$$\text{Let } S = \frac{\text{Achieved POR Response}}{(\text{Expected POR Reponse} - \text{POR Inertia Credit})}$$

*If  $S > 0.9$ ,  $Q_i = 0$  (Pass)*

*If  $S \leq 0.7$ ,  $Q_i = 1$  (Fail)*

*Otherwise,  $Q_i = (0.9 - S) \times 5$  (Partial Pass)*



# Changes to POR Assessment

- **Issue:**

- Inertia Credit is only given to Conventional Units.
- SIR payment which covers the inertial response from a Synchronous unit has since been introduced, providing an income to units which provide an inertial response.
- FFR payment which covers the reserve period of sub 2 seconds to 10 seconds has since been introduced providing a source of income for units which are reacting quicker than the POR period.

- **Proposal:**

- Removal of Inertia Credit.
- Change POR assessment method to assess the average response of a unit over the entire POR period.

- **TSOs Rationale for Assessment Changes:**

- Average assessment looks at the overall performance of a unit during the POR period.
- This gives a truer and fairer reflection of how a unit performed when providing POR and does not restrict it's performance assessment to one moment in time.
- Assessment in line with that for SOR and TOR1.





# Changes to POR Assessment

- **Two Example Assessments:**

- Example A (Current Assessment Method):

- Shows the Frequency Event Nadir occurs before the POR Period, therefore it is taken at  $T = 5s$  for assessment purposes.
- It can be seen at this time that the Unit output is below the calculated expected output.
- Inertia Credit is required to Pass POR performance assessment.

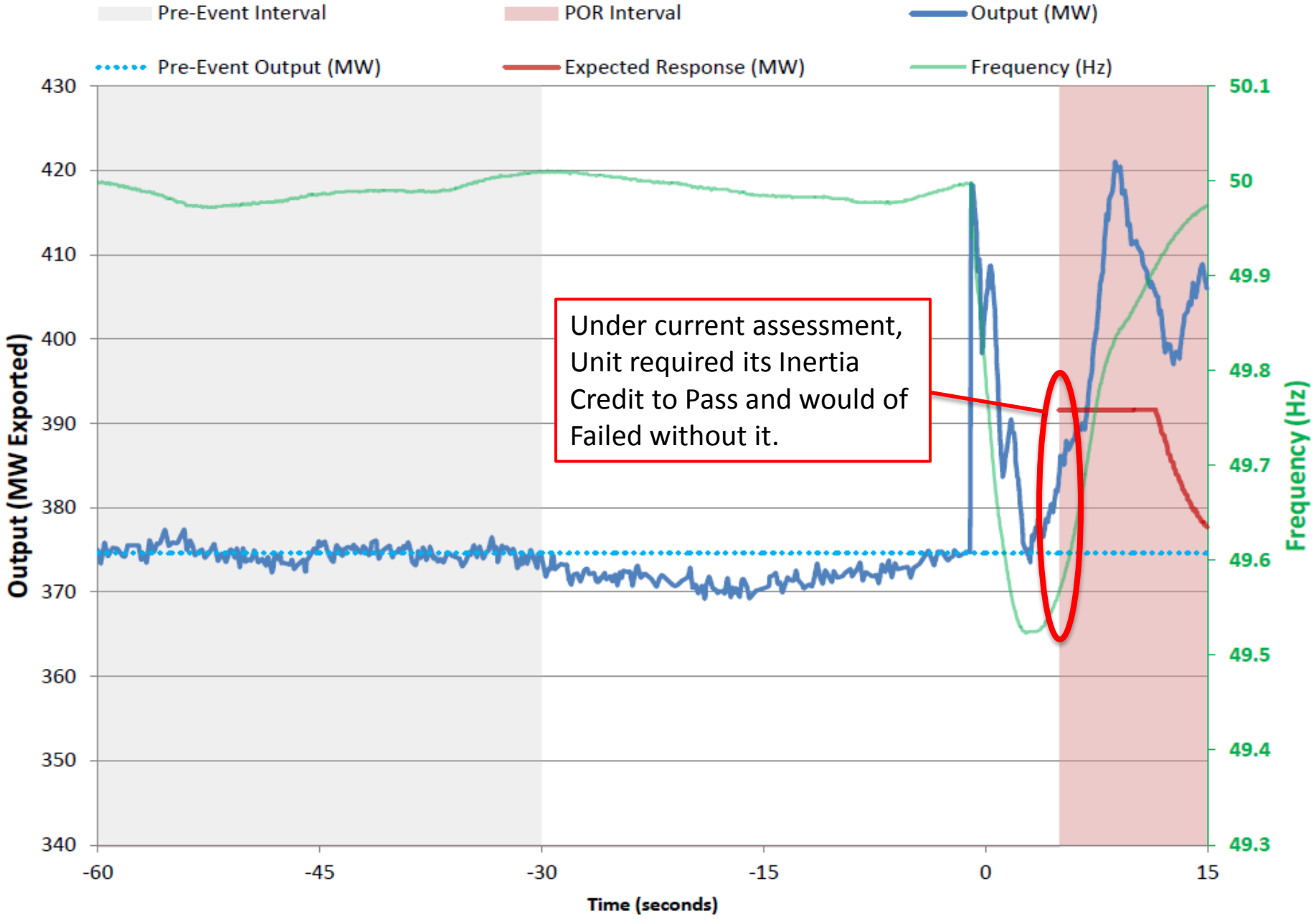
- Example B (Proposed Assessment Method):

- It can be seen that the Unit output, on average is greater than the calculated expected Unit output for the entire POR period.
- This unit would pass the proposed POR performance assessment.



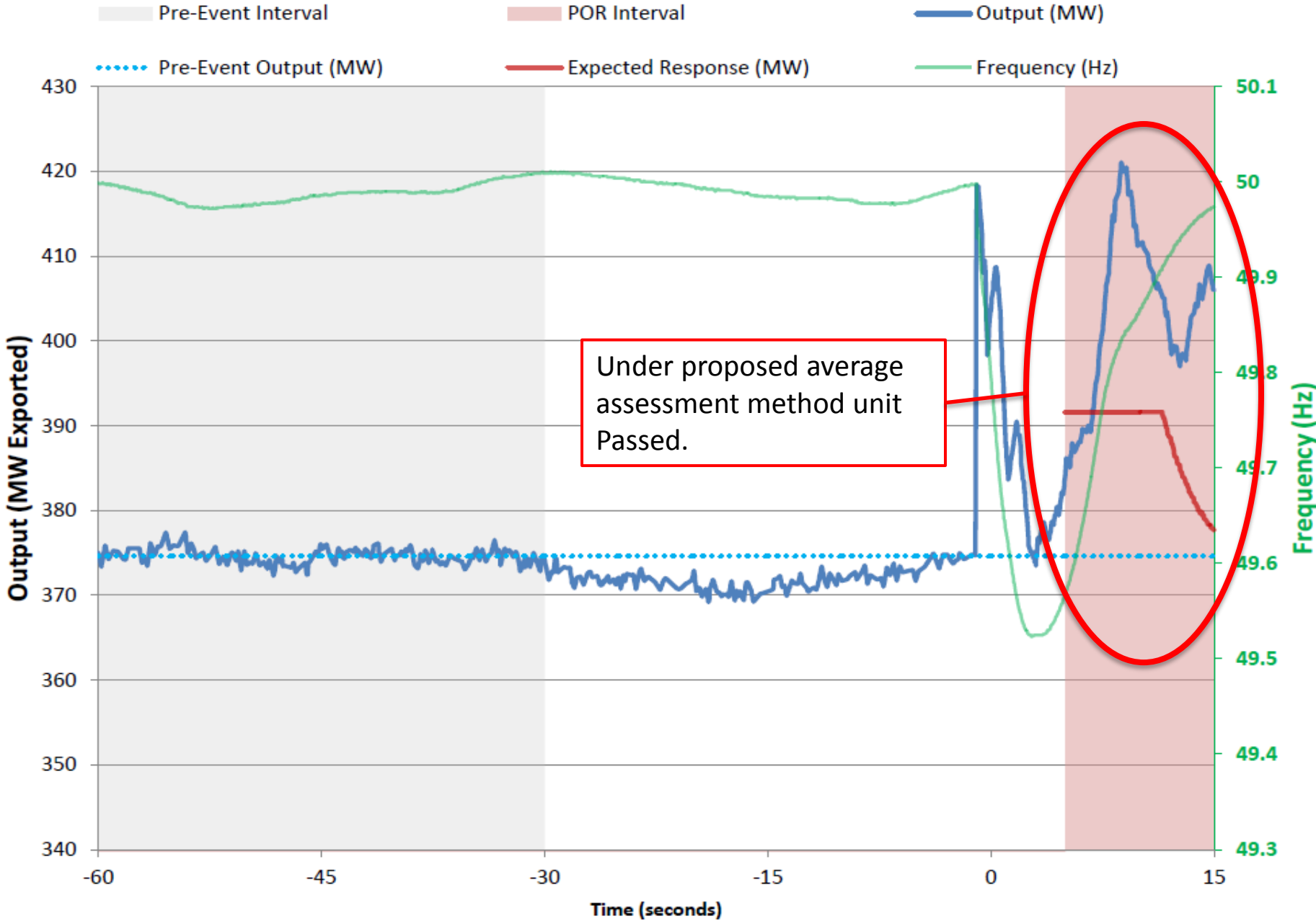
**EXAMPLE A**

# Operating Reserve Performance



**EXAMPLE B**

# Operating Reserve Performance



# POR Assessment Review

- A review was completed on the data from units which have the use of an Inertia Credit from all Events in the last 12 months.
  - Units which required their Inertia Credit to pass their POR assessment were identified.
  - The units were reassessment without their Inertia Credit.
  - The units were assessed using the proposed average assessment method.
  - The results of these assessments are as follows:
- September 2020 Event:

Unit	Current Assessment with Inertia Credit	Current Assessment without Inertia Credit	Average Response Assessment
A	Pass	Fail	Pass
B	Pass	P/Pass	Pass

# POR Assessment Review

- 5<sup>th</sup> of August 2020 Event:

Unit	Current Assessment with Inertia Credit	Current Assessment without Inertia Credit	Average Response Assessment
A	Pass	Fail	Pass
B	Pass	Fail	Pass
C	Pass	Fail	Pass
D	Pass	Fail	P/Pass
E	N/A	P/Pass	Pass
F	P/Pass	Fail	Fail
G	Pass	P/Pass	P/Pass

- July 2020 Event:

Unit	Current Assessment with Inertia Credit	Current Assessment without Inertia Credit	Average Response Assessment
A	Pass	Fail	Pass
B	Pass	P/Pass	Pass
C	Pass	P/Pass	Pass
D	P/Pass	Fail	Fail
E	P/Pass	Fail	Fail

# POR Assessment Review

- June 2020 Event:

Unit	Current Assessment with Inertia Credit	Current Assessment without Inertia Credit	Average Response Assessment
A	P/Pass	Fail	Fail
B	Pass	Fail	P/Pass
C	Pass	Fail	Fail
D	Pass	P/Pass	Fail
E	Pass	Fail	Pass
F	N/A	Fail	Fail

- Jan 2020 Event:

Unit	Current Assessment with Inertia Credit	Current Assessment without Inertia Credit	Average Response Assessment
A	Pass	Fail	Pass
B	Pass	Fail	P/Pass
C	P/Pass	Fail	Pass
D	P/Pass	Fail	Fail

# Summary

- Removal of POR Inertia Credit and move to average assessment for POR being considered for next consultation.
- TSOs believe this is a fairer and truer reflection of a units performance.
- TSOs are happy to engage with individual Units who believe they may be impacted by these changes by contacting [performancemonitor@eirgrid.com](mailto:performancemonitor@eirgrid.com) or [performancemonitoring@soni.ltd.uk](mailto:performancemonitoring@soni.ltd.uk)



# Questions





Proposal for new Ramping Margin PM Assessment Method



# Ramping Margin Service

- Ramping Margin is the increased MW Output and/or the MW Reduction that a Providing Unit can provide and maintain within certain time periods after the TSO has issued a Dispatch Instruction (DI) to the Service Provider.
  - Ramping Margin 1 (RM1): MW Output and/or MW Reduction a Providing Unit can provide within 1 hour and maintain for a further 2 hours.
  - Ramping Margin 3 (RM3): MW Output and/or MW Reduction a Providing Unit can provide within 3 hour and maintain for a further 5 hours.
  - Ramping Margin 8 (RM8): MW Output and/or MW Reduction a Providing Unit can provide within 8 hour and maintain for a further 8 hours.



# Ramping Margin Assessment

- **Current Assessment Method:** EDIL 'Fail to Sync' method.



- Performance Incident Scaling Factor (Qim) Calculation:

$$\frac{\text{Total No. of Fail Syncs in month}}{\text{Total No. of Syncs in Month}}$$

# Ramping Margin Assessment

- **Issue:**

- Current approach to ramping assessment is limited and does not provide a true reflection of a units performance with regards to the provision Ramping Margin services.
- For units with low number of Syncs, even if the unit is providing adequate ramping services, one Fail Sync can have a knock on effect on payments for 5 months.

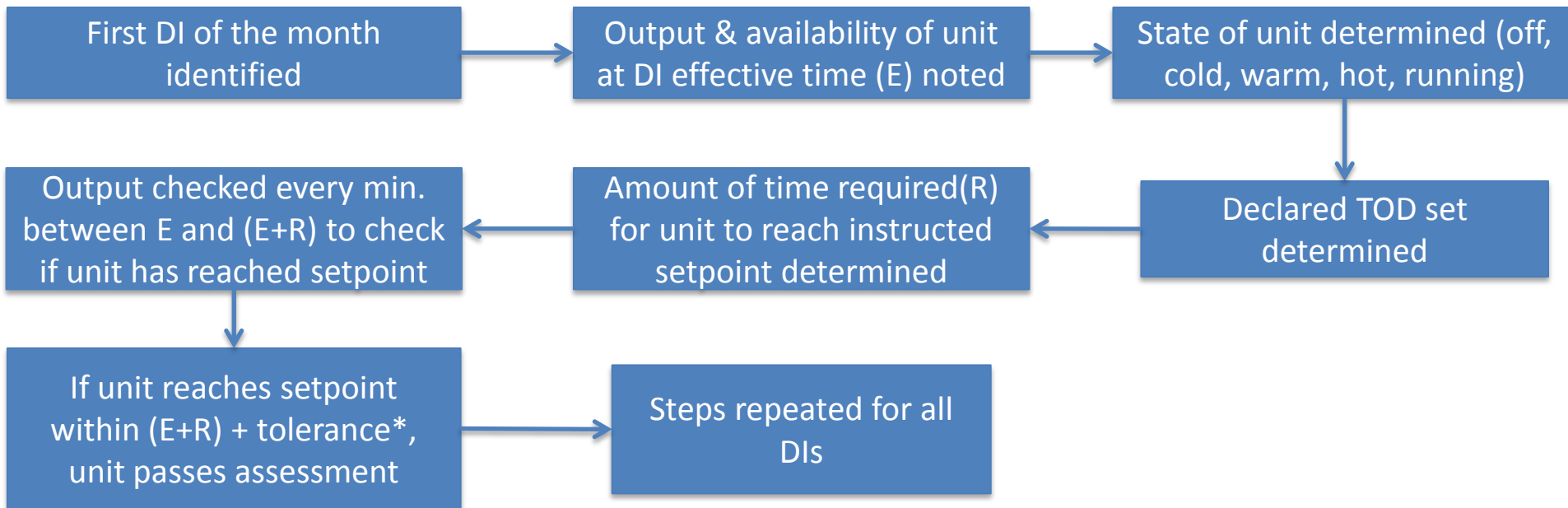
- **Proposal:**

- Develop a new ramping assessment method for RM1, RM3 & RM8 which assess a units ramping performance against its declared TOD Set.
- Replacement Reserve (Synchronised) would still be assessed using the EDIL Fail to Sync or frequency based methods as it currently is under the proposed changes.
- Replacement Reserve (Desynchronised) would still be assessed using the EDIL Fail to Sync method as it currently is under the proposed changes.



# Ramping Margin Assessment

- **Process:**



\*Tolerances still to be finalised.

# Ramping Margin Service

- **TSOs Rationale for Changes:**

- Gives a truer reflection of how a unit performed regarding the RM1, RM3 and RM8 services.
- Units with low amount of syncs and can face long term effects of a single failed sync, these units would stand a better chance of having a more accurate scalar for the RM1, RM3 and RM8 services.



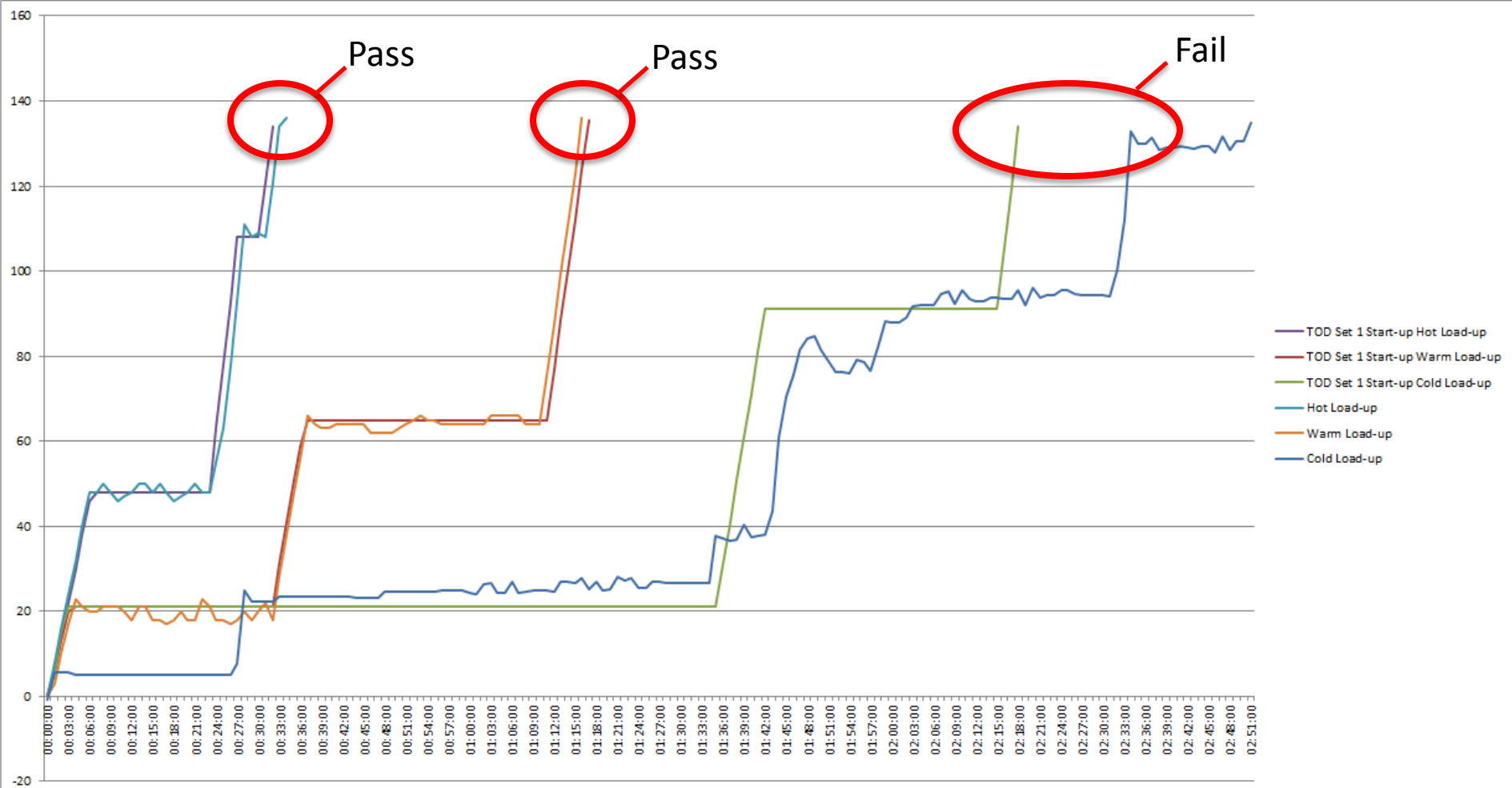
# Ramping Margin Service

- **Example assessment:**

- Sync DI Issued with an Effective Time of 00:00 to their minimum declared load of 130MW.
- The example shows the unit syncing on time – therefore the sync is achieved.
- The example shows the unit starting up in 3 different states, cold, warm and hot.
- The tool calculates the time in which the unit should reach it's minimum load according to the units declared TOD set.
- The tool checks output every minute to determine if the unit has reached it's minimum load.
- The tool will determine if the unit has reached its setpoint in the correct timeframe.



# Ramping Assessment Proposal





# Next Steps

- Development of new tool to carry out assessment.
- Testing of new tool.
- Determine tolerance levels for pass/fail criteria.
- Determine the calculation method of the Performance Incident Scaling Factor (Qi).



# Summary

- New proposed assessment method to assess the ramping performance of units either up/down.
- Provides a truer reflection of a units performance with regards to the ramping services.
- New tool to be developed and tested to perform assessment.
- Tolerance of pass/fail criteria and the calculation of Qi to be finalised.



# Discussion and Feedback Welcome

- Feedback on new ramping assessment.
- Proposals on tolerances to be applied to pass/fail criteria.
- Proposals on the calculation of  $Q_i$ .
- Any feedback or proposals can be submitted after the workshop along with any questions to [DS3@eirgrid.com](mailto:DS3@eirgrid.com) or [DS3@soni.ltd.uk](mailto:DS3@soni.ltd.uk).



# Reduction in Threshold for Assessing Units for Operating Reserve and Fast Frequency Response (FFR)



# Operating Reserve & FFR

- Operating Reserve & FFR is the additional MW output (and/or reduction in Demand) required compared to the pre-incident output (or Demand), which is fully available and sustainable for defined time periods after a Frequency Event.
  - FFR Period: 2 – 10 seconds
  - POR Period: 5 - 15 seconds
  - SOR Period: 15 – 90 seconds
  - TOR1 Period: 90 seconds to 300 seconds



# Reduction in Assessment Threshold

- **Issue:**

- Units available <1MW during a frequency event are not currently assessed and they receive N/A records.
- Long term N/A records lead to becoming data poor.

- **Proposal:**

- Reduce the assessment threshold for OR services to 0.5MW.
- Reduce the assessment threshold for FFR to 0.2MW.

- **TSOs Rationale for Changes:**

- Increases the number of units available for assessment, therefore reducing the likelihood of going data poor for smaller units.



# Review of Assessments Completed

- A review was completed on the data from Frequency Events since the 31/10/2019 Event.
- This data was reviewed to determine what effect lowering the threshold would have on currently contracted units.
- POR Review:
  - 17 additional assessments would have been completed for 10 different units.
  - Out of these 10 units, 4 of these units are currently data poor.
  - Additional assessment results

Passes	Partial Passes	Fails
8	0	9

- SOR Review:
  - 19 additional assessments would have been completed for 13 units.
  - Out of these 12 units 3 of them are currently data poor.
  - Additional assessment results:

Passes	Partial Passes	Fails
10	2	7

# Operating Reserve

- TOR1 Review:

- 14 additional assessments would have been completed for 12 units.
- Out of these 12 units 5 of them are currently data poor.
- Additional assessment results:

Passes	Partial Passes	Fails
7	3	4

- FFR Review:

- 5 additional assessments would have been completed for 3 units.
- 1 of these units is currently data poor.
- Additional assessment results:

Passes	Fails
4	1



# Summary

- Lowering of threshold for assessment of POR, SOR & TOR1 to 0.5MW from 1MW.
- Lowering of threshold for assessment of FFR to 0.2MW from 1MW.
- Providing the opportunity for units with smaller contracted values for these services to be assessed more frequently.
- Helps units to avoid becoming Data Poor.



# Questions



Data Poor Process



# Data Poor

- Should a Providing Unit fail to meet the Minimum Data Records Requirement outlined in the table below the unit will go Data Poor.

	Reserve	Ramping	Fast-acting
Minimum Data Records Required	Report at least 1 Performance Incident Scaling Factor every 12 Months	Report at least 1 Performance Incident Scaling Factor every 12 Months	Report at least 1 Performance Incident Scaling Factor every 12 Months

- When a Unit goes Data Poor they will be subjected to the Data Poor Performance Scalar.
- This leads to a reduction in payments to the Unit for the service in question.



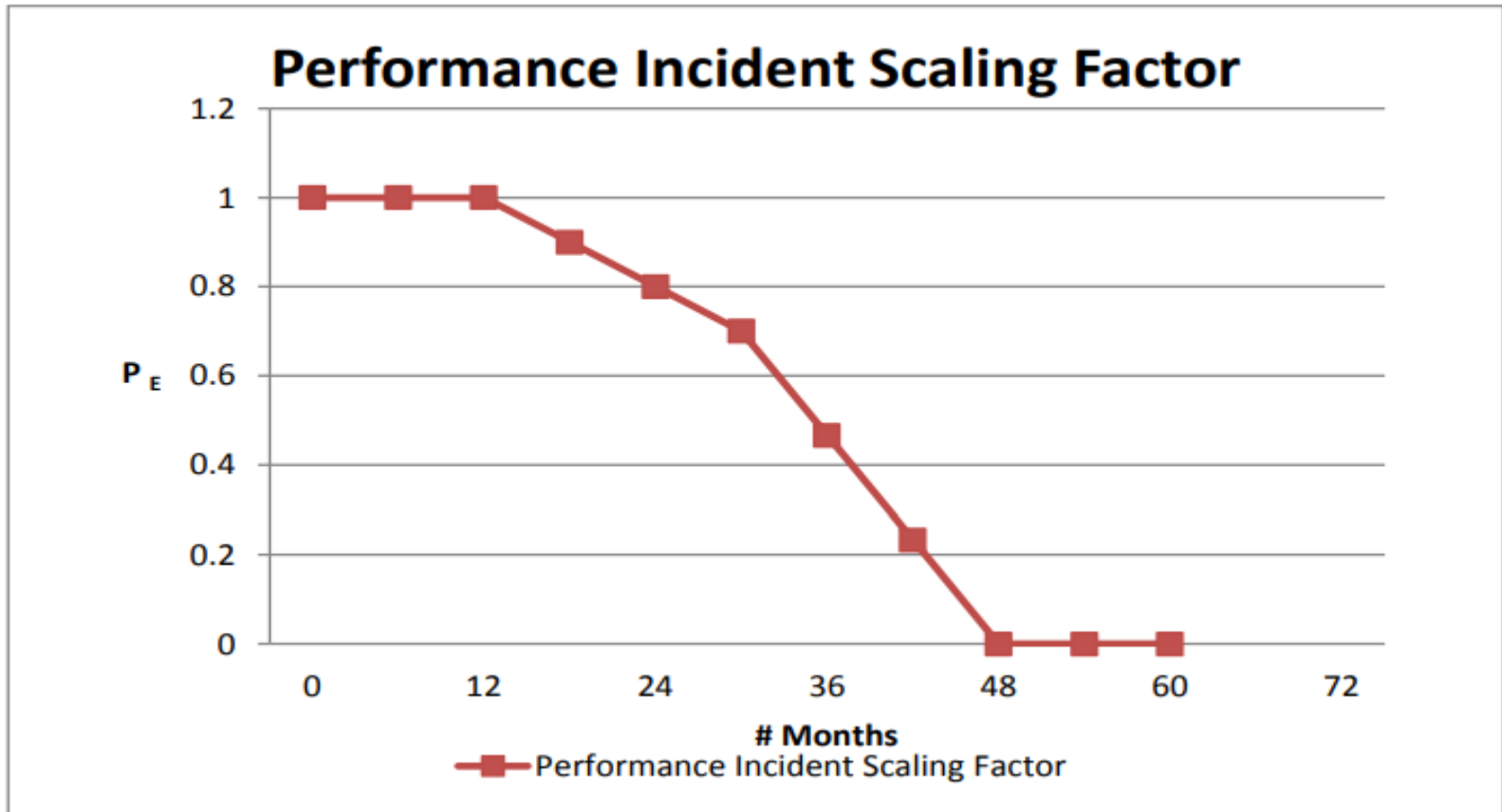
# Data Poor

- The Data Poor Performance Scalar is applied as a reducing scalar over time and is calculated using the formulae seen below:

Months without an event (M)	Performance Incident Scaling Factor Calculation ( $P_E$ )
< 12 Months (M)	$\text{MAX} (1 - \text{SUM}(K_m * V_m) , 0)$
$12 \leq \text{Months (M)} < 30$	$0.7 + ((30 - M) * (0.3/18))$
$30 \leq \text{Months (M)} < 48$	$(48 - M) * (0.7/18)$
>48 Months (M)	0

# Data Poor

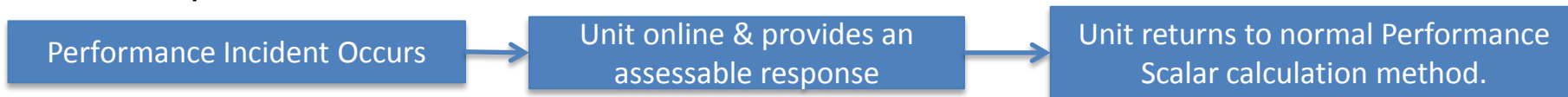
- Graphical Representation of Performance Incident Scaling Factor using the calculation in previous slide.



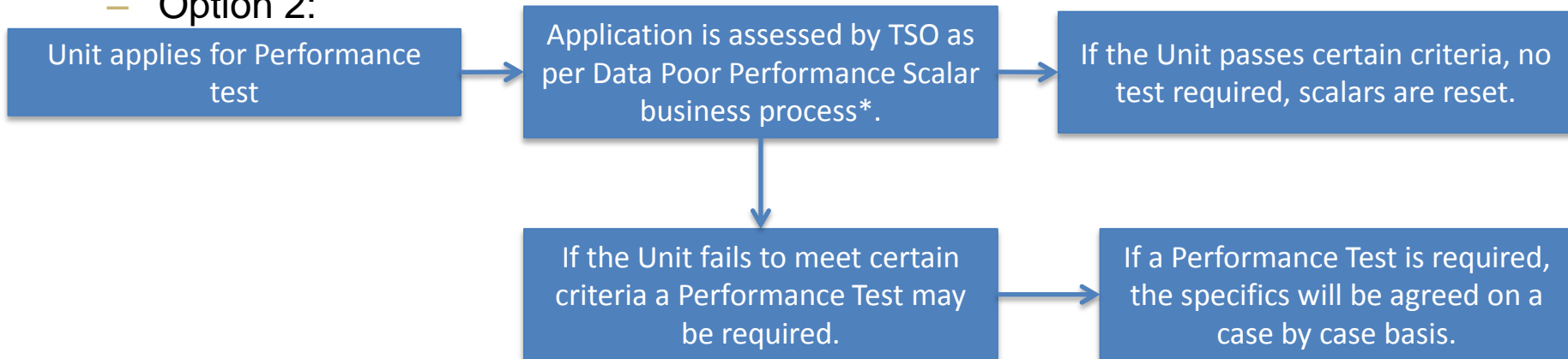
# Data Poor

- Should a Unit go Data Poor, the Unit can rectify its scalar back to 1 through two possible ways.

- Option 1:



- Option 2:



\*The Data Poor Performance Scalar business process can be seen in Fig. 9 in the DS3 System Services Protocol – Regulated Arrangements Version 3

# Summary

- TSOs do not propose any changes to the current Data Poor Process in next consultation.
- Unit can apply for a Performance Test at any time to return to the Data Rich Process.
- If a Unit has gone Data Poor and performance data is available for a chargeable event then please contact [performancemonitor@eirgrid.com](mailto:performancemonitor@eirgrid.com) or [performancemonitoring@soni.ltd.uk](mailto:performancemonitoring@soni.ltd.uk).





# Questions

