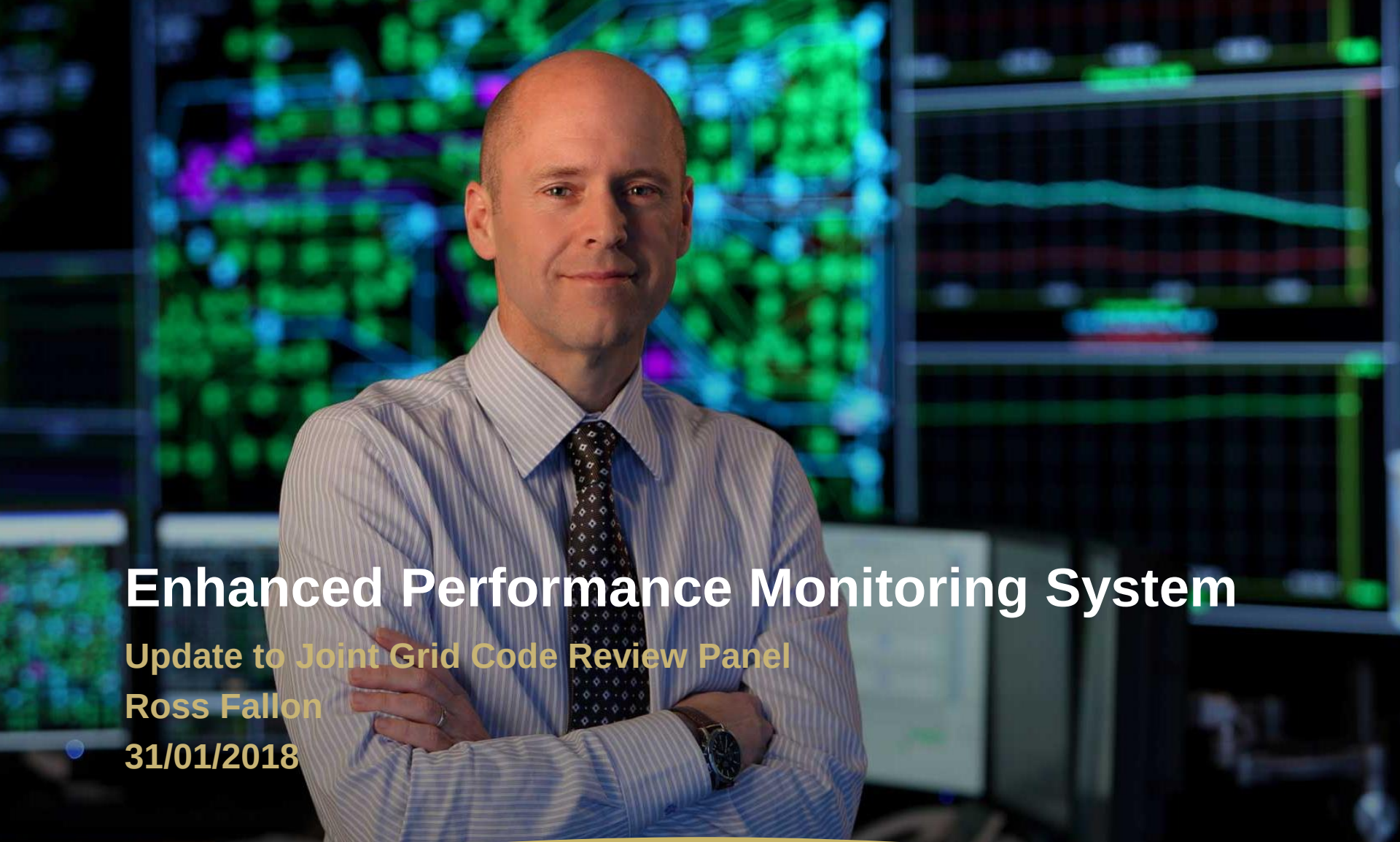

Enhanced Performance Monitoring System

Update to Joint Grid Code Review Panel

Ross Fallon

31/01/2018

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Enhanced Performance Monitoring System

Deliver a comprehensive tool to enable the TSO to monitor performance of all Users and the timely provision of data to those Users

EPMS Phase 1

Automation of existing performance monitoring activities for wind farm monthly reports and producing operating reserve reports

Future EPMS

Comprehensive performance monitoring of all DS3 system services and Grid Code

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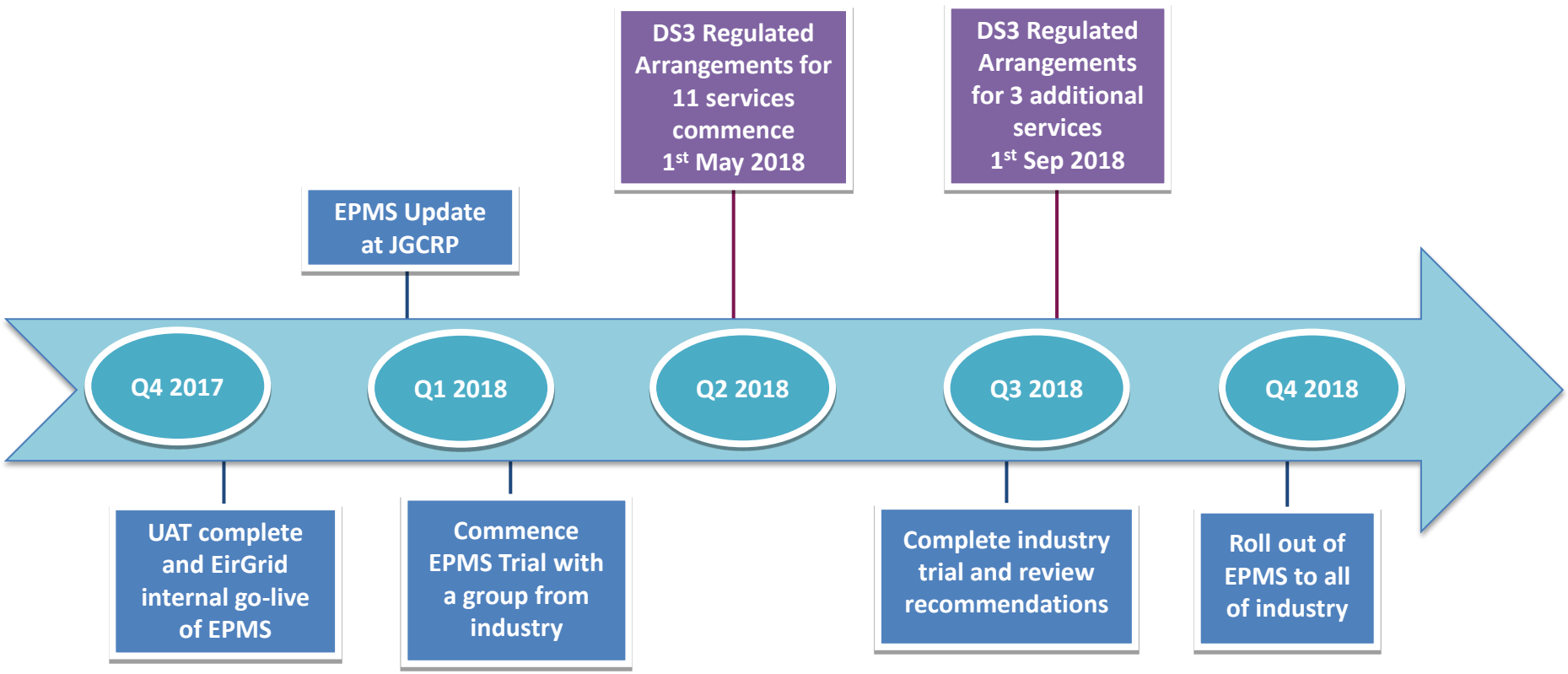
EPMS Timeline



EPMS Activities

DS3 Activities

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Terms of Reference

- Introduce the application to a subset of industry to gain experience before ‘go-live’

- Seek recommendations on the following aspects:
  - Any tolerances to be applied compliance with required performance.
  - Priority levels (from P1 to P5) that should be applied to any non performance issues identified.
  - Timelines for resolution of issues for each

- Provide feedback on EPMS Phase 1 to enable future development of the system.

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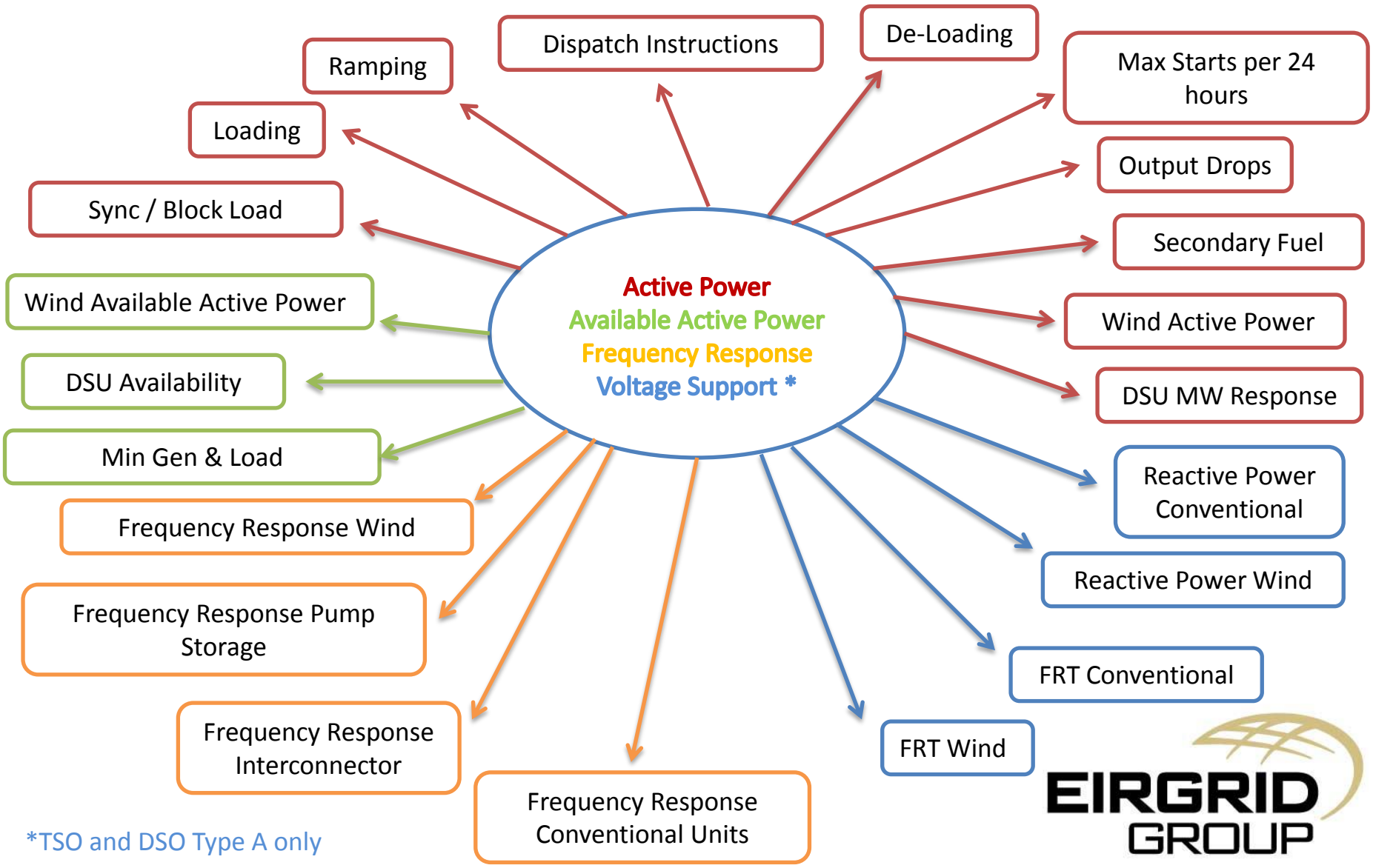
What's Monitored?



*TSO and DSO Type A only

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Performance Monitoring Concept

- Examine units performance for an event (event can be a day or a discrete time period);
- Average the performance over the last X no. of events;
- Determine the unit's deviation, if any, from the expected performance;
- If the deviation is not within an acceptable tolerance it is deemed a non-performance issue;
- Determine a priority (1 to 5) based on the severity of the deviation and indicate timeline for resolution.

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Inputs and Outputs

SCADA | EDIL | Meter | PMU | Grid Code | Event Recorders | VTOD | Contracts | Derogations

Detailed Reports | Summary Reports | Raw Data | User Reports

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Frequency Response - Detailed Summary

Company:	Generation Co.
Unit:	XYZ
Date Report Run:	24/01/2018 08:14:00
Event Date & Time:	10/01/2018 12:03:23.000
Fuel:	PRIMARY(GAS)

Frequency Response

	POR	SOR	TOR1
Expected Response (MW)	10.073	11.175	-0.00
Achieved Response (MW)	11.41	31.859	22.293

Pre-Event Analysis

Pre-Event measured at (sec):	-60 to -30
Pre-Event Frequency (Hz):	50.008
Pre-Event Output (MW):	221.00
Unit Ramping:	No
Frequency Response:	ON
Declared Availability (MW):	280.00

Frequency Movement -60 to -30 :	0.04	Hz
Unit Movement -60 to -30 :	5.69	MW

Generator Capabilities

Registered Capacity (MW):	300.00
Droop Capacity (MW):	105.00
Governor Droop (%):	4.00
Inertia Constant H (MWs/MVA):	4.25
Machine Rating (MVA):	320.00

Governor Alpha:	0
Governor Beta:	0
90% Droop:	4.00
Frequency Rated (Hz):	50.00
Inertia Calculation Tolerance (MW):	2.954

Event Analysis

T0 measured at (Hz):	49.77
Event Start Time:	12:03:23.000
Event frequency nadir (Hz):	49.41
RoCoF (Hz/sec):	

MW Data Moving Average Used:	Raw
Measurement PMU:	Primary
RoCoF measurement time (sec):	5

POR

POR nadir occurred at (sec):	5
POR Nadir (Hz):	49.52

	Expected (MW)	Achieved (MW)
Delivered at nadir:	10.073	11.406
Delivered at nadir ± 0.5 sec:	10.073	11.406
Sustained Response:	NA	NA
Average Energy Delivered:	4.133	20.937

Shortfall (MW)
NA

B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA

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Frequency Response - Overall Summary

Company:	Generation Co.
Unit:	XYZ
Date Report Run:	24/01/2018 08:14:00
No. Events Performance Assessed Over:	3
Compliance Duration:	03/01/2018 - 10/01/2018

View Performance Issue Events

FREQUENCY RESPONSE

Current Performance

	POR	SOR	TOR1
Required Performance (%)	100	100	100
Average Achieved/Expected (last 3 events) (%)	82.48	100.00	100.00
Priority	Priority 4	Compliant	Compliant
Status	Open	NA	NA
Date Raised	03/01/2018	NA	NA
Date Priority Updated	10/01/2018	NA	NA
Resolution Required By	03/05/2018	NA	NA

Date	Unit	Event Nadir (Hz)	POR Nadir (Hz)	RoCoF (Hz/Sec)	Nadir at (sec)	Declared Availability (MW)	Pre-Event Output (MW)	Expected POR (MW)	Achieved POR (MW)	Expected SOR (MW)	Achieved SOR (MW)	Expected TOR1 (MW)	Achieved TOR1 (MW)	
03/01/2018 14:04	XYZ	49.76	49.86	0.21	5.00	470.00	287.56	14	12.14	15.17	16.907	NA	8.478	
08/01/2018 07:22	XYZ	49.79	49.80	0.34	5.00	473.00	251.63	14	10.13	6.85	6.823	NA	8.423	
10/01/2018 12:03	XYZ	49.41	49.52	0.40	5.00	471.00	248.96	13.8	11.406	11.175	12.859	NA	22.293	D

	Achieved < Expected (with tolerance)
	Achieved ≥ Expected (with tolerance)
	Not expected to provide reserve
NA	Frequency recovered during timeframe
D	Dispatched during period

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Raw Data Reports

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Low FR Conventional Data Input

User Input	
Parameter	**Value**
Unit Name	XYZ
Company	Generation Co
Date	10/01/2018 12:03:23.000

Data Input	
Parameter	**Value**
SOR R1	25.40
SOR R2	25.40
SOR RMX	30.00
SOR Timeframe End	89.99
SOR Timeframe Start	15.00
SOR β	0
SOR Δ1	0
SOR Δ2	35.00
SOR Δ3	35.00
TOR1 GRMN	160.00
TOR1 R0	0
TOR1 R1	25.00
TOR1 R2	25.00
TOR1 RMX	28.00
TOR1 Timeframe End	299.99
TOR1 Timeframe Start	90.00
TOR1 β	0
TOR1 Δ1	0

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Low FR Conventional Raw data							
Time	**Event Time (Seconds)**	**Frequency (Hz)**	**Active Power Output (MW)**	**Active Power Setpoint (MW)**	**Active Power Setpoint - Accept (MW)**	**Declared Availability (MW)**	**Declared Reserve (MW)**
17/01/2018 12:02:23.00	-60.00	50.01	24.58	242.00	242.00	300.00	20.00
17/01/2018 12:02:24.00	-59.00	50.01	242.00	242.00	242.00	300.00	20.00
17/01/2018 12:02:25.00	-58.00	50.00	242.80	242.00	242.00	300.00	20.00
17/01/2018 12:02:26.00	-57.00	50.00	242.80	242.00	242.00	300.00	20.00
17/01/2018 12:02:27.00	-56.00	50.00	242.80	242.00	242.00	300.00	20.00
17/01/2018 12:02:28.00	-55.00	50.00	242.00	242.00	242.00	300.00	20.00
17/01/2018 12:02:29.00	-54.00	49.99	242.31	242.00	242.00	300.00	20.00
17/01/2018 12:02:30.00	-53.00	49.99	242.31	242.00	242.00	300.00	20.00
17/01/2018 12:02:31.00	-52.00	49.99	242.31	242.00	242.00	300.00	20.00
17/01/2018 12:02:32.00	-51.00	49.99	242.31	242.00	242.00	300.00	20.00
17/01/2018 12:02:33.00	-50.00	49.99	242.31	242.00	242.00	300.00	20.00
17/01/2018 12:02:34.00	-49.00	49.99	242.31	242.00	242.00	300.00	20.00
17/01/2018 12:02:35.00	-48.00	50.00	242.31	242.00	242.00	300.00	20.00
17/01/2018 12:02:36.00	-47.00	50.00	242.31	242.00	242.00	300.00	20.00
17/01/2018 12:02:37.00	-46.00	50.01	242.31	242.00	242.00	300.00	20.00
17/01/2018 12:02:38.00	-45.00	50.01	242.31	242.00	242.00	300.00	20.00
17/01/2018 12:02:39.00	-44.00	50.01	242.31	242.00	242.00	300.00	20.00
17/01/2018 12:02:40.00	-43.00	50.01	242.31	242.00	242.00	300.00	20.00
17/01/2018 12:02:41.00	-42.00	50.01	242.31	242.00	242.00	300.00	20.00
17/01/2018 12:02:42.00	-41.00	50.01	242.31	242.00	242.00	300.00	20.00
17/01/2018 12:02:43.00	-40.00	50.01	242.31	242.00	242.00	300.00	20.00
17/01/2018 12:02:44.00	-39.00	50.01	242.31	242.00	242.00	300.00	20.00
17/01/2018 12:02:45.00	-38.00	50.02	242.31	242.00	242.00	300.00	20.00
17/01/2018 12:02:46.00	-37.00	50.02	242.31	242.00	242.00	300.00	20.00

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Industry Group Summary

- Familiarisation with the application
- Ideally group will consist at least one from the various technology types: e.g. CCGT, hydro, wind, DSU etc.
- Nomination by February 16th 2018
- Industry Group to commence in March 2018 for 3-6 months

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Please submit expressions of interest by Friday 16th February 2018

GridCode@eirgrid.com

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