Post Operational Readiness Confirmation
Post Operations Certificate

19th November 2012

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Operational Services and Performance
EirGrid

Overview

Process

1. Performance Monitoring
   - Context
   - Daily Process
   - Monthly Process
   - Examples of compliance
2. Ancillary Services
   - Reactive Power Agreements
3. Derogations
   - Process

Pre-Requisites

1. Post Operational Readiness Confirmation
   i.e. Controllability

2. Post Operations Certificate
   i.e. Grid Code Compliance

3. Post Operational Readiness Confirmation/Post Operations Certificate

Context and Challenges

1. Monitoring and Investigation in Grid Code
   - Information Exchange OC 7
   - Enforcement of OC10 of the Grid Code
2. Changing plant portfolio to meet demand
   - Variable generation i.e. wind increasing year on year
3. Complex Outage Planning Process
   - Aligning generator outage with transmission outage is proving difficult
4. Management of Constraints Costs
   - TSO incentivised to minimise these costs, effective TY 2012-2013

EirGrid Roles and Responsibilities

1. Real-Time Operation (NCC)
   - Provides running orders and issues dispatch instructions
   - Balances the system in real-time to meet demand and reserve requirement
2. Performance Monitoring (OSP)
   - Reviews the performance of all units connected to the system and follows up on non-compliant units; (PM team)
   - Carries out Dispatch Testing/Grid Code Testing (C&T team)
   - Assesses trends in unit performance and requests information where a trend is significant to determine whether testing/derogation required;
   - Carries out studies and detailed investigation is carried out where necessary
3. EMS Support
   - Investigate RTU/telemetry issues

WFPS Performance Monitoring Process

1. Daily monitoring (TD + 1WD) and follow up:
   - Available Active Power
   - Failure to follow Active Power setpoints and voltage setpoints
   - Signal issues (e.g. MW setpoint feedback)
   - Fault Ride Through
2. Monthly Reports to monitor consistent non-compliance:
   - Dispatch Instructions
   - Available Active Power
3. Studies & Investigations where appropriate
   - Protection Standards
4. Monetary incentives/charges
   - To be raised as part of OSC consultation for TY 2013-2014

WFPS PM Events - 1st March 2011 to 13th August 2012:

Performance Parameter	No of Events
Trip	15
Non-Compliance with Dispatch Instruction	129
Signal Issue	83
Fault Ride Through	45

1. Performance Monitoring (PM) – Daily Process

Daily PM – What is monitored?

➢Dispatch Instructions

•Required to control system frequency

• To control power flows / contingencies on system

•SEM Settlement and Constraint Payments (VPTGs)

➢Availability

- Required for Constraints/Curtailment in Wind Dispatch Tool
- Required for Availability Reporting
- SEM Settlement and Capacity Payments

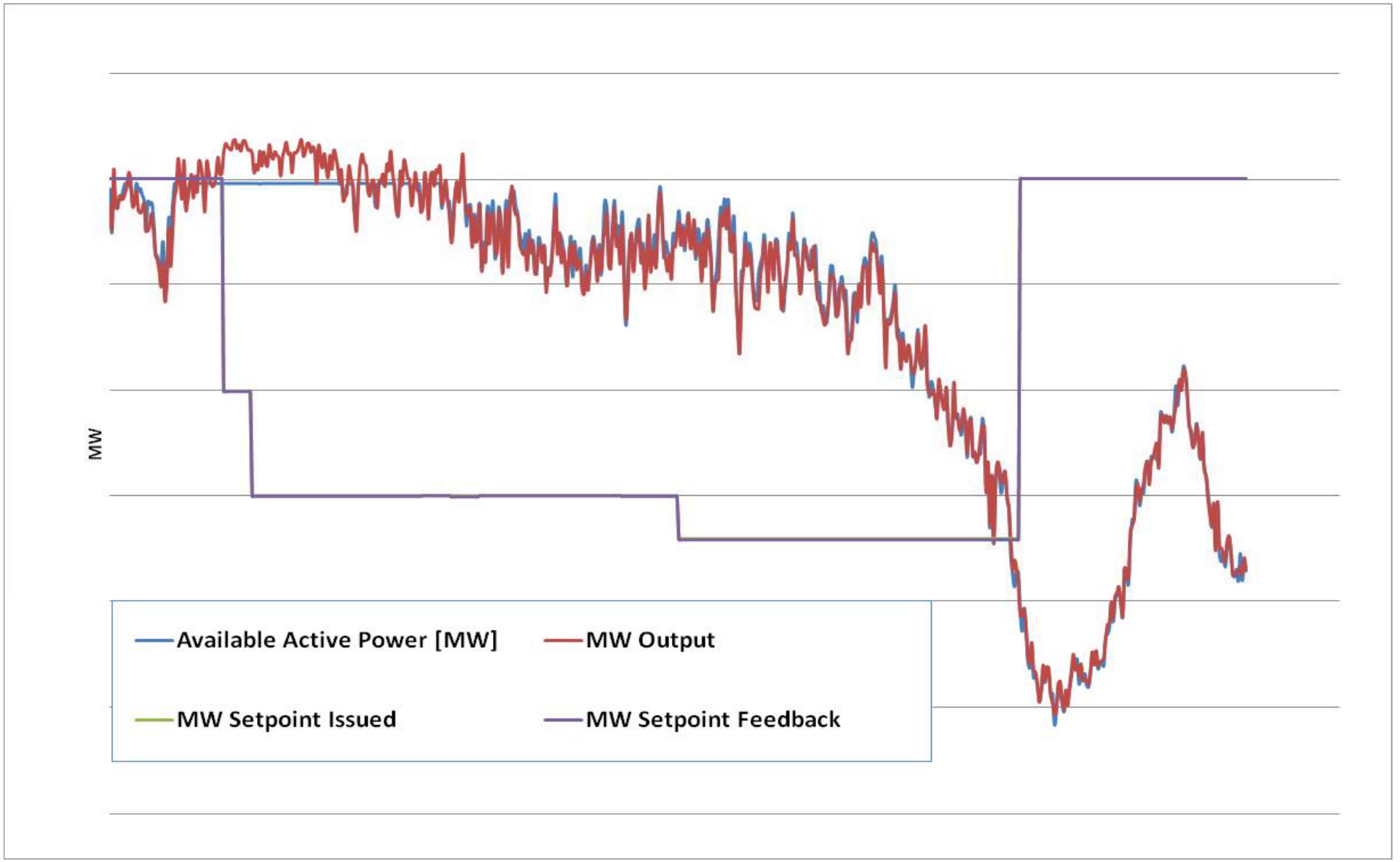
Performance Monitoring – Examples

1. Dispatch Instruction Non-Compliance

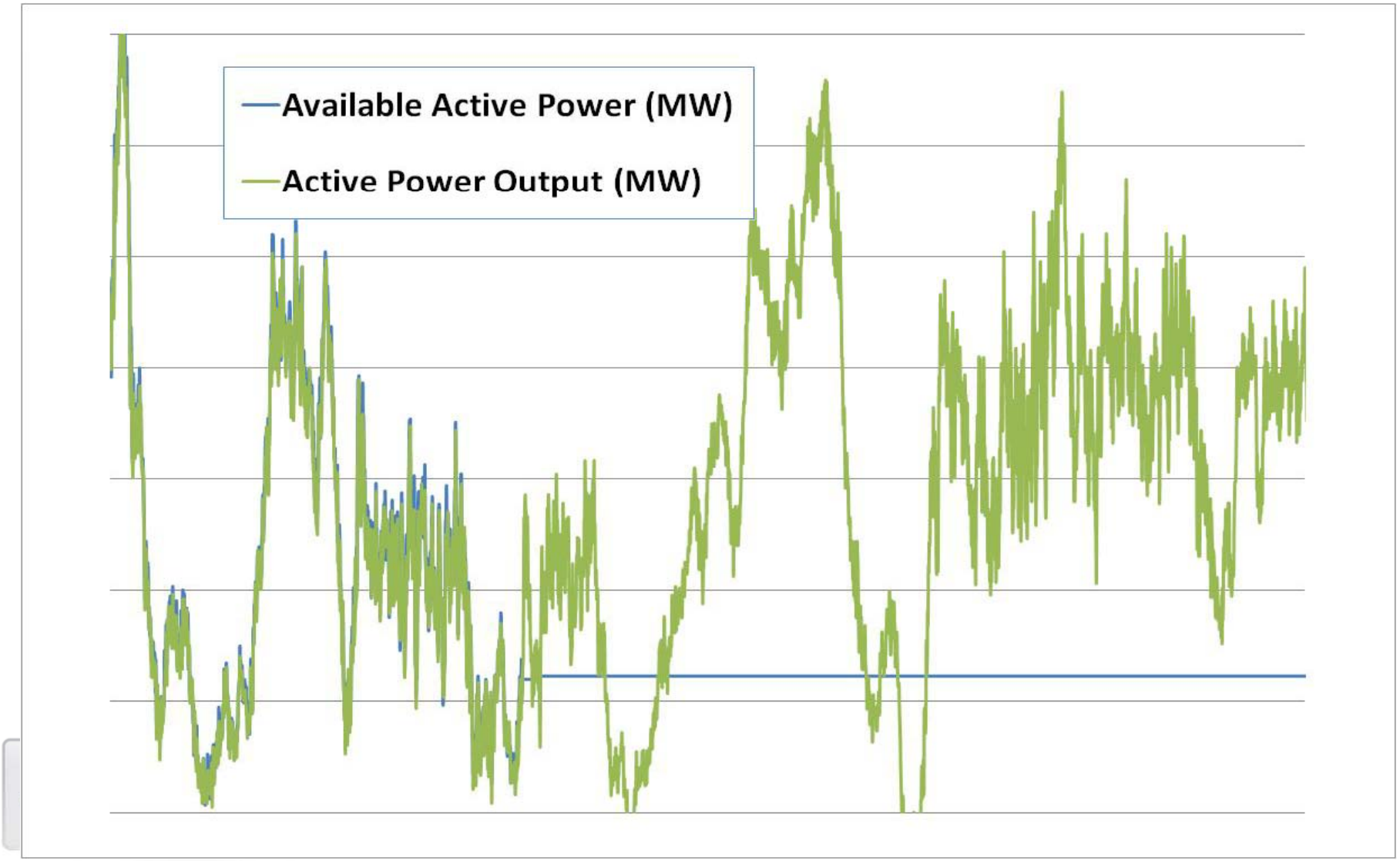
2. Available Active Power Issue

3. Fault Ride Through

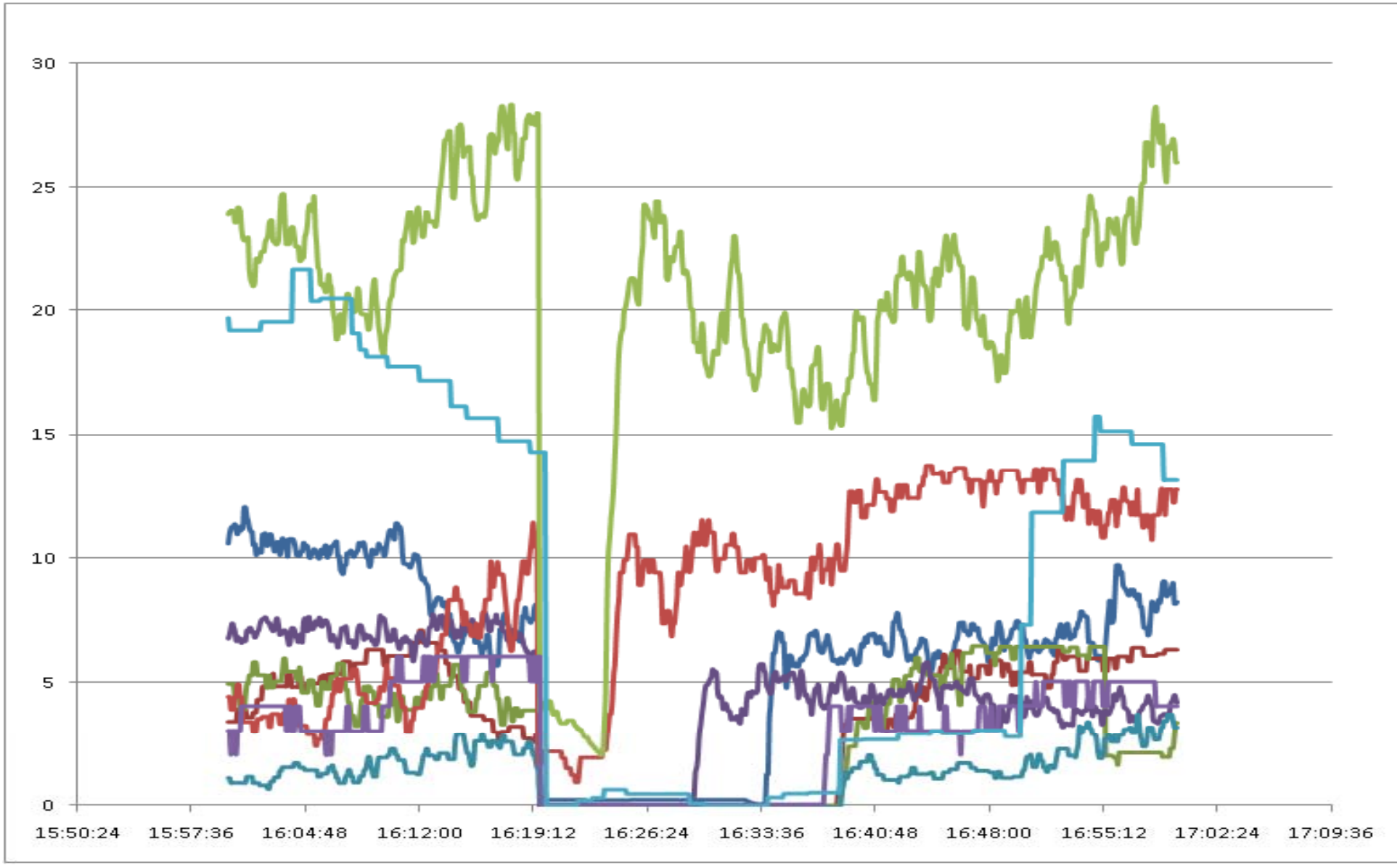
1. Dispatch Instruction Issue



2. Available Active Power Issue



3. Fault Ride Through



Daily PM and Controllability

1. Category (i) WFPS
   - Not controllable and requires dispatch test which is carried out by C&T team
2. Category (ii) WFPS
   - Daily monitoring of all Category (ii) WFPS carried out through PM team
   - All have received Operational Readiness Confirmation
   - Purpose is to ensure 'Controllable' WFPS maintain compliance
   - All Category (ii) WFPS have 12 months / until 1st December 2013 from receipt of Operational Readiness Confirmation to obtain Operations Certificate (full Grid Code Compliance)
3. Category (iii) WFPS
   - Commissioning unit which must achieve successful dispatch test for Operational Readiness Confirmation
   - Legacy units have until 1st December 2012 to move to Category (ii) or otherwise be moved to Category (i)

Daily Non-Compliances for Category (ii) WFPS

From 1st February 2013 all Category (ii) will be assessed on a daily basis for the following:

1. Dispatch Instructions (DIs)
   - Failure to accurately follow instruction by wind dispatch tool
2. Available Active Power (AAP)
   - Signal is stuck on a particular value/zero/freezes

➢ Where non-compliance is found IPP is given 10WDs to resolve/rectify the issue otherwise be moved to Category (i)

Daily DI Non-Compliance Process

What	Who
1. DI non-compliance identified & telemetry ruled out	PM Team
2. Email the IPP stating 10WDs to rectify	PM team
3. Arrange dispatch test following end of 10WD	C&T team
4. Obtain test results/report and email IPP of •Category (ii) unchanged if successful •Move to Category (i) if unsuccessful	PM team
5. If unsuccessful WFPS moves to Category (i)	C&T team
6. Email IPP to confirm category (i) change is effective and close issue with IPP	PM Team

Daily Availability Non-Compliance Process

What	Who
1. Availability non-compliance identified & telemetry ruled out	PM Team
2. Email the IPP stating 10WDs to rectify	PM team
3. Arrange dispatch test following end of 10WD	C&T team
4. Obtain test results/report and email IPP of •Category (ii) unchanged if successful •Move to Category (i) if unsuccessful	PM team
5. If unsuccessful WFPS moves to Category (i)	C&T team
6. Email IPP to confirm category (i) change is effective and close issue with IPP	PM Team

2. Performance Monitoring – Monthly Reports

Availabilty Monthly Reports

- Monitor Compliance with Availabilty Standard of 6%
- Availability analysis excludes periods where WFPS curtailed/constrained;
- Active Power Control based on NRMSD approach and MW Setpoint Feedback signal;
- Issued to IPPs/DSOs within month end + 10 working days; and
- Accompanying explanation document developed[1].

[1]Wind Farm Performance Monitoring Report; 13/06/2012

Monthly Reports

- Note that this is not a curtailment/constraint report for the following reasons:
  - Compliance with Dispatch Instructions uses Setpoint Feedback from wind farm controller;
  - New active power setpoints issued by TSO may not have been correctly processed by wind farm controller;
  - The values do not differentiate between curtailments or constraints

Monthly Reports (sample 99 MW WFPS)

Time	Available Active Power [MW]	Output [MW]	Windfarm Setpoint Feedback [MW]	Dispatched?	AAP $(X_1-X_2)^2$	DI $(X_1-X_2)^2$
00:00:00	22.41	22.23	99.00		0.03	
00:15:00	26.26	26.29	99.00		0.00	
00:30:00	30.91	25.29	99.00			

AAP aligns closely with output

Setpoint feedback ≈ size of wind farm => not dispatched

RMSD is small

Monthly Reports (sample 99 MW WFPS)

Time	Available Active Power [MW]	Output [MW]	Windfarm Setpoint Feedback [MW]	Dispatched?	AAP $(X_1-X_2)^2$	DI $(X_1-X_2)^2$
00:45:00	34.70	24.43	24.17	Dispatched		
01:00:00	34.79	24.39	24.17	Dispatched		0.05
01:15:00	34.78	24.41	24.17	Dispatched		0.06
01:30:00	35.97	19.42	19.17	Dispatched		0.06
01:45:00	35.94	19.75	19.17	Dispatched		0.33
02:00:00	35.95	32.07	21.23	Dispatched		

RMSD is small

Output closely matches setpoint. AAP is much higher than output

Setpoint feedback < size of wind farm => dispatched

Ignored to allow for profiling

Monthly Non-Compliances for Category (ii) WFPS

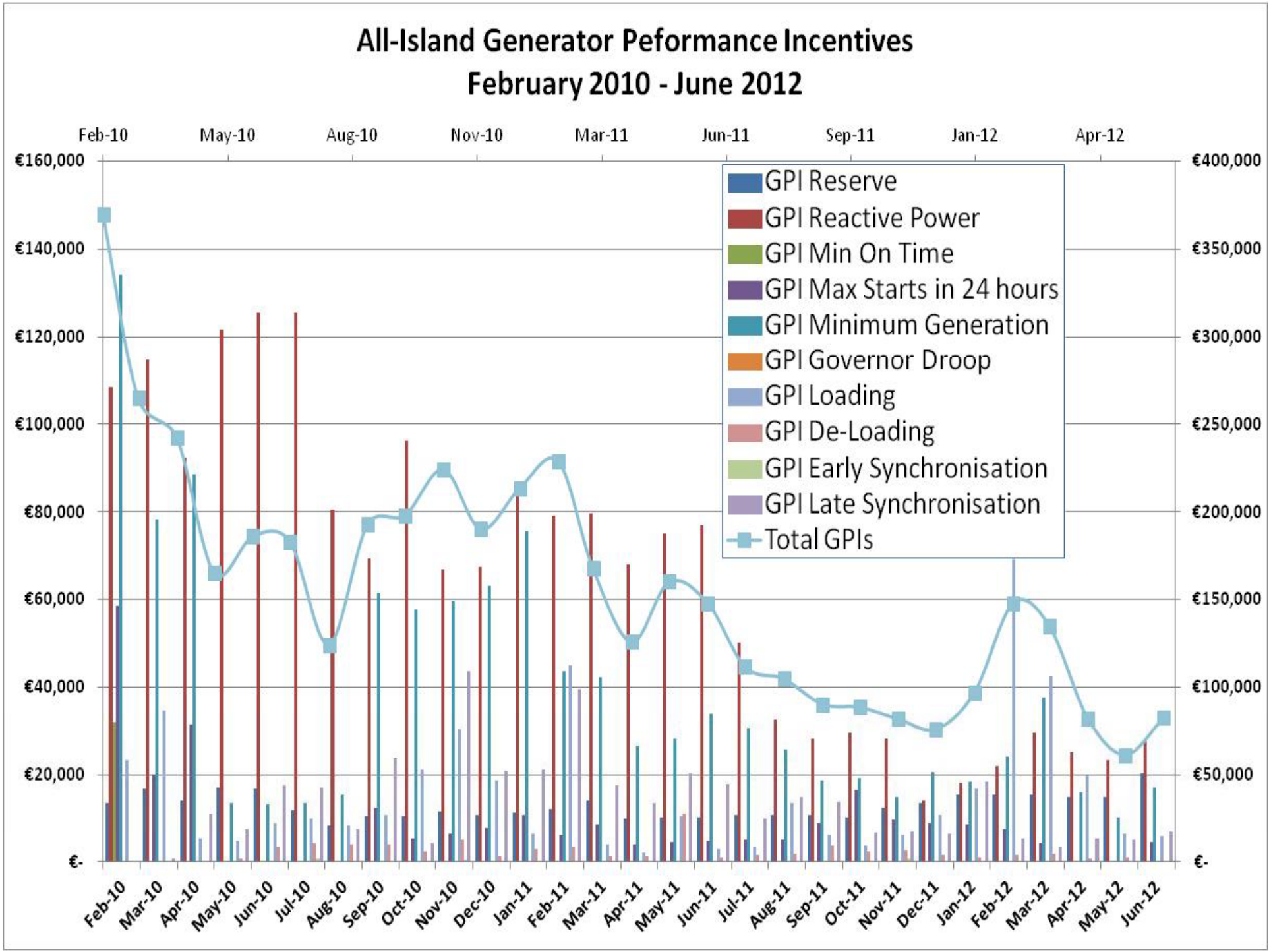
From 1st February 2013 all Category (ii) will be assessed for the following:

1. Compliance with Availabilty (AAP) Standard

- Where non-compliance is found IPP is given 10WDs to resolve/rectify the issue otherwise be moved to Category (i)

Monthly Availability Non-Compliance

What	Who
1. Wind Report run and Availability non-compliance identified	PM Team
2. Email IPP stating 10WDs to rectify	PM team
3. Arrange dispatch test following end of 10WDs	C&T team
4. Obtain test results/report and inform IPP of •Category (ii) unchanged if successful •Move to Category (i) if unsuccessful	PM team
5. If unsuccessful implement Category change to (i) and substitute Availability data with metered output	C&T team
6. Email IPP to confirm category (i) change is effective and close issue with IPP	PM Team


All-Island Generator Peformance Incentives
February 2010 - June 2012
Feb-10
May-10
Aug-10
Nov-10
Mar-11
Jun-11
Sep-11
Jan-12
Apr-12
€160,000
€140,000
€120,000
€100,000
€80,000
€60,000
€40,000
€20,000
€-
€400,000
€350,000
€300,000
€250,000
€200,000
€150,000
€100,000
€50,000
€-
GPI Reserve
GPI Reactive Power
GPI Min On Time
GPI Max Starts in 24 hours
GPI Minimum Generation
GPI Governor Droop
GPI Loading
GPI De-Loading
GPI Early Synchronisation
GPI Late Synchronisation
Total GPIs
Feb-10
Mar-10
Apr-10
May-10
Jun-10
Jul-10
Aug-10
Sep-10
Oct-10
Nov-10
Dec-10
Jan-11
Feb-11
Mar-11
Apr-11
May-11
Jun-11
Jul-11
Aug-11
Sep-11
Oct-11
Nov-11
Dec-11
Jan-12
Feb-12
Mar-12
Apr-12
May-12
Jun-12

3. Performance Monitoring – Summary

Summary

- Mutual benefit of Performance Monitoring
  - Reducing or eliminating costs for generator and consumer
  - Improving understanding of system / WFPS capability
  - Assist with monitoring processes and procedures for IPP/TSO
- Importance of Compliance in context of Controllability and Priority Dispatch Hierarchy
  - Non-controllable WFPS in Category (i) will be dispatched down first when curtailment is required
  - Controllable WFPS in Category (ii) will be moved to Category (i) should a non-compliance be found 1st February 2013
  - Controllable WFPS in Category (ii) will be moved to Category (i) should an Operations Certificate be achieved by 12months from date of Controllability/1st December 2013 as applicable

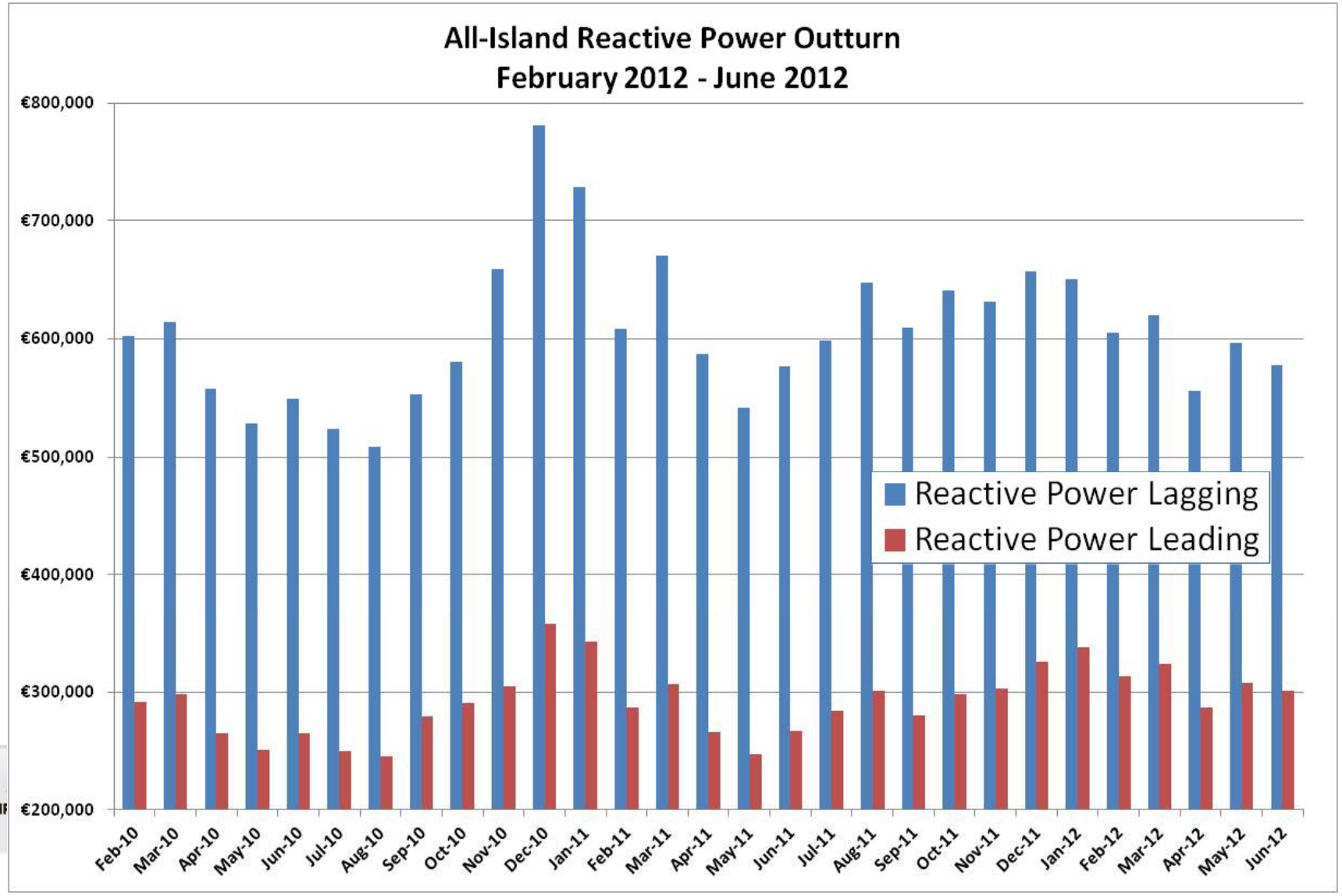
Ancillary Services and WFPS



Ancillary Services - Overview

- Units are contracted for Reactive Power only following Grid Code Testing
  - i.e. obtained an Operations Certificate
- Reactive Power Requirement
  - 5 WFPS contracted to date
  - Rate is €0.13 / MVArh
  - Rate is doubled if AVR
  - RP capability curve based on testing

Ancillary Services – Total Payments



Grid Code Derogation Process



Grid Code Obligations

- If a User cannot comply with any GC provision then as per GC.9 the User is obliged to:
  - Notify TSO and
  - Make reasonable efforts to remedy non-compliance
  - If the User believes it would be unreasonable to implement a remedy or that an extended period is required to implement a remedy then the User is required to promptly submit a derogation application to the TSO

- Usually Non Compliances are discovered by the TSO as a result of:
  - Commissioning and Testing and/or
  - Performance Monitoring

Overarching Principles

- A unit must comply with all versions of the Grid Code as approved by the CER

- Grid Code Modifications are retrospective
  - When a Modification is approved, TSO discusses compliance with IPP
  - If a User believes that it would be unreasonable for it to comply, the User has the opportunity to raise a derogation stating cost and technical reasons for not complying
  - Derogation application must contain sufficient information for the grounds for the application to be considered valid

Derogations Process Time-lines

- Derogation Applications should be submitted to GridCode@EirGrid.com, copy to RORourke@cer.ie
- The TSO checks derogation applications for completeness and issues a DAID No when the application is complete (10WDs)
- In the process of reviewing the derogation the TSO may seek further information or discuss aspects of the derogation with the applicant (10WDs)
- The TSO will provide a derogation assessment to the CER, which focuses on the technical impact on the Transmission System of granting such a derogation, including the cumulative impact of granting similar derogations to other similar Users (up to 60WDs)
- The CER decide whether on not to grant the derogation
- All granted derogations are published on the EirGrid website

Derogation Applications should include:

- GC clause(s) from which derogation is being sought
- Unit(s) for which derogation is being sought
- Length of time for which derogation is being sought
- Exact level of compliance that can be achieved under each Grid Code clause from which derogation is being sought
- Remedies to achieve compliance which have been tried or will be tried during period of temporary derogation being sought
- Exact retirement date of Unit if Unit has a scheduled retirement date
- Supporting Documentation from OEM and/or other technical reports re level of compliance for specific unit or type of unit
- Relevant Test Data from Commissioning and Testing or other source

Thank You




EIRGRID
semo
Single Electricity
Market Operator
SONI
System Operator for Northern Ireland

Q&A

OC 7 – Information Exchange

This section sets out the information exchange between the TSO and the User in the allow the timely transfer of information, in order that the **TSO** may fulfil its obligations with regard to the operation of the **Transmission System**.

For Example:

- OC7.1 sets out the requirements for the exchange of information in relation to **Operations** and/or **Events** on the **Power System** which have had (or may have had) or will have (or may have) an **Operational Effect**, and thereby have become:-
  - **Significant System Incidents** on the **Transmission System** in the case of an **Operation** and/or **Event** occurring on a **User System**; and
  - **Significant System Incidents** on a **User System** in the case of an **Operation** and/or **Event** occurring on the **Transmission System**.
  - significant system incidents on the **Other Transmission System** in the case of an **Operation** and/or **Event** occurring on the **Transmission**
- OC7.1.9.2 The **User** will notify the **TSO** of **Events** which may be **Significant System Incidents** affecting the **Transmission System**. The **TSO** may use this information in notifying any other **Users** on whose **System(s)** the **Significant System Event** will have, or may have, in the reasonable opinion of the **TSO**, an **Operational Effect.**

OC 10 – Monitoring, Testing and Investigation

This section establishes procedures for **Testing** that **Users** are operating within their design, operating and connection requirements, as specified in the **Grid Code**, **Connection Agreements**, **Ancillary Services Agreements and System Support Agreements** between **Users** and the **TSO.**

For example:

OC10.4.4 Performance parameters that the **TSO** shall **Monitor** may include, but are not limited to, the following:

- OC10.4.4.1 compliance with **Dispatch Instructions**;
- OC10.4.4.2 compliance with **Declarations** including, without limitation, in respect of: **Primary**, **Secondary** and **Tertiary Operating Reserve** provided by each of a **Generator's Generation Units,** following a low **Frequency Event** on the **Transmission System**; **Frequency Regulation** provided by each **Generation Unit** (to confirm that it is consistent with the **Declared Governor Droop**); and Tertiary Operating Reserve 2 and Replacement Reserve provided by each of a Generator's Generation Units.
- OC10.4.4.3 Compliance with **IEC Power Quality** standards; and
- OC10.4.4.4 Provision of static and dynamic **Reactive Power**; and
- OC10.4.4.5 Monitoring of **Primary Fuel** and **Secondary Fuel** capability, on-line changeover capability and fuel storage levels.
- OC10.4.5 Monitoring systems and procedures