

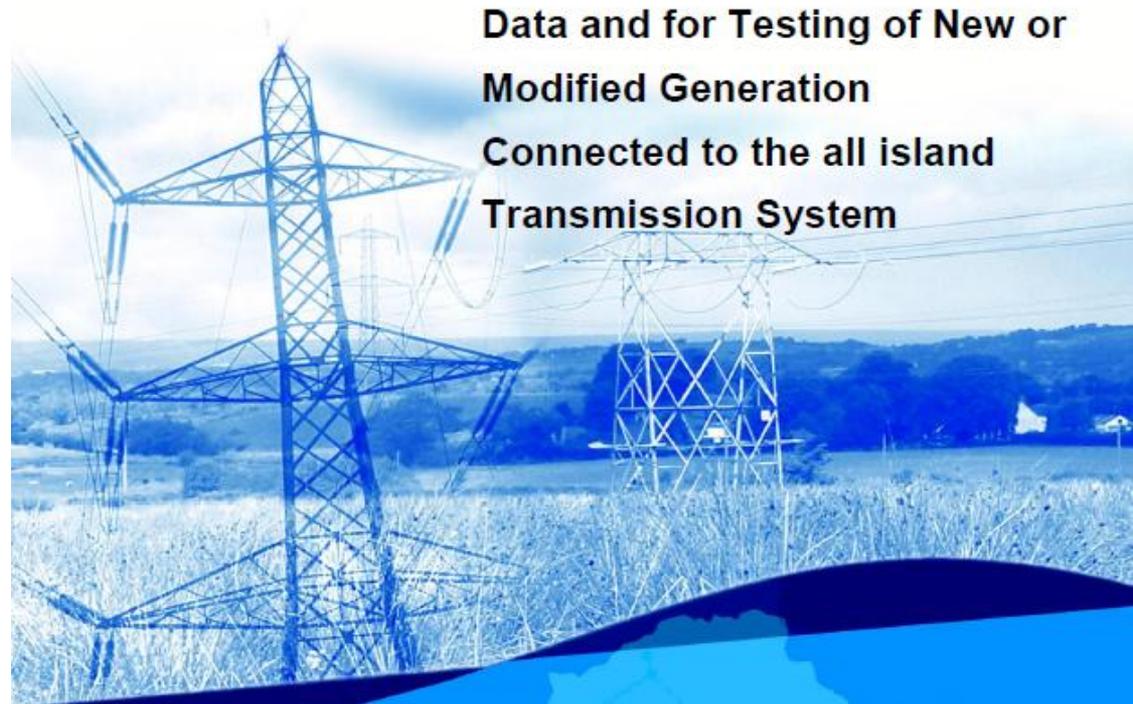
# Compliance and Monitoring Process for Conventional Generators

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# Compliance Process for Conventional Generators Connecting to the Transmission Network

**Guidance for the Exchange of  
Data and for Testing of New or  
Modified Generation  
Connected to the all island  
Transmission System**



# Compliance Process for Conventional Generators

- SONI Grid Ops Planning will manage Connection Process
- SONI System Studies will be carried out replicating Generator's proposed development & the effect on All Island Transmission System
- Mechanisms are in place for SONI to inform EirGrid of potential issues affecting the ROI Transmission System



# Compliance Process for Conventional Generators

- A Connection agreement will be signed between SONI & the Generator detailing:
  - Capacity & characteristics of generation which **may be** connected to the All-Island Transmission System
  - All NI Security & Planning Standards that must be met
  - NIE & Generators equipment and identify Connection Points
  - Special arrangements/responsibilities for continued operation/maintenance



# Compliance Process for Conventional Generators

- A Connection Report shall be submitted by the Generator 3 months prior to Connection
- The Connection Report **must** demonstrate that the Generators Plant and Apparatus is compliant as regards:
  - All relevant Connection Conditions in GC
  - Any Specific Technical Conditions in the Connection Agreement
- For each relevant condition the Generator is required to evidence compliance



# Compliance Process for Conventional Generators

- A Connection Report shall be submitted as follows:
  - Interim Report (3Parts):
    - Safety Rule Clearance on Generator Apparatus
    - Energisation of Generator Apparatus
    - Synchronising Of Generator Units
  - Final Report (within 2 months of synchronising to the System)
  - A Final Report will include an updated Interim Report & results from on-site testing and monitoring of Generator's Plant and Apparatus (including any changes made during commissioning)



# Commissioning Procedures

- Pre-Synchronisation

- SONI will require detailed information on:

- Generator's Excitation Control System Tests

- Generator's Governor Control System Tests

- Post-Synchronisation

- SONI will co-ordinate & plan any commissioning tests that will have an impact on the all island Transmission System

- Prior to synchronisation the Generator should advise SONI of the times of the tests and the tests to be carried out

- At least 6 weeks advance notice of compliance tests should be given to SONI



# Compliance Tests

- Excitation System Open Circuit Step Response Test
  - To assess the excitation system of the unit operating at no load
- Open & Short Circuit Saturation Test
  - To verify the Generator Short Circuit Ratio
- Excitation System Under Excitation Limiters
  - To verify the performance of the under excitation limiter



# Compliance Tests

- Excitation System On Load Tests
  - Required to evaluate both the steady-state & dynamic stability of the excitation system
- Governor Response
  - To prove the Generator will respond to frequency deviations on the system & that the droop setting is correct



# Compliance Tests

- Unit Load Rejection

- To assess the ability of the Generator to remain connected under islanding conditions
- To prove the Generator will remain at full speed no load in the event of isolation from the System

- Reactive Capability

- SONI will require a demonstration of the leading and lagging reactive power capability on each generating unit
- The requirement is to have the capability to achieve 0.8 lagging and 0.95 leading power factors at the generator terminals, while supplying rated active power (MW)



# Performance Monitoring

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# Performance Monitoring

- On satisfactory completion of the tests listed, SONI would consider the Generator's plant to be compliant
- As part of the life time compliance, SONI will continue to monitor the plant's performance and will discuss any concerns with the Generator as part of the normal and ongoing liaison process
- SONI have produced a Quarterly Performance Monitoring Report for each Generator which were circulated to each Generator
- SONI analyse and report on Low and High Frequency Events on the system
- SONI & EirGrid are working together to deliver DS3 Performance Monitoring and Testing workstream



# Performance Monitoring

The Quarterly Reports have the objective of assessing the following trends and non-compliances with the Grid Code (or UREGNI approved derogation):

- Active Power Duration Curve;
- Reactive Power Range;
- Operating Reserve Duration Curve;
- Failure to Synchronise Analysis;
- Technical Offer Data



# Performance Monitoring

## Active Power Duration

- Ensuring each generator can operate at its min gen and maximum declared availability.
- If unproven, a dispatch test will be arranged to prove compliance.

## Reactive Power Range

- Ensuring the leading and lagging reactive power range, as required by the Grid Code, should be the same as or less than the declared value, unless there is an approved derogation



# Performance Monitoring

## Operating Reserve Duration Curves

- Ensuring the declared, contracted and Grid Code requirement for Primary Operating Reserve (POR) and Secondary Operating Reserve (SOR). The POR and SOR range, as required by the Grid Code, should be the same as or less than the declared value, unless there is an approved derogation.

## Failure to Synchronise Analysis

- This aspect of the report lists any instances of generating units failing to synchronise within the required time. Any instances where a unit is non-compliant for two consecutive quarters then OSP will follow up with the generating units.



# Performance Monitoring

## TOD Non-Compliance

This report is a table listing Technical Offer Data (TOD) parameters submitted for the Generation Unit which are not compliant with Grid Code, and the associated dates for which the TOD dataset applied. For all instances of non compliance SONI require the Generator to achieve compliance or if that is not possible, submit a derogation application or a modification request to the Grid Code.

- Non-compliant with their minimum generation;
- Non-compliant with their ramp rates;
- Non-compliant with their minimum up times and minimum down times;
- Non-compliant with their time from synchronisation to minimum generation; and,
- Non-compliant with their time from minimum generation to de-synchronisation;



# Performance Monitoring

## Reserve Event Analysis

- Each event where frequency falls below 49.7Hz or above 50.2Hz is assessed
- Primary, Secondary and Tertiary Operating Reserve performance is calculated and reported on
- For non-compliance with contract values, Reserve Charges applicable by Harmonised Ancillary Services team.



# Thank You

