

Customer Guide
Pre and Post Energisation requirements for DSO Wind & Solar PV
Generators

&

Power Generating Module Document [PGMD] for Controllable
Power Park Modules [PPMs] – All Topologies except 2

Power Park Module Details	
Power Generating Facility [PGF] Name	
Gen Ref [DG number]	
Phase [if applicable]	

Version Control			
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This is a:

- 1. Generic document for general guidance
- 2. A site specific PGMD, issued to an individual PPM

Introduction

The EU Network Code “Requirements for Generators” [RfG], mandates the provision of a PGMD, by ESB Networks, to PPMs of Types B and C. ESB Networks has decided to also issue such PGMDs to PPMs of Type D.

This document sets out, to the appropriate level of detail, the milestones and steps required for the PPM in question, to attain a Final Operational Notification [FON]. In addition to providing clarity, the document may also be used by the PPM, to track progress through the process.

Use of the term “Customer”

Throughout this document, in order to aid readability, the term “Customer”, is used to mean the **Power Generation Facility Owner** [PGFO], as defined in RfG. This is the person or entity that has executed a Connection Offer with ESB Networks, or agents appointed on their behalf, for the purpose of carrying out some, or all, of the tasks listed below.

Definitions

A full list of definitions, relevant to this PGMD, is given in Appendix 1.

1. High Level view of process

This section describes the process in general, as a pre-cursor to the detailed items/milestones listed in section 2.

It is the responsibility of the Customer

- **to demonstrate compliance with the Distribution Code, through:**
 - **provision of studies and necessary documentation**
 - **carrying out testing and issuing a test report assessing test results for compliance with the Distribution Code**
- **to provide performance data**
- **to understand the process and the lead-times in achieving the PGMD milestones.**

To achieve this, a dedicated Coordinator should be appointed by the Customer, who informs all DSO and TSO parties with commissioning schedules. If the Customer is not familiar with any elements of the testing process, then a meeting should be requested by the Customer with the DSO and TSO as appropriate. A Customer may cancel scheduled testing at any point within the process but with the understanding that there are associated lead times for rescheduling. The Customer is responsible for demonstrating compliance with the latest version of the Distribution Code. The Customer is responsible for securing all necessary PPM resources to carry out testing. If there is a change of testing coordinator by the Customer, DSO & TSO should be informed.

The stakeholders involved in this process are:

- **Customer**
 - Customer's Consultant
 - Original Equipment Manufacturer [OEM] Representative
- **ESB Networks**
 - ESBN Operations System Performance
 - National Distribution Control Centre (NDCC)
 - ESB Telecoms Services
 - Renewable Delivery
 - Customer Delivery
 - RES & Flexibility Customer Connections
- **EirGrid**
 - System Support & Analysis - Commissioning & Testing Team
 - IT Applications (EMS team)
 - System Analysis

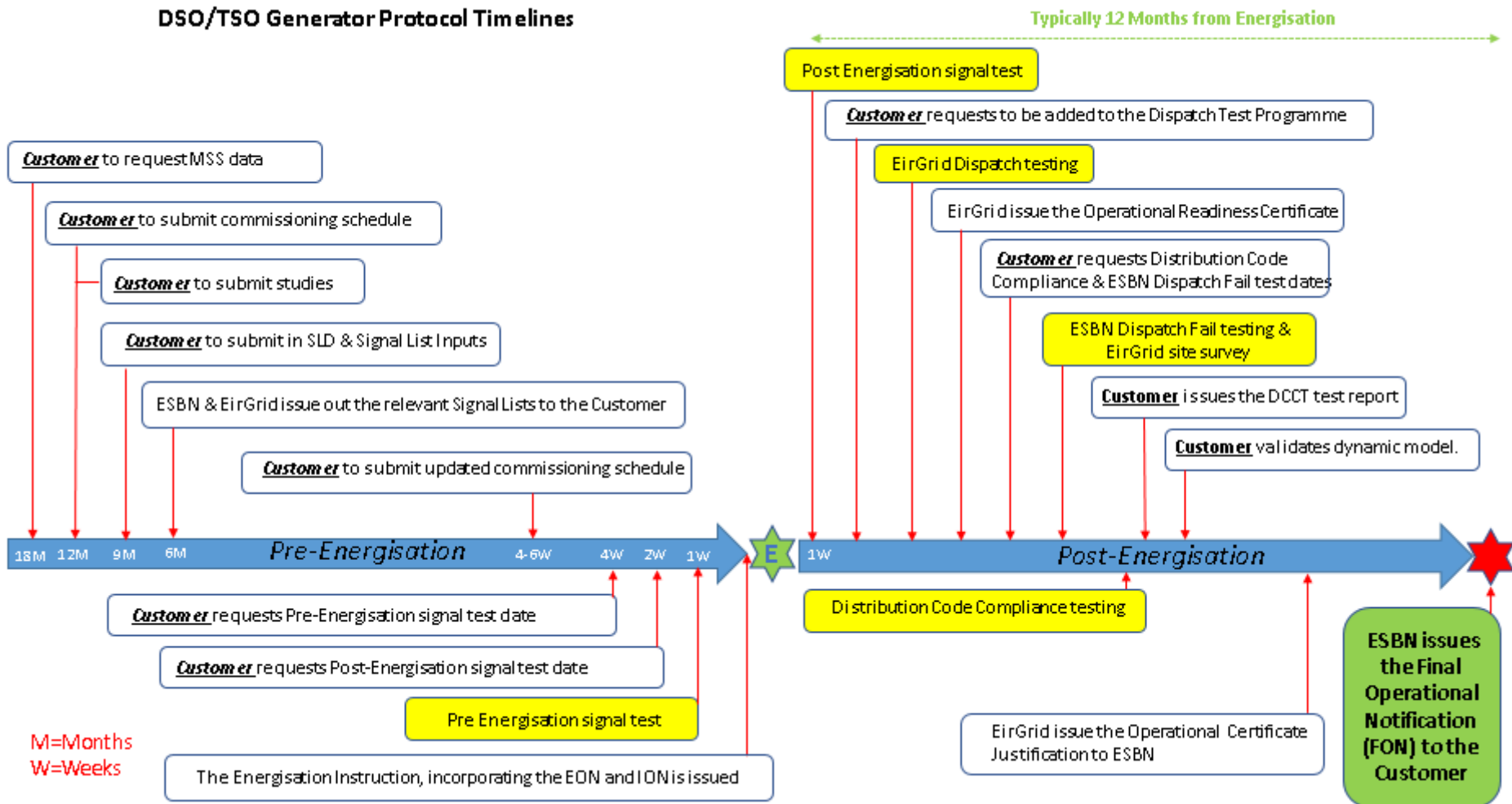
Points of Contact within ESB Networks & EirGrid:

- Commercial dsogenerators@esb.ie
- RES & Flexibility Customer Connections dsogenerators@esb.ie
- Renewables Delivery (Customer Project Manager will be allocated)
- ESB Network Operations System Performance team DSOGenTesting@esb.ie
- EirGrid System Support & Analysis – Commissioning & Testing – generator_testing@eirgrid.com
- EirGrid Future Networks – System Analysis – ped@eirgrid.com

The following infographic sets out graphically, the high-level sequence of actions.

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DSO/TSO Generator Protocol Timelines



2. Detailed lists of Milestones

This section is divided up into two parts:

1. Steps prior to Energisation
2. Steps following Energisation

Part 1: Steps prior to Energisation

The emphasis in this section, is to provide details of the steps to be taken by the Customer or their appointed Consultants or Agents. However, on some cases, in order to provide additional context, significant events or relevant actions by other parties may also be listed. Where these arise, such rows will be italicized, to emphasize this point.

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Step No.	Compliance Requirement of the PGM	Distribution Code Reference	Timeline	Means of demonstration of compliance	Adjudicator of Compliance	Customer Notes
1	Customer to request Minimum System Strength (MSS) data to facilitate Fault Ride Through study from dsogenerators@esb.ie	N/A	Prior to 18 months before energisation	MSS obtained.		
2	Customer to provide PPM Commissioning schedule to the ESBN Customer Project Manager	DCC4.4 (and DCC9.8 for 110kV connected)	12 months before energisation	Provision of schedule	1. EirGrid 2. ESBN	
3	Customer to provide Voltage Fault Ride Through Study via ESBN Customer Project Manager. Note: FRT reports & models should be provided ASAP once the MSS data are received. All the FRT-items should be closed 12 months before energisation.	DCC11.2	12 months before energisation	Receipt & approval by EirGrid Generator Testing	EirGrid	
4	Customer to provide Dynamic Models to the ESBN Customer Project Manager. Note. The models must be submitted in a specified format (see TSO schedule of Tests).	DCC11.7	12 months before energisation	Receipt & approval by EirGrid Generator Testing	EirGrid	
5	Customer to provide confirmation of RoCoF Capability to the ESBN Customer Project Manager	DCC10.5.1/11.3.1	12 months before energisation	Receipt & approval by EirGrid Generator Testing	EirGrid	
5A	Harmonic studies: Customer to provide Power Quality study, as required.	Requirement temporarily suspended at time of writing/issue, pending outcome of EirGrid – ESBN discussions				

Step No.	Compliance Requirement of the PGM	Distribution Code Reference	Timeline	Means of demonstration of compliance	Adjudicator of Compliance	Customer Notes
6	Customer to provide Information required to develop relevant signal lists the ESBN Customer Project Manager		9 months before energisation	Receipt & approval by EirGrid Generator Testing and issuance of signal list by TSO. (Issuance of signal list by TSO is included in Operational Certificate Justification)	EirGrid	/
7	Market Registration should be carried out by the Customer >10MW		Submission 3 months before energisation		EirGrid	
8	Customer to provide an updated commissioning schedule to the ESBN Customer Project Manager	N/A	4-6 weeks before energisation			
9	Customer to provide relevant Wiring Completion Certificate(s) to the ESBN Customer Project Manager as per site specific signal lists issued by TSO and DSO	N/A	4-5 weeks before energisation	Signed Wiring Completion Cert (as specified in signal list) submitted to TSO& DSO	EirGrid	
10	Customer requests Pre-energisation signals and controls test date from the ESBN Customer Project Manager. ESBN System Performance then liaise with all relevant internal/external stakeholders to officially schedule the test date.	N/A	4-5 weeks before energisation		ESBN-System Performance	
11	Customer to provide information with respect to the Operation Instruction to the ESBN Customer Project Manager. This includes 24 Hr. primary points of contact, approved list of Operators, Telemess training certificates and Declaration of Competence.	DCC11.6.2.6.1 or 2- responsible operator tbc	2-4 weeks before energisation	ESBN issues final version of Ops Instruction		

Step No.	Compliance Requirement of the PGM	Distribution Code Reference	Timeline	Means of demonstration of compliance	Adjudicator of Compliance	Customer Notes
12	Customer requests Post-energisation signals and controls test date from the ESN Customer Project Manager & ESN System Performance then liaise with all relevant internal/external stakeholders to officially schedule the test date.		2 weeks before energisation			
13	Pre-energisation Signals and Controls Test take place, involving ESBTS, EirGrid EMS, and ESN SCADA Support.					
14	Customer to send signed Pre-Energisation Signals and Controls certificate to (Generator_testing@eirgrid.com) and copy (DSOGenTesting@esb.ie)		1 week before energisation	Signed Pre-Energisation & Commissioning Test Certificate submitted to TSO& DSO	EirGrid / ESBTS	
15	For Reactive Power controls/signals, Customer sends pre-energisation Signals and Control Test certificate to (DSOGenTesting@esb.ie)		1 week before energisation	Signed Pre-Energisation & Commissioning Test Certificate submitted to TSO& DSO	ESBN / ESBTS	
Not Applicable						
16	ESBN will issue an approved Energisation Instruction on behalf of the System Manager which incorporates the EON and ION.					

Energisation

Note on Energisation Instruction:

- Issuance of an Approved Version of the Energisation Instruction [EI] to the Customer or their appointed agents, constitutes the means through which the Customer is notified that, at the appropriate step therein, it is in order to connect their plant to the Distribution System for the first time. It thus constitutes an **Energisation Operational Notification [EON]**.
- It also constitutes the means through which, when successful energisation has been achieved through the execution of the EI, the Power Generating Module [PGM], may use the grid connection for a period of time no greater than one year from the date of issuance of an approved version of the EI, to initiate compliance tests to ensure compliance with the relevant specifications and requirements of the Distribution Code. This may involve the exporting of power up to limits prescribed by other processes but in any event no greater than the MEC. It thus also constitutes an **Interim Operational Notification [ION]**.

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Part 2: Steps following Energisation

Step No.	Compliance Requirement of the PGM	Distribution Code or Other Ref	Timeline	Means of demonstration of compliance	Adjudicator of Compliance	Customer Notes
17	Customer to confirm 5MW limit in place. (This limit may be revised upwards in the future).		Energisation (prior to first export)	Confirmation to TSO and DSO System Performance	EirGrid ESBN	
18	Post-Energisation Signals and Controls Test take place, involving ESBTS, EirGrid EMS, and ESBN SCADA Support.					
19	Customer to send Post-Energisation Signals and Controls certificate to (Generator_testing@eirgrid.com) and copy (DSOGenTesting@esb.ie)	TSO Signal List	Energisation + 1 week	Signed Post-Energisation & Commissioning Test Certificate submitted to TSO & DSO	EirGrid	
20	For Reactive Power Commands/Signals, Customer to send post-energisation and Control Test certificate to (DSOGenTesting@esb.ie)	ESBN Signal List	Energisation +	Signed Post-Energisation &	ESB	
Not Applicable						
21	Customer to confirm they are ready for a Dispatch Test and request the TSO to carry one out at the next opportunity. This request should be sent to (Generator_testing@eirgrid.com) and copy (DSOGenTesting@esb.ie)	Distribution Code Compliance Test Procedure/ EirGrid Controllability Categorisation Policy	Approx. 1 week after Post-Energisation & Commissioning Test Certificate			
22	EirGrid carry out Dispatch Tests, analyse test data, and issue a dispatch test report within 10 business days of test completion. If the test result is positive, allow the PPM to increase their export limit, usually in blocks of 10MW. Repeat steps 21 and 22 until MEC is reached. Customer to repeat step 21 after MEC is reached. This final test will be for ORC. Note there is a deadline (refer to Controllability Policy)					
23	EirGrid will issue Operational Readiness Confirmation (ORC) to the Customer allowing progress to the DCCT testing phase.		2 weeks after final Dispatch Test			

Step No.	Compliance Requirement of the PGM	Distribution Code or Other Ref	Timeline	Means of demonstration of compliance	Adjudicator of Compliance	Customer Notes
24	Customer requests test dates for Distribution Code Compliance testing, from (Generator_testing@eirgrid.com) and copy (DSOGenTesting@esb.ie)		After ORC is received.			
25	Customer completes site survey template and issue to (Generator_testing@eirgrid.com) and copy (DSOGenTesting@esb.ie)	Grid Code Connection Agreement PPM 1.5.1 PPM 1.6.1	Prior to Dispatch Fail Test			
26	Customer requests ESN Dispatch Fail Test date from (DSOGenTesting@esb.ie) and copy (Generator_testing@eirgrid.com)		After Distribution Code Compliance Test			
27	ESBN Dispatch Fail Test (DFT) involving ESN System Performance, EirGrid, an ESN Operator and Customer Operator. ESN System Performance will issue a DFT procedure prior to testing.					
28	Customer to submit test procedures for Distribution Code Compliance Tests (Active Power Control and Frequency Response) to (Generator_testing@eirgrid.com) and copy (DSOGenTesting@esb.ie) using the latest test procedure templates as published on the EirGrid website.	NA	At least 1 month prior to test date		EirGrid	

Step No.	Compliance Requirement of the PGM	Distribution Code or Other Ref	Timeline	Means of demonstration of compliance	Adjudicator of Compliance	Customer Notes
29	For Reactive Power, Customer to submit test procedures using site specific template for Distribution Code Compliance Reactive Power Control (DSOGenTesting@esb.ie) (Generator_testing@eirgrid.com)	PPM Reactive Power Control &	At least 1 month prior to test date		ESBN	
Not Applicable						
30	Customer to carry out test with EirGrid for Distribution Code Compliance Tests (Active Power Control and Frequency Response)		Target 9 months after energisation		EirGrid	
31	For Reactive Power Commands/Signals, Customer to carry out test for Distribution Code Compliance Reactive Power Control & C		Target 9 months		ESBN	
Not Applicable						
32	Customer to submit Distribution Code Compliance Test (Active Power Control and Frequency Response) reports to (DSOGenTesting@esb.ie) and copy (Generator_testing@eirgrid.com), using the latest report templates as published on the EirGrid website.		Test data to be submitted within 1 business day of test. Test report to be submitted within 20 business days.		EirGrid	
33	Customer to submit Reactive Power Control and capability report to (DSOGenTesting@esb.ie) (Generator_testing@eirgrid.com)		Test data to be submitted within 1	All sections of Test completed with pass. Test	ESBN	
Not Applicable						
			within 20 business days.			

Step No.	Compliance Requirement of the PGM	Distribution Code or Other Ref	Timeline	Means of demonstration of compliance	Adjudicator of Compliance	Customer Notes
34	The Customer shall provide details confirming the accuracy of the models provided, versus the behavior of the generator in the real world.	DCC11.7.8		The customer shall ensure that the appropriate tests are performed, and measurements taken to assess the validity of the dynamic model.	EirGrid	
35	EirGrid will issue an Operation Certificate Justification to ESNB on successful completion of the Distribution Code Compliance testing. Where non-compliance(s) are notified to the Customer, the Customer must have submitted the appropriate derogation(s) to distcodepanel@esb.ie , prior to the Operational Certificate Justification being issued					
36	ESBN System Performance will issue the Final Operational Notification (FON) on behalf of the System Manager to the Customer					

Notes:

- *To obtain an Operational Readiness Confirmation, all EON and ION tests must be completed plus Post Energisation signals & commissioning tests and EirGrid Dispatch tests. Deadline for Operational Readiness Confirmation: 2 weeks after final Dispatch Test; (final Dispatch Test: 6 weeks after installation of final generation unit). Operational Readiness Confirmation is Issued by EirGrid following final successful Dispatch Test at MEC.*
- *Achieving Operational Readiness Confirmation allows the Customer move to Dispatch Fail Testing, Distribution Code Compliance Testing.*
- *Following issue of Operational Readiness Confirmation, ESN Dispatch Fail Testing & Distribution Code Compliance Testing must be completed.*
- *Re step 30 re Distribution Code Compliance Test: The Customer is to demonstrate*
 - (1) active power control, functioning of available active power and mechanical availability, when operated from NCC.*
 - (2) correct response to changes in grid frequency, in line with settings provided in signal list. This also includes new RfG Frequency modes - FSM, LFSM-U & LFSM-O.*
 - (3) upon completion of testing, communicate any known non-compliance to ESN /EirGrid prior to issuance of the test report. This will facilitate retesting at an earlier stage.*

See pass criteria as described in the DCCT procedure.

3. Declaration of completion of milestones

DECLARATION – TO BE COMPLETED BY THE POWER GENERATING FACILITY OWNER:	
I declare that for all the Power Generating Modules associated with this contract:	
1. I believe that to the best of my knowledge, all the milestones above have been completed	
2. I request that a Final Operational Notification be issued to me	
Name:	
Signature:	Date:

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Appendix 1: Definitions

The following definitions are used as taken from EU 2017/631 and defined in the **Distribution Code**:

Energisation Operational Notification (EON)	A notification issued by the DSO to a power generating facility owner , prior to energisation of its internal network
Final Operational Notification (FON)	A notification issued by the relevant system operator to a power generating facility owner , who complies with the relevant specifications and requirements, allowing them to operate a power- generating module by using the grid connection;
Installation Document	A document containing information about a type A power generating module and confirming its compliance with the relevant requirements set out in EU 2016/631.
Interim Operational Notification (ION)	A notification issued by the relevant System Operator to a Power Generating Facility Owner , which allows them to operate a power generating module by using the grid connection for a limited period of time and to initiate compliance tests to ensure compliance with the relevant specifications and requirements
Power Generating Facility	A facility that converts primary energy into electrical energy and which consists of one or more Power Generating Modules connected to a network at one or more connection points.
Power Generating Facility Owner (PGFO)	A natural or legal entity owning a power generating facility
Power Generating Module (PGM)	Either a synchronous power-generating module or a power park module .
Power Generating Module Document (PGMD)	A document provided by the Power Generating Facility Owner to the relevant system operator for a Type B or C ⁱ power-generating module which confirms that the Power Generating Module's compliance with the technical criteria set out in this regulation has been demonstrated and provides the necessary data and statements, including a statement of compliance
Power Park Module (PPM)	A unit or ensemble of units generating electricity, which is either non-synchronously connected to the network or connected through power electronics, and also has a single connection point to a transmission system or distribution system.
Statement of Compliance	A document provided by the Power-Generating facility owner to the DSO stating the current status of compliance with the relevant specifications and requirements set out in EU 2016/631.

ⁱ RfG stipulates that PGMDs are issued in respect of Type B and C PPMs but ESNB has decided to extend the practice to Type D PPMs also.