

SEM

EirGrid Grid Code Harmonisation

Grid Code Modifications Consultation Paper

19 June 2007 – 10 July 2007

Version 1.1

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1. Background

1.1 SEM

The Single Electricity Market ("SEM") was developed by the Commission for Energy Regulation and the Northern Ireland Authority for Energy Regulation pursuant to a Memorandum of Understanding dated 23 August 2004 and the subsequent All-Island Energy Market Development Framework agreed in November 2004 between Noel Dempsey TD, the Minister for Communications, Marine and Natural Resources in Ireland and Barry Gardiner MP, the Minister with Responsibility for Enterprise, Trade and Investment in Northern Ireland.

1.2 Grid Code Modifications

It has been deemed necessary to modify both the EirGrid Grid Code and the SONI Grid Code in order to facilitate the SEM. A Grid Code Harmonisation Workstream was set up between EirGrid and SONI to identify the specific modifications necessary to each Grid Code. The Workstream used the SEM Trading and Settlement Code as a guide to how the new SEM would operate. The Workstream also liaised with numerous other workstreams that were set up to identify changes required surrounding topics such as Outage Planning, System Planning, Near-time Operations, Licences, Wind, Demand Side Units, Connections and Ancillary Services.

1.3 Grid Code Review Panels

The Workstream utilised the existing Grid Code Review Panels in Ireland and Northern Ireland to keep Grid Code Users informed and up-to-date on the progress of the modification proposals and thinking that was evolving. Three joint Grid Code Review Panel meetings took place in December 2006, March 2007 and May 2007. All information was also posted on the EirGrid and SONI websites as soon as it was available.

First Meeting: A joint Grid Code Review Panel meeting was held on 13 December 2006 at NIAUR's (then NIAER) offices in Belfast. There was good attendance at that meeting and an overview of the process for achieving the harmonised Grid Codes for SEM in Northern Ireland and the Republic of Ireland was given by EirGrid and SONI. A number of key issues were discussed in detail, including how the harmonised Grid Codes would work together, the process for governance of the 'Sections under Common Governance' of the Grid Codes, and details of discussions on matters such as availability, within day testing, demand side units and wind. Issues relating to system planning, ancillary/system support services, outage planning and process were also usefully discussed.

Second Meeting: A second joint Grid Code Review Panel meeting was held on 27 March 2007 in Dublin. There was also good attendance at that meeting and an overview was given of the following documents, with discussion on the points that attendees wanted to explore further:

- § the first draft of the 'Sections Under Common Governance' of the Grid Codes (SDC1 and SDC2);
- § a first draft of the Glossary and Definitions containing the new definitions used in these Sections Under Common Governance;
- § revised drafts of the Planning Codes of both Grid Codes;
- § revised draft of the SONI Connection Conditions;
- § revised drafts of the OC2 (Operational Planning) sections of both Grid Codes;
- § a new section OC7.2.4.5 for the EirGrid Grid Code (Information Exchange requirements for price-making wind farms); and

§ the inclusion of “Substitute Reserve” in EirGrid’s OC4.6.

There was a GCRP consultation from 27 March 2007 to 11 April 2007, with documents posted on both TSOs’ websites.

Third Meeting: A third joint Grid Code Review Panel meeting was held in Belfast on 3 May 2007. At this meeting, the TSOs gave Users an overview of the further changes made to SDC1, SDC2 and the New Definitions Glossary following the second Grid Code Review Panel meeting and the comments helpfully received from some Users. The main changes discussed at the meeting included:

- § the changes made to give a more “All-Island aspect” to the SDCs;
- § the change in wind farm terminology with the introduction of the terms “Controllable WFPS” and “Dispatchable WFPS”;
- § the new references made to both Generator and Demand Side Unit Aggregators;
- § the introduction of “Technical Parameters” as a common term to refer to “GSDPs” in Northern Ireland and “Operating Characteristics” in the Republic of Ireland.

The TSOs also confirmed at that meeting that they would not create a new SDC3 section under Common Governance, as a careful review of the existing SDC3 section of the SONI Grid Code and the OC4.3 and OC5 sections of the EirGrid Grid Code showed that, subject to a few limited areas, the approach in terms of frequency control was essentially consistent in both Grid Codes, and therefore could be left to be dealt with in those different sections in each of the Grid Codes. As a result some minor modifications have been proposed to EirGrid’s OC4.3 and Connection Conditions.

There was a GCRP consultation from 3 May to 18 May, with documents posted on the TSOs’ websites.

1.4 Main Public Consultation

This document describes the modifications that EirGrid is proposing to be made to the EirGrid Grid Code. This document is to be used in conjunction with the tracked changes version of the Grid Code also posted on the EirGrid website, along with the consultation paper on the Scheduling and Dispatch Codes, SDC1 and SDC2, which are the “Sections Under Common Governance”. As these sections are to appear in almost identical format in both the EirGrid and the SONI Grid Codes, EirGrid and SONI have prepared a joint consultation document on these sections.

In order to give Users an overview of the complete process of modifications across the whole island of Ireland, the table below sets out Grid Code sections that are being consulted on as part of the overall process in both the SONI and EirGrid Grid Codes. Those sections marked with an * are the Sections Under Common Governance and these, along with the new definitions glossary are the subject of a separate User Paper as mentioned above. The remaining sections of the EirGrid Grid Code are covered under this User Paper and the remaining sections of the SONI Grid Code in SONI’s User Paper. A link to the SONI documentation is contained in Appendix A5 to this paper.

EirGrid Grid Code	SONI Grid Code
*SDC1	*SDC1
*SDC2	*SDC2
New and Revised Definitions for SDC1 and SDC2 Glossary	New and Revised Definitions for SDC1 and SDC2 Glossary
Planning Code	Planning Code
Connection Conditions	Connection Conditions
OC1 – Demand Forecasts	OC1 – Demand Forecasting
OC2 – Operation Planning	OC2 – Operation Planning
OC3 – Interconnector Management	OC3 – Operating Margin
OC4 – System Services	OC4 – Demand Control

OC7 – Information Exchange	OC5 – Operational Liaison
OC8 – Operational Testing	OC6 – Safety Co-ordination
OC10 – Monitoring, Testing and Investigation	OC7 – Contingency Planning
OC11 – Safety Co-ordination	OC8 – Operational Event Reporting and Information Supply
WFPS1 – Wind Farm Power Stations	OC9 – Numbering and Nomenclature
General Conditions	OC10 – System Tests
Glossary	OC11 – Testing, Monitoring and Investigations
	SDC3 – Frequency Control
	General Conditions
	Glossary
	Metering Code, Sub Codes and APs

2. Key modifications proposed to EirGrid Grid Code sections

Please note that not all references appropriate to Generator Aggregators have been identified yet.

GRID CODE INTRODUCTION

EirGrid's Grid Code does not currently contain an Introduction. Typically Grid Code Introductions do not actually form part of the Grid Code itself, they are merely an aid for Users. EirGrid is currently preparing an Introduction to the Grid Code, and this will be made available to Users in due course. It is not being included as part of this consultation.

GC GENERAL CONDITIONS

Modification proposals to reflect the governance arrangements as detailed in the Governance Paper have been included in the General Conditions. A link to the Governance Paper is provided in Appendix A1 on page 9 below.

PC PLANNING CODE

The Planning Code provides for the interaction between the TSO and Users with regard to the development of User Systems, their impact on the Transmission System, and the exchange of information between the TSO and Users to facilitate such planning and development. Modifications to the Planning Code are required to provide for the co-ordinated planning of the development of the Transmission Systems in both jurisdictions and to provide for the participation of Generator Aggregators and Dispatchable Demand Customers and Aggregators. Out of date references to Interconnectors have also been removed.

PCA PLANNING CODE APPENDIX

It is proposed to add the requirement to submit a CCGT Installation Matrix at defined atmospheric conditions into PC.A4.3. SONI currently requires CCGTs to provide a CCGT installation matrix in order for the TSO to know what configuration the CCGT will operate given a particular Dispatch Instruction. EirGrid is now adding this requirement to the Planning Code Appendix.

New sections PC.A5 and PC.A4.13 for Dispatchable Demand Customers and Demand Side Unit Aggregators and Generator Aggregators is also being added to the Planning Code Appendix to detail the data that these new Grid Code Users must provide to the TSO. Please reference Appendix A2 for further detail on Dispatchable Demand Customers.

In addition, references to Wind Farm Power Stations in PCA4.10.1.4 have been modified to Controllable WFPS, in line with the nomenclature modification proposals in the other Grid Code sections. Please reference Appendix A3 for further details.

CC CONNECTION CONDITIONS

Only minor modifications are required to the Connection Conditions. CC.12 Signals has been modified to reflect the requirements for submission of generator governor status and also signals required to be submitted by Dispatchable Demand Customers and Demand Side Unit Aggregators.

Please reference Appendix A2 for further detail on Dispatchable Demand Customers and Demand Side Unit Aggregators.

In CC.7.3.5 it is proposed to modify the defined term “CCGT Module” to “CCGT Installation” to align the terminology with SONI. The existing definition for “CCGT Module” shall be used for “CCGT Installation” with some minor changes.

OC1 DEMAND FORECASTS

It is required to modify instances of “Schedule Day” to “Trading Day”.

OC2 OPERATIONAL PLANNING

It is proposed to modify OC2 to reflect the all-island approach to operational planning, including the sharing of information between the two TSOs. In addition, as the diagram on page OC2 – 2 is now out-of-date it is proposed to remove it. Additional modifications are also required following the introduction of Dispatchable Demand Customers. The clauses affected are OC2.1, OC2.2, OC2.3, OC2.4, OC2.5, OC2.6 and OC2.7. Further details are in Appendix A2 below.

OC3 INTERCONNECTOR MANAGEMENT

It is proposed to delete OC3 Interconnector Management in its entirety as these requirements shall be reflected in the System Operator Agreement (SOA) and it is not appropriate to include them in the Grid Code anymore. The existing Interconnector, the tie-line between Louth and Tandragee Stations will be referred to in the remainder of the Grid Code as an Inter-jurisdictional Tie Line. Where Interconnector appears in the Grid Code from now on, it will refer to the Moyle Interconnector between Northern Ireland and Scotland, and/or any East-West Interconnectors that may be built in the future.

OC4 SYSTEM SERVICES

It is proposed to modify OC4.6 to include a new section on Substitute Reserve. It is also proposed to modify OC4.3 to harmonise with SONI’s SDC3. Modifications include detail on expected generator response to frequency deviations and the issuing of target frequency dispatch instructions.

OC5 DEMAND CONTROL

No modifications are being proposed to OC5 at this time.

OC6 SMALL SCALE GENERATOR CONDITIONS

No modifications are being proposed to OC6 at this time.

OC7 INFORMATION EXCHANGE

It is required to modify OC7 to include scope for Dispatchable Wind Farm Power Stations and Dispatchable Demand Customers to provide a control facility, along with all other centrally dispatchable plant. Please reference Appendix A3 for the Wind related modifications and A2 for the Dispatchable Demand customers. The relevant text modifications for Generator Aggregators are still being considered.

OC8 OPERATIONAL TESTING

It is proposed to modify OC8 to allow for both Full-Day and Within-Day Operational Testing. The clauses affected are OC8.5, OC8.8, OC8.9 and OC8.10. Additional modifications are also required following the introduction of Dispatchable Demand Customers. The affected clauses are OC8.1, OC8.2, OC8.3, OC8.6 and OC8.7. Please reference Appendix A4 for further detail.

OC9 EMERGENCY CONTROL AND POWER SYSTEM RESTORATION

No modifications are being proposed to OC9 at this time.

OC10 MONITORING TESTING AND INVESTIGATION

It is proposed to modify OC10 as a result of introduction of Dispatchable Demand Customers. The affected clauses are OC10.2, OC10.3, OC10.4.5.2 and OC10.7. Please see Appendix A2 for further detail. The relevant text modifications for Generator Aggregators are still being considered.

OC11 SAFETY CO-ORDINATION

It is proposed to modify the scope of OC11 as a result of introduction of Dispatchable Demand Customers. Please see Appendix XX for further detail.

SDC1 GENERATION SCHEDULING

This section has been fully replaced with new text appropriate to the new SEM. The title of this code is also changing to "Unit Scheduling", to reflect the fact that Generation is not the only thing being dispatched. The text of SDC1 in the EirGrid Grid Code has been drafted to be identical, in so far as was feasible, to the proposed text for SDC1 in the SONI Grid Code. As this is a section under common governance, the detail on the modifications to SDC1 are contained in a separate paper which is available on the EirGrid website. The proposed text of the SDCs is available both in the tracked changes version of the EirGrid Grid Code, and also as a separate document on the website.

SDC2 GENERATION DISPATCHING

This section has been fully replaced with text appropriate to the new SEM. The title of this code is also changing to "Control, Scheduling and Dispatch", to reflect the fact that Generation is not the only thing being dispatched. The text of SDC2 in the EirGrid Grid Code has been drafted to be identical, in so far as was feasible, to the proposed text for SDC2 in the SONI Grid Code. As this is a section under common governance, the detail on the modifications to SDC2 are contained in a separate paper available here:

SDC2 APPENDIX

This appendix is part of SDC2 and is also detailed in the separate paper referenced above.

WFPS1 WIND FARM POWER STATIONS

Modifications are being proposed to reflect new terminology, such as Controllable Wind Farm Power Station and also the de minimus size of 30 MW for provision of availability declarations and wind power forecasts has been removed. The requirement to provide Availability Declarations under SDC1 is now included and, for Dispatchable Wind Farms, the requirement to comply with SDC2. Further details in section XX below.

GLOSSARY

Many new defined terms have arisen as a result of the re-writing of the SDCs. EirGrid and SONI jointly produced new definitions for these terms. There were instances where a term appeared in one Grid Code but not the other, so the existing definition or a slightly amended version was then proposed in both.

These definitions have been inserted into the tracked changes version of the Grid Code, but for ease of reference, are all also available in one document. Further detail on the definitions is also available in the SDCs User Paper.

Some further definitions have required a change, such as referencing the "island of Ireland" in the definitions relating to "External Interconnection", and referencing "consumption" of electricity in the definition of Plant.

The following definitions can also now be deleted, as they are no longer use in the text: Schedule; Schedule Day, System Demand (this is now defined by summing the definitions of "System" and

“Demand”); Available Transfer Capability; Bulk Supply Points; Declared Operating Characteristics; Incremental Break Point; Incremental Price; De-loading rate; Generation Schedule; Interchange Schedule; Interconnector Energy Trade; Interconnector Transfer Schedule; Net Transfer Capacity; Nomination; Notified Transmission Flow; Scheduling; Voltage Mvar Optimisation Programme.

The following abbreviations can also be deleted: ATC; NTC; NTF.

3. Appendices

List of Appendices

- A1 Grid Code Governance Arrangements
- A2 Dispatchable Demand in the SEM
- A3 Wind in the SEM
- A4 Within-Day Testing
- A5 Link to other relevant (Grid Code for SEM) consultation papers and documentation

3.1 Appendix A1 Grid Code Governance Arrangements

The Grid Code Governance arrangements for SEM are detailed in the Governance Paper that was approved by the Regulatory Authorities in October 2006. This document is available at the following link:

http://www.eirgrid.com/EirgridPortal/uploads/Grid_Code_docs_for_website/Grid_Code_Governance_for_SEM_20062909_v4_0_web.pdf

Grid Code Harmonisation for Single Energy Market

Demand Side Units and Aggregators– Impact on the EirGrid Code Consultation Version 3

Introduction

Dispatchable Demand Customers are Demand Customers which have the ability to reduce their Demand by at least 4 MW via their Demand Side Units (DSUs) when Dispatched by the System Operator. For Demand Customers with a Demand Reduction capability below 4 MW to participate in the Single Energy Market (SEM) they must be associated with other Demand Customers via an aggregation route with a combined reduction capability of at least by 4 MW.

In simple terms the Dispatchable Demand Customer would submit a Demand Reduction and an associated price, if the price is lower than the System Marginal Price then the Demand Side Unit is dispatched. Dispatchable Demand Customers of this nature have previously not existed on either the EirGrid or SONI System. It is unclear at this point on the likely level of Demand Side Unit participation on the 1st November 2007.

Dispatchable Demand Customers with respect to their Demand Side Units can submit commercial and technical offer data into the market and will be treated exactly the same as other Price Maker Generation Units. That is, the consumption (or planned consumption) by a Demand Customer can be reduced on receipt of a Dispatch Instruction issued by the System Operator as part of a merit order Dispatch. However, this will have implication for the operation of the System and the rules detailed in Grid Codes and Distribution Code.

Section 2 below lists the principles underpinning Demand Side Units participation in the Single Energy Market (SEM), section 3 describes the implementation of Demand Side Units in the Single Energy Market and section 4 details the resulting changes to the EirGrid Grid Code (Glossary, Planning Code, Planning Code Appendix, Connection Conditions, OC2, OC7, OC8, OC10, OC11, SDC1 and SDC2 of the EirGrid Grid Code) while section 5 summaries the conclusions. **In the future, Grid Code Changes outlined below**

will need to be replicated, where appropriate, into the Distribution Code in the RoI. In the interim, the Distribution Code could refer to the appropriate Grid Code clauses.

Principles

1. Principles of Demand Side Units in the SEM Trading and Settlement Code

The following general principles apply to Demand Side Units under the SEM Trading and Settlement Code (SEM T&SC):

1. Each Demand Side Unit shall be classified as a Predictable Price Maker Generator Unit (Ref: 5.154 SEM T&SC);
2. A single Demand Side Unit can be associated with a number of Demand Sites, provided that those Demand Sites Units comprise of one single Supplier Unit and are within the same Currency Zone (ref: 5.150 SEM T&SC);
3. To qualify to register as a Demand Side Unit, the site must contain the following (ref: 5.151 SEM T&SC):
 - a. Demand Site shall house a final customer or consumer;
 - b. Demand Site must have the technical and operational capability to deliver Demand Reduction in response to Dispatch Instructions from the System Operator in accordance with the Grid Codes or Distribution Code;
 - c. Demand Site will have the appropriate equipment to permit real-time monitoring of delivery by the System Operator;
 - d. The Demand Site shall have a Maximum Import Capacity (MIC) and shall **not** have a Maximum Export Capacity (MEC).

In the Grid Code the Demand Side Unit definition differs from the SEM Trading and Settlement Code definition as it only refers to one Site. However, to capture the multiple sites concept the Grid Cod has introduced the Demand Side Unit Aggregator concept.

2. System Operator Requirements

The following general principles are the System Operators requirements for Demand Side Units:

1. Since other price-making units are to be dispatched via the EDIL (Electronic Dispatch Instruction Logger) system (including price-making wind farms), Demand Side Units must have the capability to accept and act upon instructions from the EDIL system;
2. The operator of Demand Side Units will also be obliged to submit declarations of availability (the equivalent of its Available Demand Reduction);
3. Demand Side Units must have SCADA facilities for TSO real-time monitoring of the Demand Reduction;

4. Only Demand Side Units with a load reduction capability of greater than or equal to 4 MW will receive a dispatch instruction from the appropriate System Operator. This threshold is proposed as the number of eligible Demand Side Units could be excessive and it ensures that the System Operators are effectively able to manage the dispatching of the greatly increased volume of participants;
5. Demand Side Units with a load reduction capability less than 4 MW must operate in conjunction with a Demand Side Unit Aggregator. The System Operators will send dispatch instructions to Demand Side Unit Aggregators where their Aggregated Demand Side Units have a combined load reduction capability greater than or equal to 4 MW;
6. The System Operators would still reserve the right to dispatch the individual units below the 4 MW Threshold if required for System Security reasons;
7. The System Operator will monitor responses to ensure Demand Side Units are compliant with Dispatch Instructions; and
8. The rules which apply to a Demand Side Units shall also apply to Aggregated Demand Side Units;

Implementation of Demand Side Units in the Single Energy Market

1. Demand Side Unit Dispatch and Control

The EDIL interface will be the mechanism by which the System Operator issues a Dispatch Instruction to Dispatchable Demand Customers or Demand Side Unit Aggregators for their respective Demand Side Units.

The process will be as follows:

- a. A Dispatchable Demand Customer or a Demand Side Unit Aggregators shall install EDIL at their Control Facility;
- b. The NCC operator will send a Demand Reduction Dispatch Instruction to a Dispatchable Demand Customer or Demand Side Unit Aggregator;
- c. The Responsible Operator accepts the instruction and implements it;
- d. The Demand Reduction Dispatch Instruction will be exported in the same way as Dispatch Instructions are (via the NESS system into the output NGDI file);
- e. The NGDI file will be saved in ODS and then wrapped into XML and sent via web service to the SMO;
- f. Settlement associated with Demand Units will be handled by the SMO.

Each Demand Side Unit Aggregator will install SCADA metering for each individual Site under its control and bring this back to a single control point, called the Control Facility. These multiple sites will then be aggregated to form a single Demand Side Unit and the aggregated SCADA value will be sent to the appropriate System Operator Control Centre. The TSO can request Dispatchable Demand Customers and

Demand Side Unit Aggregators to validate that the aggregated SCADA signal is the correct aggregation of the individual sites.

2. Real-time Availability Declarations

Dispatchable Demand Customers or Demand Side Unit Aggregators for their respective Demand Side Units will have to declare their availability through the EDIL system, like all other Price-making Generator Units. In respect of Demand Side Unit Aggregators, a single aggregated availability will be required for the Aggregated Demand Side Units.

3. Threshold for Individual Demand Side Unit Participation

To efficiently manage dispatching all predictable price maker units, it is proposed that the System Operators would only issue dispatch instructions to all predictable price maker units which have a capability of 4 MW and above. Therefore individual Demand Customers with a Demand Reduction capability below 4 MW will have to follow the aggregated Demand Side Unit route. However as for Generators, they can opt to become part of an Aggregator, or participate as autonomous generation.

As the number of eligible Demand Side Units could be excessive, this proposal ensures that the System Operators are effectively able to dispatch all predictable price maker units in merit, while maintaining Security of Supply and their licence conditions.

4. Monitoring Compliance

To ensure system security is maintained, the System Operators must ensure that there is sufficient capacity dispatched to meet the demand and that all Predictable Price Maker Generation Units responded as confirmed, i.e. complied with the dispatch instructions. This is normally confirmed by monitoring the output of the generators against the dispatch level. This method of confirmation cannot be applied to Demand Side Units as the actual Site Demand can vary significantly between trading periods. In this case the System Operator will propose arrangements to the Demand Side Units with regard to compliance monitoring which will be reflected in the Grid Code and these are given below.

Compliance monitoring will not be performed in real time and will be done on a needs be basis.

For a Demand Side Unit which achieves its reduction only via the operation of a generator, the output of the generator should be provided to the System Operator via a SCADA signal. This signal will be compared to the dispatched Demand Reduction, if the output of the generator is within 5% of the dispatched Demand Reduction, the Demand Side Unit is compliant. For Dispatchable Demand Customers or Demand Side Unit

Aggregators who provide Demand Reduction by reducing their consumption in any trading period by switching off process which would normally be on, these customers will be required to submit a Demand Profile as part of their technical offer data. The Demand Profile must not exceed the Demand Sites Maximum Import Capacity. This Demand Profile will be used for availability declaration, dispatch instruction validation and compliance monitoring. In this case, Dispatchable Demand Customers or Demand Side Unit Aggregators would be deemed to be in compliance if the difference between the Demand Profile and the metered quantity plus the Demand Reduction is within an agreed fixed percentage, e.g. 5% of the Demand Reduction. To validate the Demand Profile the TSO can compare the actual Site(s) consumption against the Demand Profile when the Demand Side Unit or Aggregated Demand Side Units were declared available but not Dispatched.

5. Demand Side Unit Aggregator Systems

The robustness of the Demand Side Unit Aggregator systems and the level of detail that the Aggregator must submit on the systems needs further consideration e.g. how the aggregator systems operate, the aggregated response to instructions and related data.

Impact to the EirGrid Grid Code

The inclusion of Demand Side Units and Aggregated Demand Side Units in the Single Energy Market and the resulting proposed changes as discussed above will impact on the Grid Code. The sections of the EirGrid Grid Code impacted are the Glossary, Planning Code, Planning Code Appendix, Connection Conditions, OC2, OC7, OC8, OC10, OC11, SDC1 and SDC2 and these will be discussed in the following sections.

Where a section of the Grid is being modified solely for the inclusion of Demand Side Units the text changes to the Grid Code will appear in this document otherwise reference will be made to the documents which include all modification to that section of the Grid Code.

1. Glossary

The proposed modifications to the Grid Code Glossary driven by the inclusion of Demand Side Unit (s) are as detailed in the SDC New Definitions Document, these new definitions are required to cover the addition of Demand Side Units and Aggregated Demand Side Units and the associated impacts to the Transmission System definition as specified in the Grid Code. The new definitions relevant to the addition of Demand Side Units and Aggregated Demand Side Units are as follows:

Aggregated Demand Side	A group of Demand Sites represented by a Demand Side Unit Aggregator , which together. are capable of a Demand Reduction capability equal to or
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Unit	above 4 MW and is subject to Dispatch Instruction from the TSO
Demand Profile	The estimated consumption in MW Demand for a Demand Site or estimated aggregated consumption in MW Demand for Demand Sites represented by a Demand Side Unit Aggregator for each Trading Period in the following Optimisation Time Horizon Period and which must be submitted to the TSO in the Availability Notice under SDC 1.4.1.2
Demand Reduction	The reduction in MW Demand which can be achieved in one currency zone by a Demand Side Unit or Aggregated Demand Side Unit for each Trading Period in the following Optimisation Time Horizon Period and which must be submitted to the TSO in an Availability Notice under SDC1.4.1.2.
Demand Side Unit	A Demand Site which houses a Demand Customer connected to Transmission System or Distribution System which can deliver a Demand Reduction upon receipt of a Demand Reduction Dispatch Instruction from the TSO and which has a Demand Reduction capability of at least 4 MW.
Demand Side Unit Aggregator	A person who represents several Demand Sites , with an aggregated Demand Reduction not less than 4 MW, by in particular preparing notices under SDC1 on behalf of these Demand Sites and receiving Dispatch Instructions on behalf of these Demand Sites under SDC2.
Demand Site	A premises owned by a Demand Customer connected to the Transmission or Distribution Systems with a Demand Reduction capability. The Demand Site shall have a Maximum Import Capacity and shall not have a Maximum Export Capacity .
Dispatchable Demand Customer	A person who operates a Demand Side Unit , with an aggregated Demand Reduction not less than 4 MW, and is subject to the Grid Code pursuant to any agreement with the TSO or otherwise.
Initial Demand Reduction	The Demand Reduction of the Demand Side Unit or Aggregated Demand Side Unit following a Dispatch Instruction from the TSO when the Demand Reduction is at 0 MW for a period greater than the Maximum Down Time specified by the Dispatchable Demand Customer or the Demand Side Unit Aggregator in the Technical Parameters .
Initial Demand Reduction Time	The Time as specified by the Dispatchable Demand Customer or the Demand Side Unit Aggregator in the Technical Parameter and is the time it takes for the Dispatchable Demand Customer to be able to implement

	the Initial Demand Reduction from receipt of Instruction from the TSO .
Maximum Export Capacity	In relation to an Interconnector , the maximum amount of electricity in MW that can be exported through that Interconnector . In all other cases, the value (MW) provided in accordance with the Generator's Connection Agreement
Maximum Import Capacity	In relation to an Interconnector , the maximum amount of electricity in MW that can be imported through that Interconnector . In all other cases, the values (kW and/ or kVA) provided in accordance with the User's Connection Agreement

2. Proposed Changes to Planning Code and Planning Code Appendix

The proposed modifications to the Planning Code and the Planning Code appendix are required as the Transmission System Operator needs information on Demand Side Units and Aggregated Demand Side Units. This information was not required in the past as this category of User did not exist prior to SEM.

The proposed modification to the Planning Code is the inclusion of Dispatchable Demand Customers and Demand Side Unit Aggregators in PC.3 Scope. This ensures, where appropriate, that these Users will be bound by the Planning Code and Planning Code Appendix. Please refer to the proposed modified Planning Code for more detail on the proposed modification.

The proposed modification to the Planning Code Appendix is the inclusion of section PC.A5. This section details the information required from Dispatchable Demand Customers and Demand Side Unit Aggregators regarding their Demand Side Unit(s), to enable the Transmission System Operators to efficiently plan the Transmission System. The proposed change is as detailed in red below:

PC. A5 Dispatchable Demand Customers and Demand Side Unit Aggregators

For each Dispatchable Demand Customer and Demand Side Unit Aggregator, the following information shall be provided:

- (a) Total Demand Reduction Capability (MW);**
- (b) Location of Demand Site(s);**

- (c) **Demand Reduction** capability per **Site (MW)**;
- (d) **Demand Reduction** capability from generation per **site (MW)**;
- (e) **Demand Reduction** capability from avoided **Demand** consumption per **site (MW)**;
- (f) The name of the **Transmission Station(s)** to which the **Demand Site(s)** is normally connected; and
- (g) **Annual Demand Profile**.

[Note: thought is being given to inserting a requirement on Aggregators to submit data on the systems by which they achieve the aggregated response to instructions, and related data]

3. Proposed Changes to Connection Conditions

The proposed modifications to Connection Conditions, CC.3 **Scope** and CC.12 **Signals** are required to ensure that the appropriate signals are obtained from the Dispatchable Demand Customers and Demand Side Unit Aggregators which will be used by the TSO, for the efficient operation of the Transmission System and ,where appropriate, to confirm compliance. The modifications to the Connection Conditions are highlighted in red below.

CC.3 SCOPE

The **Connection Conditions** apply to the TSO and to the following **Users**:

- (a) **Generators** with **Registered Capacity** greater than 2MW;
 - (b) The **Distribution System Operator**;
 - (c) **Demand Customers**; and
 - (d) **Dispatchable Demand Customers and Demand Side Unit Aggregators**
- in relation to their connection to the **Transmission System**.

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CC.12 SIGNALS TO BE PROVIDED BY USERS

CC.12.1 Each **User** shall provide such signals and indications in relation to the **User's Plant and Apparatus** as are required by the TSO (acting reasonably) in accordance with the **Connection Agreement**.

CC.12.2 Signals and indications required to be provided by **Users** will include but shall not be limited to the following:

- (a) **LV switchgear** positions pertinent to the status of each **Grid Connected**

Transformer through a set of two potential free auxiliary contacts (one contact normally open and one contact normally closed when the circuit breaker is open) for each circuit breaker;

- (b) kV at transformer low **Voltage** terminals; and
- (c) a minimum of four sets of normally open potential free auxiliary contacts in each transformer LV bay for fault indication.

(d), (e), (f), (g) and (h) are applicable to Generators only

- (d) MW and +/-Mvar at alternator terminals of each **Generation Unit**;
- (e) kV at **Generator Transformer LV** terminals;
- (f) **Generator Transformer** tap position;
- (g) Measured or derived MW output on each fuel, from **Generation Units** that can continuously fire on more than one fuel simultaneously;
- (h) Where it is agreed between the TSO and the **Generator** that signals are not available on the HV terminals, +/- MW and +/- Mvar shall be provided at the **Grid Connected Transformer low Voltage** terminals; and
- (i) Status of **Governor Control System** and any **Load** limiters. (as proposed in OC4.3 and CC12.2 Frequency Control Modifications for SEM – Consultation Version 2)

(j) and (k) are applicable to Demand Customers only,

- (j) MW and +/- Mvar at the HV terminals of the **Grid Connected Transformer**; and
- (k) **Grid Connected Transformer** tap position.

(l), (m) and (n) are applicable to Dispatchable Demand Customers and Demand Side Unit Aggregators only,

- (l) MW and +/- Mvar at alternator terminals of each **Generator** where applicable;
- (m) Measured or derived **MW Output** for each **Generator** at the HV terminals of the **Grid Connected Transformer**; and
- (n) **Demand Reduction** aggregated at the HV terminals of the **Grid Connected Transformer**.

4. Proposed Modification to OC2, Operational Planning

The aim of OC2 is to promote the development and implementation of a co-ordinated Generation Outage Programme, consistent with security of supply and requirements for the secure and economic operation of the Transmission System and the Other Transmission System, and with the needs of Generators, in respect of Plant maintenance requirements and resource limitations. Therefore as Dispatchable Demand Customers and Demand Side Unit Aggregators are operating Demand Side Units which are being treated as Generators, it is appropriate that they are included in the Generation Outage Programme. Hence it is proposed that OC2 is modified to include Dispatchable Demand Customers and Demand Side Unit Aggregators, the detailed changes are as per the OC2 document.

5. Proposed Modification to OC7, Notification of Events and Operations

The proposed modifications to OC7 are in sections **OC7.1.3 Scope** and **OC7.2 Operational Communication and Data Retention** of the EirGrid Grid Code. These modifications are required to ensure that Demand Side Units and Aggregated Demand Side Units are treated similarly to all other Price Making Generation Units. It ensures that the contact locations, communication methods and procedures between the TSO and the Dispatchable Demand Customer or Demand Side Unit Aggregator are specified. The communication of Dispatch Instructions shall normally be via Electronic Dispatch Instruction Logger (EDIL). The proposed changes to OC7 are detailed below:

OC7.1.3 SCOPE

OC7.1.3.1 OC7.1 applies to the TSO and to Users, which term in OC7.1 means:-

- (a) **Generators;**
- (b) **Dispatchable WFPSs; (as proposed in the Wind Modifications to the Grid Code for SEM Consultation Version 2)**
- (c) **Distribution System Operator;**
- (d) **Demand Customers; and**
- (e) **Dispatchable Demand Customers and Demand Side Unit Aggregators.**

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OC7.2.3 SCOPE

OC7.2.3.1 OC7.2 applies to the TSO and to Users, which term in OC7.2 means:

- (a) **Generators;**
- (b) **Dispatchable WFPSs; (as proposed in the Wind Modifications to the Grid Code for SEM Consultation Version 2)**
- (c) **Distribution System Operator;**

- (d) **Demand Customers;** and
- (e) **Dispatchable Demand Customers and Demand Side Unit Aggregators.**

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OC7.2.4.3 Demand Customers

OC7.2.4.3.1 The **Demand Customer's** contact locations and personnel referred to in this Section OC7.2.4.3 shall be notified by the **Demand Customer** to the **TSO** prior to connection and thereafter updated as appropriate.

OC7.2.4.3.2 The **Demand Customer** is required to provide the **TSO** with the contact information of a **Responsible Operator(s)** who shall respond to communications from the **TSO** without undue delay (except where otherwise provided for by agreement between the **Demand Customer** and the **TSO**, such agreement not to be unreasonably withheld) and are of suitable experience and training and are authorised to perform functions on behalf of the **Demand Customer**.

OC7.2.4.3.3 The **Responsible Operator** shall have the ability to attend the **Site** of the **Demand Customer** within 60 minutes of an instruction to do so being issued by the **TSO**.

OC7.2.4.3.4 At any point in time, a single person shall be designated by the **Demand Customer** and notified to the **TSO** as the **Responsible Manager**. The **Responsible Manager** shall be responsible for dealing with the **TSO** on matters relating to the **Grid Code** other than as provided for in OC7.2.4.3.2 and OC7.2.4.3.3. In the event that the **Responsible Manager** is not a person on duty at the **Site** of the **Demand Customer**, then the **Responsible Manager** must be capable of being contacted from the **Site** of the **Demand Customer** at all times, and in the event that the **TSO** issues a request to the **Site** of the **Demand Customer** requiring the **Responsible Manager** to contact the **NCC**, the **Responsible Manager** shall comply with the request without unreasonable delay and in any case within 15 minutes of the request.

OC7.2.4.3.5 **Dispatchable Demand Customers and Demand Side Unit Aggregators** are required to provide a **Control Facility**. The **Dispatchable Demand Customer and Demand Side Unit Aggregator** shall ensure acting in accordance with **Good Industry Practice** that the **Control Facility** is staffed with appropriate staffing levels at all times.

OC7.2.4.3.6 For Dispatchable Demand Customers and Demand Side Unit Aggregators, the Control Facility shall be staffed by a Responsible Operator(s) who shall respond to communications from the TSO without undue delay (except where otherwise provided for by agreement between the Dispatchable Demand Customer or the Demand Side Unit Aggregator and the TSO, such agreement not to be unreasonably withheld) and are of suitable experience and training and are authorised to perform functions on behalf of the Dispatchable Demand Customer or the Demand Side Unit Aggregator as follows:

- (a) to accept and execute Dispatch Instructions;**
- (b) to receive and acknowledge receipt of requests, for amongst other matters, operation outside the Declared values of Demand Reduction and Ancillary Service capability.**

OC7.2.4.3.3 The Responsible Manager shall be authorised by the Demand Customer to perform the following functions on behalf of the Dispatchable Demand Customer or the Demand Side Unit Aggregator:

- (a) to make estimates in accordance with Good Industry Practice as to the Demand Reduction and Ancillary Service capability;**
- (b) to make Declarations of the Demand Reduction for each Dispatchable Demand Customer;**

The Dispatchable Demand Customer may, from time to time, notify a replacement contact location and personnel which meets the foregoing requirements.

OC7.2.5.3 Supervisory Control and Data Acquisition (SCADA)

OC7.2.5.3.1 SCADA remote terminal equipment shall be required in the control room of the Transmission Station at the User Site for the transmission of signals and indications to and from the NCC. The signals and indications which must be provided by Users for transmission by SCADA equipment to the NCC are the signals and indications referred to under Connection Conditions together with such other information as the TSO may from time to time by notice to Users reasonably require.

OC7.2.5.3.2 For Dispatchable Demand Customers and Demand Side Unit Aggregators, SCADA remote terminal equipment shall also be required at the Control Facility for the transmission of signals and indications to and from the NCC. The signals and indications which must be provided by Dispatchable Demand Customers and Demand Side Unit

Aggregators for transmission by **SCADA** equipment to the **NCC** are the signals and indications referred to under **Connection Conditions** together with such other information as the **TSO** may from time to time, by notice to **Dispatchable Demand Customers** or and **Demand Side Unit Aggregators**, reasonably require.

OC7.2.5.3.3 Interface cabinets shall be installed in the control room of the **Transmission Station** at the **User Site** and also on the **User's Site** or, in the case of a **Dispatchable Demand Customer** or **Demand Side Unit Aggregator**, in the **User's Control Facility**. Provision and maintenance of wiring and signalling from the **Generator's User's Plant and Apparatus** to the **User's** interface cabinet shall be the responsibility of the **User**. The **TSO** shall provide the cables to interconnect these interface cabinets.

6. Modifications to OC8, Monitoring, Testing and Investigation

The proposed modifications to OC8 are to ensure that the Dispatchable Demand Customers and Demand Side Unit Aggregators are bound by rules and procedures for Operational Testing. This will also ensure that Demand Side Units and Aggregated Demand Side Units are treated similarly to all other Price Making Generation Units. The detailed proposed modifications to this section of the Grid Code are contained in the OC8 document.

7. Modifications to OC10, Monitoring, Testing and Investigation

The proposed modifications to OC10 of EirGrid Grid Code are as detailed below. These changes are required to ensure that Demand Side Units and Aggregated Demand Side Units are treated similarly to all other Price Making Generation Units, and that their performance can be monitored and where applicable appropriate actions taken.

OC10 MONITORING, TESTING AND INVESTIGATION

OC10.1 INTRODUCTION

OC10.1.1 In order to discharge its responsibilities in respect of the safe, secure and economic operation of the **Transmission System** and in respect of generation **Dispatch**, the **TSO** will need to carry out certain **Monitoring, Testing and Investigation** in respect of the performance of **Users' Plant**.

OC10.1.2 OC10 does not apply to **Operational Tests**, which may be required by the **TSO** or by **Users**. The procedures by which **Operational Tests** are notified, and approved, executed and reported, are covered under **Operational Testing (OC8)**.

OC10.2 OBJECTIVE

OC10.2.1 The primary objectives of OC10 are to establish 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**.

OC10.2.2 In order to achieve the primary objective set out in OC10.2.1, OC10 establishes procedures for **Monitoring, Testing and Investigation**. In particular, this facilitates adequate assessment of each of the following:

- (a) whether **Centrally Dispatched Generation Units (CDGU), Demand Side Units and Aggregated Demand Side Units** comply with **Dispatch Instructions**;
- (b) whether **Generators, Dispatchable Demand Customers and Demand Side Unit Aggregators** are in compliance with **Declarations of Availability, Ancillary Services capabilities, Operating Characteristics** and any other data required to be registered by those **Generators, Dispatchable Demand Customers and Demand Side Unit Aggregators** under the **Grid Code**;
- (c) whether **Power Quality** of **Users** conforms with International Electro technical Commission Standards: 'Electromagnetic Compatibility-Limits-Limitation of emission of harmonic currents for equipment connected to medium and high voltage power supply systems [IEC/TR3 61000-3-6] and 'Electromagnetic Compatibility-Limits-Limitation of voltage fluctuation and flicker for equipment connected to medium and high voltage power supply systems ' [IEC/TR3 61000-3-7];
- (d) whether **Users** are in compliance with protection requirements and protection settings under the **Grid Code, Users' Connection Agreements, Ancillary Service Agreements and System Support Agreements** between **Users** and the **TSO**.

OC10.3 SCOPE

OC10 applies to the TSO and to the following Users

- (a) **Generators** which, for the purposes of OC10, include all **Generators** with **Generation Unit(s)** subject to **Central Dispatch** or with **Generation Unit(s)** that have a total **Registered Capacity** greater than **4 MW** on a single **Site**;
- (b) **The Distribution System Operator**;
- (c) **Suppliers**;
- (d) **Demand Customers**;
- (e) **Dispatchable Demand Customers** in respect of their **Demand Side Units**; and
- (f) **Demand Side Unit Aggregators** in respect of the **Demand Side Units** which they represent.

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C10.4 MONITORING

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OC10.4.5 Monitoring systems and procedures

OC10.4.5.1 Procedures and systems used for assessment of compliance will be either generic procedures (which will be provided by the TSO) or otherwise agreed between the TSO and the User, such agreement not to be unreasonably withheld.

OC 10.4.5.2 Compliance of **Demand Side Units** or **Aggregated Demand Side Units** with **Dispatch Instructions**

The following validation will be performed in real time:

- (i). For a **Demand Side Unit** or **Aggregated Demand Side Unit** which achieves the **Demand Reduction** only by operating a generator, the **Demand Side Unit** or the **Aggregated Demand Side Unit** shall be deemed compliant if the **SCADA Signal** confirms that the increased output of the generation is within 5% of the **Demand Reduction**.

The following validation will be performed on a needs be basis and will not be performed in real time:

- (ii). For a **Demand Side Unit** or **Aggregated Demand Side Unit** which achieves the **Demand Reduction** only by reducing their **Demand**, the **Demand Side Unit** or the **Aggregated Demand Side Unit** shall be deemed to be compliant with the **Dispatch Instruction** if the difference between the **Demand Profile** and the metered **Demand** plus the **Demand Reduction** is within 5%.
- (iii) For a **Demand Side Unit** or **Aggregated Demand Side Unit** which achieves the **Demand Reduction** by reducing their **Demand** and operating a generator, the **Demand Side Unit** or the **Aggregated Demand Side Unit** shall be deemed to be compliant with the **Dispatch Instruction** if the difference between the **Demand Profile** and the metered **Demand** plus the **Demand Reduction** is within 5%.

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OC10.7 CONSEQUENCES OF MONITORING, TESTING AND INVESTIGATION

OC10.7.1 **Non-compliance with a Dispatch Instruction issued by the TSO to a Generator, Dispatchable Demand Customer or Demand Side Unit Aggregator.**

OC10.7.1.1 When the TSO considers that a **Generator**, a **Dispatchable Demand Customer** or a **Demand Side Unit Aggregator** is not in compliance with a **Dispatch Instruction** then the TSO shall inform the **Generator**, the **Dispatchable Demand Customer** or the **Demand Side Unit Aggregator** by agreed methods, identifying the relevant **Generation Unit**, **Demand Side Unit** or **Aggregated Demand Side Unit**, and identifying the **Dispatch Instruction** and the time of issue of the **Dispatch Instruction** with which the TSO considers the **Generator**, the **Dispatchable Demand Customer** or the **Demand Side Unit Aggregator** is not in compliance. This shall be known as a "**Warning** for non-compliance with a **Dispatch Instruction**". The **Warning** is to contain a **Dispatch Instruction** which may be identical to the original **Dispatch Instruction** or which may differ from it. The occurrence of the **Warning** shall be logged by the TSO and by the **Generator**, the **Dispatchable Demand Customer** or the **Demand Side Unit Aggregator**

OC10.7.1.2 On receipt of a **Warning** for non-compliance with a **Dispatch Instruction**, the **Generator**, **Dispatchable Demand Customer** or **Demand Side Unit Aggregator** must as soon as possible, and in any case within ten (10) minutes of the receipt of the **Warning**:

- (a) commence to comply with the **Dispatch Instruction** included with the **Warning** (this may be the original or a modified **Dispatch Instruction** as outlined in OC10.7.1.1); or
- (b) reply to the **TSO**, disputing in good faith the validity of the original **Dispatch Instruction**, detailing the grounds on which the validity is being disputed; or
- (c) reply to the **TSO**, disputing in good faith the validity of the assessment of non-compliance. In this event the **Generator**, **the Dispatchable Demand Customer or the Demand Side Unit Aggregator** must as soon as is reasonably practicable, inform the **TSO** in detail of the grounds on which the assessment of non-compliance is being disputed; or
- (d) reply to the **TSO**, giving a reason for inability to comply with the **Dispatch Instruction**, and making a revised **Declaration** in respect of the **Availability, Ancillary Service capabilities or Operating Characteristics**, as appropriate.

OC10.7.1.3 If the **Generator**, **Dispatchable Demand Customer or the Demand Side Unit Aggregator** complies in accordance with OC10.7.1.2 (a), no further action shall arise.

OC10.7.1.4 In the event of the **Generator**, **Dispatchable Demand Customer or Demand Side Unit Aggregator** making a revised **Declaration** under OC10.7.1.2 (d), the **TSO** shall then issue a new **Dispatch Instruction**, consistent with the revised **Declaration**. The revised **Declaration** will be backdated to the time of issue of the relevant **Dispatch Instruction**. Notwithstanding the backdating of the revised **Declaration**, the **Generator**, **Dispatchable Demand Customer or the Demand Side Unit Aggregator** will still be deemed under OC10.7.1.1 as having failed to comply with a **Dispatch Instruction**.

OC10.7.1.5 In the event of OC10.7.1.2 (b) or OC10.7.1.2 (c) applying, the **TSO** shall consider the substance of the **Generator's**, **Dispatchable Demand Customer's or the Demand Side Unit Aggregator's** disputation. The **TSO** shall, where the **TSO** considers appropriate, communicate with the **Generator**, **Dispatchable Demand Customer or the Demand Side Unit Aggregator** to clarify aspects relating to the issue and receiving of the **Dispatch Instruction**, and the **Generator's**, **Dispatchable Demand Customer's or the Demand Side Unit Aggregator's** actions. The **TSO** shall acting reasonably determine the validity of the **Generator's**, **Dispatchable Demand Customer's or Demand Side Unit Aggregator's** disputation, and shall inform the **Generator**, **Dispatchable Demand Customer or the Demand Side Unit Aggregator** as to its decision. The **TSO** shall record both its decision, and also all pertinent information relating to the event, including the

Generator's, **Dispatchable Demand Customer's or the Demand Side Unit Aggregator's** disputation and such information shall be deemed to be **Operational Data**.

OC10.7.1.6 Where the TSO, acting reasonably, is of the view that a disputation given by a **Generator , Dispatchable Demand Customer or the Demand Side Unit Aggregator** is not valid or not wholly valid or if the **Generator, Dispatchable Demand Customer or Demand Side Unit Aggregator** has not replied in accordance with OC10.7.1.2, the TSO shall inform the **Generator, Dispatchable Demand Customer or the Demand Side Unit Aggregator** that it is overriding, by means of a **Post Event Notice**, the **Generator's, Dispatchable Demand Customer's or the Demand Side Unit Aggregator's Declaration** in respect of the **Availability, Ancillary Service capabilities or Operating Characteristics** of the **Generation Unit or Demand Side Unit**, as appropriate. The **Post Event Notice** shall govern until such times as the **Generator, Dispatchable Demand Customer or the Demand Side Unit Aggregator** submits a revised **Availability Notice** ~~makes a further Declaration~~.

OC10.7.1.7 Where the TSO gives a **Post Event Notice** under OC10.7.1.6, the **Post Event Notice** shall be backdated to the time of issue of the relevant **Dispatch Instruction**, or the latest time for which there exists compelling evidence that the **Generation Unit, Demand Side Unit or the Aggregated Demand Side Unit** was acting in compliance with the **Dispatch Instruction**, whichever is the later. The **Post Event Notice** shall set the level of **Declared Availability, Declared Ancillary Service capability or Declared Operating Characteristic**, as the case may be, at such level as the **Monitoring, Testing or Investigation** indicates the **Generation Unit** actually achieved. Notwithstanding the backdating of the **Post Event Notice**, the **User Generator** will still be deemed under OC10.7.1.1 as having failed to comply with a **Dispatch Instruction**.

OC10.7.1.8 In the event that the **Dispatchable Demand Customer or the Demand Side Unit Aggregator** is deemed by the TSO in accordance with the provisions of this OC10 to be in non-compliance with its **Dispatch Instructions**, that is the **Demand Side Unit or Aggregated Demand Side Unit** failed to comply with three (3) **Dispatch Instructions** in a one calendar month period then the TSO shall notify the **Dispatchable Demand Customer or the Demand Side Unit Aggregator** of the continued non-compliance. The **Dispatchable Demand Customer or the Demand Side Unit Aggregator** shall take immediate action to remedy such non compliance. The terms of this OC10.7.1.8 shall be without prejudice to the rights of the TSO to instruct the **Market Operator** that the

Demand Side Unit or Aggregated Demand Side Unit is in breach of the Grid Code and hence the SEM Trading and Settlement Code.

OC10.7.2 Non-compliance by a Generator with Declared Operating Reserve

OC10.7.2.1 In evaluating the adequacy of the performance of a **Generation Unit**, the TSO shall compare the actual performance as measured, with the expected performance for that **Generation Unit**. The expected performance from the **Generation Unit** shall be calculated based on the **Frequency** deviation from the Pre-Incident **Frequency**, and the **Generation Unit's** then **Declared** values of **Availability, POR, SOR, TOR1, TOR2** and **Governor Droop**;

OC10.7.2.2 Where the performance of a **Generation Unit** is deemed by the TSO to be in non-compliance with **Declared Operating Reserve**, then the TSO shall notify the **Generator** of the non-compliance, identifying the system or procedure by which non-compliance was measured. The TSO shall by means of a **Post Event Notice** override the **Generator's Declaration** in respect of **Operating Reserve**. The revised **Declaration** shall be effective from the time of commencement of the **Test** or **Event** on which the non-compliance has been assessed, or such later time as may, in the opinion of the TSO acting reasonably, be appropriate if the non-compliance did not apply to the full period of the **Test** or **Event**.

OC10.7.2.3 Following the notification of non-compliance, the TSO shall make available to the **Generator** within three **Business Days** relevant data in relation to the system **Frequency** and **Generation Unit** performance, that the **Generator** may reasonably require substantiating the assessment of non-compliance.

OC10.7.2.4 The consequences of non-compliance by a **Generator** with **Declared Operating Reserve** will be addressed in the **SEM Trading and Settlement Code** and other agreements as appropriate.

OC10.7.3 Non-compliance by a Generator, **Dispatchable Demand Customer** or **Demand Side Unit Aggregator** with **Declared an Availability Notice**.

OC10.7.3.1 In the event that the performance of a **Generation Unit, Demand Side Unit or Aggregated Demand Side Unit** is deemed by the TSO to be in non-compliance with its

Declared Availability, then the TSO shall notify the **Generator, Dispatchable Demand Customer or the Demand Side Unit Aggregator** of the non-compliance.

OC10.7.3.2 Having so informed the **Generator, Dispatchable Demand Customer or the Demand Side Unit Aggregator**, the TSO shall, by means of a **Post Event Notice**, override the **Generator User's Declaration in respect of Availability Notice**, with a value as appropriate to the outcome of the **Test or Investigation**. The revised **Declaration** shall be effective from the time of commencement of the **Test or Investigation** on which the non-compliance has been assessed, or such later time as may, in the opinion of the TSO acting reasonably, be appropriate if the non-compliance did not apply to the full period of the **Test or Investigation**.

OC10.7.3.3 **The economic consequence of non-compliance by a Generator, Dispatchable Demand Customer or the Demand Side Unit Aggregator with Declared Availability will be addressed in the SEM Trading and Settlement Code and other agreements as appropriate.**

OC10.7.4 Non-compliance by a Generator with Declared Ancillary Services or Declared Operating Characteristics

OC10.7.4.1 In the event that the performance of a **Generation Unit** is deemed by the TSO to be in non-compliance with its **Declared Ancillary Services** capability or **Operating Characteristics**, then the TSO shall notify the **Generator** of the non-compliance, and having so informed the **Generator** then the TSO shall by means of a **Post Event Notice** override the **Generator's Declaration** in respect of **Ancillary Services** or **Operating Characteristics** as appropriate.

OC10.7.4.2 **The consequences of non-compliance by a Generator with Declared Ancillary Services or Declared Operating Characteristics will be addressed in the SEM Trading and Settlement Code and other agreements as appropriate.**

OC10.7.5 Non-compliance by a **Generator User** with a Connection Condition or Registered Operating Characteristics

OC10.7.5.1 In the event that the performance of a **Generation Unit**, is deemed by the TSO in accordance with the provisions of this OC10 to be in non compliance with its **Operating Characteristics** or with a **Connection Condition**, then the TSO shall notify the **Generator** of the non-compliance and the **Generator** shall take immediate action to remedy such non-compliance. The terms of this OC10.7.5 shall be without prejudice to the rights of the TSO to **De-energise** the **Generator's Plant and Apparatus** in accordance with the terms of OC9.6.

OC10.7.5.2 In the event that the performance of a **Demand Side Unit** or the **Aggregated Demand Side Unit** is deemed by the TSO in accordance with the provisions of this OC10 to be in non-compliance with its **Operating Characteristics**, including **Demand Profile**, or with a **Connection Condition**, then the TSO shall notify the **Dispatchable Demand Customer** or the **Demand Side Unit Aggregator** of the non-compliance and the **Dispatchable Demand Customer** or the **Demand Side Unit Aggregator** shall take immediate action to remedy such non compliance. The terms of this OC10.7.5 shall be without prejudice to the rights of the TSO to **De-energise** the **Demand Site and Apparatus** in accordance with the terms of OC9.6.

8. Modifications to OC11, Safety Co-Ordination

The proposed modifications to OC11 of EirGrid Grid Code are as detailed below. This proposed change is required to ensure that Demand Side Units and Aggregated Demand Side Units are operated in accordance with approved safety rules.

OC11.3 SCOPE

OC11 applies to the TSO and to the following Users:

- (a) **Generators;**
- (b) the **Distributor System Operator;**
- (c) **Demand Customers;**
- (d) **Dispatchable Demand Customers and Demand Side Unit Aggregators;**
- (e) the TAO; and
- (f) agents of **the TSO** or agents of any **User** (as defined in OC 11.3 (a), (b), (c) and (d)).

9. Proposed Modifications to SDC1 and SDC2

The proposed modifications to the SDCs ensure that any Grid Code User, including Dispatchable Demand Customers and Demand Side Unit Aggregators that register under the SEM Trading and Settlement Code as Price-Makers, are required to submit the relevant data to enable the System Operators to produce the Indicative Operations Schedule and that under SDC2 the User can receive a dispatch instruction from the TSO via an electronic interface, which is currently EDIL.

Dispatchable Demand Customers and Demand Side Unit Aggregators will be also bound by SDC1 and SDC2. Please refer to the proposed modifications to the text of the SDC1 and SDC2 documents for more detail.

Conclusions

The System Operators are recommending the approval of the:

- modifications to the Grid Code to ensure that Dispatchable Demand Customers and Aggregated Demand Side Units are treated in the same manner as all Price Maker Generator Units;
- Threshold of 4 MW below which Users will not be dispatched. This will allow the System Operators to effectively dispatch all Predictable Price Maker Generator Units in merit, while maintaining Security of Supply and licence conditions; and
- method for monitoring compliance with the dispatch instructions for Demand Side Units and Demand Side Unit Aggregators.

3.3 Appendix A3 Wind in the SEM

Grid Code Harmonisation for SEM Wind in the SEM - Impact on the EirGrid Grid Code

Consultation Version 3

Introduction

This paper is presented in two sections

- A) Wind in the SEM & the Application of the T&SC Rules
- B) Impact on the EirGrid Grid Code

A) Wind in the SEM & the Application of the T&SC Rules

1) Summary of Classification of Wind Farms in the SEM

According to V1.3 of the SEM Trading and Settlement Code (T&SC), Wind Power Units can be classified as Variable Generator Units or Autonomous Generator Units.

Autonomous Generator Units are automatically registered as Price Taker Generator Units. The SO will not be able to/ obliged to send instructions to wind farms. They will not be included in Reserve Constrained Unit Commitment (RCUC). They will not have to provide availability declarations nor will the TSO have to provide an individual Wind Power Unit forecast for it.¹

According to the T&SC Wind Farms which are Dispatchable are classified as Variable Generator Units and can register as Price Maker Units or Price Taker Units (*ref: 2.38, 2.39, 2.40*)

Wind Farms which are classified as Variable Generator Units and register as Price Taker Units will have to provide availability declarations and the TSO will have to provide an individual Wind Power Unit forecast for it as it will be included in the RCUC.

Wind Farms which as classified as Variable Generator Units and register as Price Maker Units will have to provide availability declarations and the TSO will have to provide a Wind Power Unit forecast for wind farm as it will be included in the RCUC.

2) Curtailment & Constraining

At present, there is no formal approved policy document that makes a distinction between constraints [for transmission reasons] and curtailment [for wind reasons] and any compensation for either or both. The Regulators are currently considering this issue and a consultation paper is expected to issue shortly.

3) Wind Dispatch/ Wind Control

1) Autonomous Wind Farms

(e.g. pre-Wind Grid Code wind farms or <5MW distribution-connected wind farms in Ireland; WFPS pre-April 1st 2005 wind farms and wind farms <5MW in Northern Ireland)

Autonomous Wind Farms will not be subject to dispatch, curtailment or constraint instructions and therefore will not have to reduce their output.

¹ An individual wind power forecast will be produced for *all* wind farms.

2) Variable Price Taker Units

(e.g. currently called WFPS in Ireland and PDWFPS in Northern Ireland. These will both change to Controllable WFPS in both Grid Codes following the introduction of the SEM.)

Variable Price Taker Units (VPT) may be subject to a curtailment and/or constraint instruction.

EIRGRID:

The mechanism by which Curtailment Instructions or Constraint Instructions will be issued to VPT is via EirGrid's Energy Management System (EMS) system. The process will be as follows:

- a. The Active Power Control Set-point will be entered into the EMS system.
- b. The APC Setpoint ('Curtailment' or 'Constraint' Instruction) is issued to the Wind Power Unit.
- c. The Instruction is captured in the EMS system and exported to the Historical Information System, HIS.
- d. The HIS will then export the data to the Operational Data Store, ODS.
- e. The instruction is then taken from ODS and used to create a single set of dispatch instructions.
- f. These are in turn, translated into XML and sent to SMO via a web service.

An application is being developed to differentiate between different types of instructions. In the long term (but not for Day 1).

3) Variable Price Maker Units

(e.g. category does not exist in either code at present; will be called Dispatchable WFPS in Ireland & Northern Ireland for SEM.)

VPM will be subject to dispatch instructions.

EIRGRID/ SONI:

The mechanism by which Dispatch Instructions will be issued to VPM is via the **EDIL interface**. The process will be as follows:

- The NCC operator will issue a Dispatch Instruction to the Variable Price Maker wind farm via the Electronic Dispatch Instruction Logger, EDIL.
- The Wind Farm Responsible Operator accepts the instruction and implements it.
- The Dispatch Instruction will be exported in the same way as Dispatch Instructions to Generation Units (via the NESS system into the output NGDI file)
- The NGDI file will be saved in ODS and then wrapped into XML and sent via web service to the SMO.

Dispatching VPM from EDIL is the best option because:

- All dispatchable plant is dispatched from a single point (EDIL)
- All price-making units are dispatched from a single point
- All price-making units are treated equally in respect of the data interfaces with the TSO
- The TSO will not directly control any price-making unit on the system – DI are sent via the EDIL system but the operator at the site carries out the instruction.

The proposed OC7.2 changes, SDC1 and SDC2 for the Grid Code post SEM ensure that all price making wind farms require EDIL.

3) *Wind Availability Declarations*

EIRGRID/ SONI:

Day Ahead Availability Declarations

Both Variable Price Makers and Variable Price Takers will have to submit an availability notice at 10am on the day preceding the Trading Day as per the Grid Code. The Grid Code does allow however, that the Availability Declaration to the Market Operator is adequate.

Real-Time Availability Declarations

Variable Price Maker will have to declare their availability through the EDIL system, like all other price-making Generator units.

EIRGRID:

Variable Price Taker will not be 'declaring' real-time availabilities through the EDIL. The wind farm will be sending a live Available Active Power signal to the EMS which will change when this available active power changes, due to changes in wind conditions.

B) Impact on the EirGrid Grid Code

1. Summary of new nomenclature for all Wind Farms

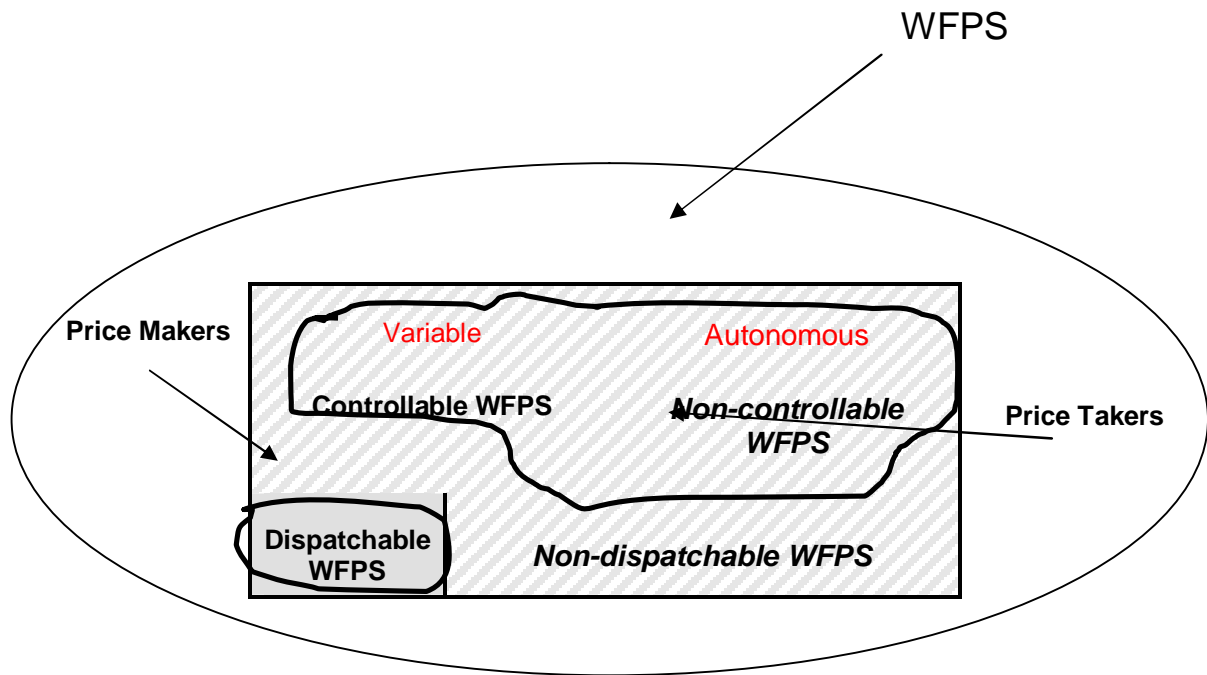
For SEM, all wind farms will be categorised as **WFPS**. The SONI code defines wind farms in this way at present and this **WFPS** definition includes wind farms that are less than 5MW and those that pre-date the revised code. No similar category exists or is necessary in the EirGrid code at present but the Distribution Code will need to be changed to align it with the new categorisations. This can be done once all changes to the EirGrid and SONI codes are agreed.

If a wind farm needs to be controllable then it will be bound by all the terms covering **WFPS** and by the additional requirements set out for **Controllable WFPS**.

A **Controllable WFPS** (a wind farm that can automatically act upon a remote signal to adjust its **Active Power** output) is a wind farm that can comply with the EirGrid code at present; **Controllable WFPS** are equivalent to the **PDWFPS** in the existing SONI code.

For the avoidance of doubt, all references to **Wind Farm Power Station** in the EirGrid code will be changed to **Controllable WFPS** and all references to **PDWFPS** in the SONI code will be changed to **Controllable WFPS**.

If a wind farm needs to be dispatchable then it will be bound by all the terms covering **WFPS** and by the requirements for **Controllable WFPS** and by the requirements for **Dispatchable WFPS**. **Dispatchable WFPS** (a wind farm that can act upon a dispatch instruction to adjust its output) is a wind farm that can comply with the EirGrid code at present and will have to comply with the new revised EirGrid code. This category does not exist in either code at present.



Two new terms need to be defined for the new EirGrid code (remove existing WFPS definition):

Controllable WFPS: A site containing at least one **WTG** which can automatically act upon a remote signal from the **TSO** to change its **Active Power** output.

Dispatchable WFPS: A **Controllable WFPS** which must have a **Control Facility** in order to be dispatched via an **Electronic Interface** by the **TSO**.

2. Use of the term Dispatchable with respect to Wind Farms

2.1 The term “Dispatchable” in the T&SC

The term “**Dispatchable**” in the T&SC:

means, in relation to a Generator Unit, the ability of the Generator Unit to receive and act upon an instruction given by the System Operator to the Participant's approved contact person or location to change the output or manner of operation of the Generator Unit in accordance with the relevant Grid Code

The term “**Generator Unit**” in the T&SC:

means a Generator, or other item of plant capable of being Dispatched, registered by a Participant under the Code. For the purposes of the Code a Generator Unit may be any one of the following types, without limitation: Demand Side Unit, Energy Limited Generator Unit, Interconnector Unit, Interconnector Error Unit, Interconnector Residual Capacity Unit, Netting Generator Unit, Pumped Storage Unit, Run-of-River Hydro Unit or Wind Power Unit

Upon registration with the SMO, each Generator Unit shall be classified as a Predictable Generator Unit, a Variable Generator Unit or an Autonomous Generator Unit (ref: 5.3). The following excerpts for the T&SC v1.3 apply:

Autonomous Generator Unit

5.4 A Generator Unit shall be classified as an Autonomous Generator Unit and a Price Taker Generator Unit if the Unit is not Dispatchable.

Variable Generator Unit

5.5 A Generator Unit shall be classified as a Variable Generator Unit if:

1. the short-term availability of the Generator Unit is unpredictable as a result of its fuel source; and
2. the Generator Unit is a Wind Power Unit or a Run-of-River Hydro Unit; and
3. the Generator Unit is Dispatchable.

In the terms of the Registration of Units, the following applies:

2.38 Parties may apply for registration of Generator Units which have Priority Dispatch for their entire capacity and which are Variable or Predictable Generator Units as either:

1. A Price Maker Generator Unit; or
2. A Price Taker Generator Unit.

2.39 A Party or Applicant registering an Autonomous Generator Unit shall register such Unit as a Price Taker Generator Unit.

2.40 Parties which have registered Units that have Priority Dispatch as Variable Generator Units or Predictable Generator Units may change the status of such Unit(s) as Price Taker Generator Units or Price Maker Generator Units by application to the Market Operator, giving at least 29 days notice pursuant to Agreed Procedure 4 "Data Transaction Submission and Validation".

Priority Dispatch under the T&SC v1.3: means priority dispatch as afforded under governing legislation in either Jurisdiction

Proposed modifications to OC7

There are resulting modifications being proposed to sections OC7.1.3, OC7.2.3, OC7.2.4 of EirGrid's Grid Code. Please refer to the tracked changes version of the Grid Code for these modification proposals.

Proposed modifications to WFPS1

In order to update the **WFPS1** to include for the nomenclature as above in section 1, it is proposed that all instances of **Wind Farm Power Station** are to be replaced with **Controllable WFPS**. All modifications to **WFPS1** can be found in the tracked changes version of the EirGrid Grid Code – there are 116 instances of **Wind Farm Power Station** that have been changed to **Controllable WFPS**. The relevant existing references to **Wind Farm Power Station** in the Definitions section shall also change to **Controllable WFPS**. The definitions that require modification are the following:

1. **Active Power Control**
2. **Active Power Control Setpoint**
3. **Available Active Power**
4. **Black Start Shutdown**
5. **Controlled Active Power**
6. **Meteorological Mast**
7. **TSO Telecommunication Interface Cabinet**
8. **Voltage Regulation System Slope Setting**
9. **Wind Farm Control System**
10. **Wind Farm Power Station Availability**
11. **Wind Farm Power Station MW Available Declaration**
12. **Wind Farm Power Station Operator**

In order to align WFPS1.7.5 and WFPS1.7.6 with both the new rules in the Trading and Settlement Code and the proposed SDC1, it is proposed to remove the words “with a MEC in excess of 30 MW” from WFPS1.7.5 and WFPS1.7.6. (see Appendix 1 for changes)

As “Electronic Interface” has now been defined as part of the SDC changes, references to “electronic interface” have been capitalised and put in bold font.

Proposed changes to PCA.4.10.1

PCA4.10.1 deals with Modelling requirements for wind turbine generators. In order to align the PCA with the nomenclature modifications proposed above, it is proposed to change all instances of **Wind Farm Power Station** in PCA.4.10.1 to **Controllable WFPS**.

3.4 Appendix A4 Within-Day Testing

Please reference the Within-Day Testing Paper at this link

<http://www.eirgrid.com/EirgridPortal/uploads/Grid Code/Within Day Operational Tests in the SEM V1.pdf>

3.5 Appendix A5 Links

SDC Consultation Paper

<http://www.eirgrid.com/EirgridPortal/uploads/Grid%20Code/SDCs%20USER%20PAPER%20FOR%20PUBLIC%20CONSULTATION.pdf>

The SDCs are available as individual documents on the EirGrid Website at these links:

SDC1: <http://www.eirgrid.com/EirgridPortal/uploads/Grid%20Code/SDC1%20for%20SEM%20Consultation%20V1.pdf>

SDC2:

<http://www.eirgrid.com/EirgridPortal/uploads/Grid%20Code/SDC2%20for%20SEM%20Consultation%20V1.pdf>

Definitions new and revised for the SDCs:

<http://www.eirgrid.com/EirgridPortal/uploads/Grid%20Code/SDCs%20New%20Definitions%20Consultation%20V1.pdf>

SONI-related documentation is available on their website here

<http://www.soni.ltd.uk/gridcodeDrafts.asp>