SONI Limited

Demand Side Units

Grid Code Amendments Consultation Paper

1st November 2011

APPENDIX: Proposed Grid Code Modifications

It is proposed to amend the Grid Code by adding in the text in red and by deleting the text in blue strikethrough.

INTRODUCTION

4. The **Operating** procedures and principles governing the **TSO's** relationship with all **Users** under the **Grid Code**, be they the **DNO**, **Generators**, **Suppliers**, **Interconnector Users**, **Interconnector Owners**, **Generator Aggregators, Demand Side Units, Aggregators**, **Dispatchable Demand Customers** or **Large Demand Customers** are set out in the **Grid Code**. The **Grid Code** specifies day-to-day procedures for both planning and operational purposes and covers both normal and exceptional circumstances.

GLOSSARY AND DEFINITIONS

Aggregated Demand Site	A group of **Individual Demand Sites** connected to the **Transmission** or **Distribution System** and represented by a **Dispatchable Demand Customer**, which together are capable of a **Demand Side Unit MW Capacity** ~~**Reduction Capability**~~ equal to or above 4 **MW** (and which is therefore subject to **Central Dispatch** from the **TSO**). Each **Individual Demand Site** comprising an **Aggregated Demand Site** shall be in one currency zone and shall have a **Demand Side Unit MW Capacity** of no greater than **10 MW**. Unless otherwise specified, information submitted in respect of an **Aggregated Demand Site** shall always be at an aggregated level.
Availability	In respect of any period (and, in the case of a **PPA CDGU**, in relation to a **Designated Fuel** and, in the case of a **CDGU** other than

a **PPA CDGU**, in relation to a fuel), shall mean:

(a) for any **CDGU**, **Controllable WFPS** or **Dispatchable WFPS** the figure (expressed in **MW** as at the **Connection Point** and at the direct connection with the **Distribution System**) stated in accordance with SDC1.4.1.1(a) to be the capability of the **CDGU**, **Controllable WFPS** or **Dispatchable WFPS** to generate electricity during that period. In relation to all **CDGUs** including an **Open Cycle Gas Turbine CDGU** and/or a **CCGT Installation**, the **Availability** declared by a **Generator** shall correspond to the maximum generation of electricity which that **Generator's CDGU** can achieve during that period. In relation to all **CDGUs**, the **Availability** declared by a **Generator** shall correspond to the level of generation of electricity up to and including the **Contracted Capacity** (for **PPA CDGUs** other than **PPA Open Cycle Gas Turbines**) or **Contracted Capacity (Peak)** (for **PPA Open Cycle Gas Turbines**) or **Registered Capacity** (for non-**PPA** plant) which that **CDGU** can achieve during that period;

(b) for **Demand Side Units**, the ~~**Demand Reduction**~~ **Demand Side Unit MW Capacity** (expressed in **MW** as at the **Connection Point** and at the direct connection with the **Distribution System**) stated in accordance with SDC1.4.1.1(a) to be the capability of the **Demand Side Unit** to reduce **Demand** during that period;

(c) for **Aggregated Generating Units**, the aggregated figures (expressed in **MW** as at the **Connection Points** of each

individual **Aggregated Generating Unit**) stated in accordance with SDC1.4.1.1(a) to be the capability of the **Aggregated Generating Units** as a whole to generate electricity during that period;

(d) for an **Interconnector**, the figure (expressed in **MW** at Auchencrosh) stated in accordance with SDC1.4.1.1(a) to be the capability of the **Interconnector** to export or import electricity.

"Available" shall be construed accordingly.

~~**Demand**~~ **Demand Side Unit Energy Profile**	The estimated ~~consumption in MW **Demand**~~ total **Energy** requirement for an **Individual Demand Site** or aggregated ~~consumption~~ for each **Individual Demand Site** which form part of an **Aggregated Demand Site** 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 Side Unit Import Capacity	The import value (in **MW,** MVA, kW and/or kVA) nominated by the **Dispatchable Demand Customer** for each Individual **Demand Site** within the Demand Side Unit.
Demand ~~Reduction~~ Side Unit MW ~~Capability~~ Capacity	The ~~reduction capability in **MW Demand**~~ maximum change in **Active Power** that can be achieved by a **Demand Side Unit** by totalling the potential increase in on-site **Active Power Generation** and the potential decrease in on-site **Active Power Demand** at each **Individual Demand Site.** ~~that can be achieved by the **Demand Side Unit.**~~
Demand ~~Reduction~~Side Unit	The ~~reduction in MW **Demand**~~ forecasted change in **Active Power**

MW Availability	which can be achieved in one currency zone by a **Demand Side Unit** for each **Trading Period** in the following **Optimisation Time Horizon** period and which must be submitted by the **User** to the **TSO** in an **Availability Notice** under SDC1.4.1.2.
Demand Side Unit	An **Individual Demand Site** or **Aggregated Demand Site** with a **Demand Side Unit MW Capacity** ~~**Reduction Capability**~~ of at least 4 MW. The **Demand Side Unit** shall be subject to **Central Dispatch**.
Demand Side Unit Export Capacity	The export value (in MW, MVA) nominated by the **Dispatchable Demand Customer** for each **Individual Demand Site** within the Demand Side Unit.
Demand Side Unit MW Response	The proportion (in **MW**) of the **Demand Side Unit MW Capacity** that is delievered at a given time following a dispatch instruction from the **TSO**. This value will be zero unless dispatched by the **TSO**.
Dispatchable Demand Customer	A person who operates a **Demand Side Unit**, with a **Demand Side Unit MW Capacity** not less than 4 **MW**.
Individual Demand Site	A single premises of a **Customer** connected to the **Transmission System** or **Distribution System** with a **Demand** ~~**Reduction**~~ **Side Unit MW Capacity** ~~**Capability**~~. The **Individual Demand Site** ~~shall have a~~ can have a ~~**Maximum Import Capacity**~~ **Demand Side Unit Export Capacity** and ~~shall not have a **Maximum Export**~~ a **Demand Side Unit Import Capacity.**
Initial Demand Side Unit Response ~~**Reduction**~~	The **Demand Side Unit MW Response** ~~**Demand Reduction of a Demand Side Unit**~~ following a **Dispatch Instruction** from the **TSO** when the **Demand Side Unit MW Response** ~~**Reduction**~~ is at 0 **MW** for a period greater than 24 hours.
Initial Demand Side Unit	The time as specified by the **Dispatchable Demand Customer** in the **Technical Parameters** and is the time it takes for the

Response ~~Reduction~~ Time	**Dispatchable Demand Customer** to be able to implement the **Initial Demand Side Unit Response ~~Reduction~~** from receipt of the **Dispatch Instruction** from the **TSO.**
Maximum Down Time	The maximum period of time during which **Demand Side Unit MW Response ~~Demand Reduction~~** at a **Demand Side Unit** can be greater than zero **~~Dispatched~~**.
Minimum Down Time	The minimum period of time during which **Demand Side Unit MW Response ~~Demand Reduction~~** at a **Demand Side Unit** can ~~be~~ be greater than zero **~~Dispatched.~~**
Outage	In relation to a **Generating Unit**, a total or partial reduction in **Availability** in connection with the repair or maintenance of the **Generating Unit** or any associated **Power Station Equipment**, or resulting from a breakdown or failure of the **Generating Unit** or any associated **Power Station Equipment**. In relation to a **Demand Side Unit** or a **Large Demand Customer**'s site, a total or partial change ~~reduction~~ in **Demand ~~Reduction~~Side Unit MW Capacity** ~~capability~~ in connection with the repair or maintenance of the **Demand Side Unit** or **Large Demand Customer's** unit or any associated equipment or resulting from a breakdown or failure of the **Demand Side Unit** or **Large Demand Customer's** site or any associated equipment. In relation to the **TSO,** the removal for repair or maintenance, or as a result of failure or breakdown, of any part of the **Transmission System**. In relation to the **DNO**, the construction, the removal for repair or maintenance or as a result of failure or breakdown, of any part of the distribution lines at 33kV on the **Distribution System**.

PLANNING CODE

PC.A2.3.3 **Generating Unit** Data Requirements

In relation to **Generating Units** other than the wind turbines comprised within a **WFPS**:

(a) Prime mover type;

(b) **Generating Unit** type;

(c) **Generating Unit** rating and terminal voltage (MVA & kV);

(d) **Generating Unit** rated power factor;

(e) **Registered Capacity** sent out (**MW**);

(f) **Maximum Generation** and **Minimum Generation** capability sent out (**MW** sent out);

(g) **Reactive Power** capability (both leading and lagging) at the lower voltage terminals of the **Generator Transformers** for **Maximum Generation**, normal full **Load** and normal minimum **Load**;

(h) Maximum auxiliary **Demand** ~~demand~~ in **MW** and **MVAr**;

(i) Inertia constant (**MW** sec/**MVA**);

(j) Short circuit ratio;

(k) Direct axis transient reactance;

(l) Direct axis sub-transient time constant;

(m) **Generator Transformer** rated MVA, positive sequence reactance, and tap change range;

(n) **Sustained Load Diagram**; and

(o) a list of the **CCGT Modules** in the **CCGT Installation**, identifying each **CCGT Module**, and the **CCGT Installation** of which it forms part unambiguously, together with any other information which may be relevant in relation to the **CCGT Modules** and **CCGT Installations** and their operation.

In relation to the wind turbines comprised within a **WFPS**, such data equivalent to that listed in PC.A2.3.3(a) to PC.A2.3.3(n) as the **TSO** shall reasonably require.

PC.B2.2.2 **Generating Unit** Data Requirements

In relation to **Generating Units** other than the wind turbines comprised within a **WFPS**:

(a) Prime mover type;

(b) **Generating Unit** type;

(c) **Generating Unit** rating and terminal voltage (MVA & kV);

(d) **Generating Unit** rated power factor;

(e) **Registered Capacity** sent out (**MW**);

(f) **Maximum Generation** and **Minimum Generation** capability sent out (MW sent out);

(g) **Reactive Power** capability (both leading and lagging) at the lower voltage terminals of the **Generator Transformers** for **Maximum Generation**, normal full **Load** and normal minimum **Load**;

(h) Maximum auxiliary **Demand** ~~demand~~ in **MW** and **MVAr**;

(i) Inertia constant (**MW** sec/MVA);

(j) Short circuit ratio;

(k) Direct axis transient reactance;

(l) Direct axis sub-transient time constant;

(m) **Generator Transformer** rated MVA, positive sequence reactance, and tap change range;

(n) **Sustained Load Diagram**; and

(o) a list of the **CCGT Modules** in the **CCGT Installation**, identifying each **CCGT Module**, and the **CCGT Installation** of which it forms part unambiguously, together with any other information which may be relevant in relation to the **CCGT Modules** and **CCGT Installations** and their operation.

In relation to the wind turbines comprised within a **WFPS**, such data equivalent to that listed in PC.B2.2.2(a) to PC.B2.2.2(n) as the **TSO** shall reasonably require.

OPERATING CODE

OC1.5 **DEMAND** FORECASTS

OC1.5.1 The following factors will be taken into account by the **TSO** when conducting **Demand** forecasting in the **Operational Planning Phase** and in the **Programming Phase**:-

(a) historic generation output information recorded by the **TSO** or submitted by the **DNO** in accordance with OC1.4.1.2;

(b) local factors known to the **TSO** in advance which may affect **Demand** on the **NI System**, for example trade holidays and school holidays;

(c) anticipated **Loading** profiles submitted by the **DNO** in respect of I**ndependent Generating Plant** pursuant to OC1.4.1.3;

(d) prospective new **Demand** ~~demand~~ for **Energy** exceeding 2**MW** on the **NI System** submitted in accordance with the terms of the Planning Code;

(e) **Customer Demand Management** of which the **TSO**, is aware in accordance with OC4;

(f) estimated **Energy** sales information submitted by **Suppliers** pursuant to OC1.4.1.1;

(g) anticipated transfers across **Interconnectors** and the **Inter-jurisdictional Tie Lines** between Northern Ireland and the Republic of Ireland; and

(h) other information supplied by **Users**.

The peak daily **Demand** forecast in the **Operational Planning Phase** will become the **Average Cold Spell Demand** forecast which is utilised by the **TSO** to determine whether the **Licence Standards** can be met.

OC2.1 INTRODUCTION

OC2.1.1 **Operational Planning** involves planning through various timescales, the matching of generating capacity with forecast **Demand** ~~demand~~ on the **All Island Networks** together with a reserve of generation to provide the **Margin** taking into account **Outages** of **CDGUs** (and/or in the case of a **CCGT Installation**, **CCGT Modules** as provided in OC2), **Dispatchable WFPSs, Controllable WFPSs, Power Station Equipment** and **Outages** of and constraints on parts of the **NI System** and taking into account the output of **Independent Generating Plant** and transfers of electricity across any **Interconnector** and the **Inter-jurisdictional Tie Line** between Northern Ireland and the Republic of Ireland, in order to maintain the security and integrity of the **NI System**.

OC3.4 CONSTITUENTS OF OPERATING MARGIN

The **Operating Margin** comprises **Contingency Reserve** and **Operating Reserve**.

OC3.4.1 **Contingency Reserve**

Contingency Reserve is the margin of generation over forecast **Demand** ~~demand~~ which is required to be held in Northern Ireland in the period from 24 hours ahead down to real time to cover against uncertainties in generating plant **Availability** and **Interconnector Availability** and against both weather forecast and **Demand** ~~demand~~ forecast errors. It is provided by **Generating Plant** in Northern Ireland which is not required to be **Synchronised** but which must be held available to **Synchronise** within a defined timescale as provided in OC3.4.6.1.

OC3.4.2 **Operating Reserve**

OC3.4.2.1 **Operating Reserve** is additional output from **Generating Plant** in Northern Ireland, additional **Interconnector** transfer and/or reduction in **Demand** which must be realisable in real time operation to respond in order to contribute to containing and correcting any **System Frequency** deviation to an acceptable level, within the limits specified in the Electricity Supply Regulations (N.I.) 1991, in the event of a loss of generation or a loss of import from any **Interconnector** or mismatch between generation output and **Demand** ~~demand~~.

OC3.4.6 Provision of **Operating Margin**

OC3.4.6.1 **Contingency Reserve**

This is the reserve held in Northern Ireland over, and above**, Operating Reserve,** which is required in the period from 24 hours ahead (SDC1 **Scheduling**) down to real time to cover against uncertainties of generation output, weather conditions and **Demand** ~~demand~~ forecast. The amount of **Contingency Reserve** required at the day ahead **Scheduling** stage under SDC1 and in subsequent timescales will be decided by the **TSO** acting in conjunction with the **Other TSO** on the basis of historical trends in the reduction in **Availability** of **CDGUs** and increases in forecast **Demand** ~~demand~~ up to real time operation.

OC4.1 INTRODUCTION

OC4.1.1 Operating Code No 4 ("OC4") is concerned with the provisions made by the **TSO** and procedures to be followed by the **TSO** and **Users** to permit a reduction in **Demand** in

the event that there are insufficient **Generating Plant**, **WFPSs**, **Independent Generating Plant**, **Demand Side Units** or transfers across any **Interconnectors** and the **Inter-jurisdictional Tie Lines** between Northern Ireland and the Republic of Ireland available to meet **Demand** in all or any part of the **NI System** and/or in the event of problems on the **NI System**, including, without limitation, in the event of both a steady state shortfall of generation and a transient shortfall of generation following a sudden loss of generation. OC4 also covers operating problems such as unacceptable voltage levels and thermal overloads and also the provision of information on any **Demand Control** arrangements by **Suppliers**, including **Demand Control** arrangements providing for the utilisation of controllable **Load** blocks on the **NI System** (for example, by radio teleswitching). OC4 does not override and must be read in conjunction with the **Operating Security Standard**. The **Demand Control** arrangements may also apply where there are insufficient **Generating Plant, Demand Side Units** or transfers to meet **Demand** ~~demand~~ in all or any part of the **Other Transmission System** and/or in the event of problems on the **Other Transmission System** in circumstances where the **TSO** is able to assist the **Other TSO** and where doing so would not have a detrimental effect on the security of the **NI System**.

OC11.10.3 **Demand Side Units**

OC11.10.3.1 **Monitoring** of **Demand Side Units** will be undertaken by the **TSO** in accordance with the applicable **Agreed Testing and Monitoring Procedure.**

OC11.10.3.2 If a **Demand Side Unit** is found by the **TSO** to be non-compliant pursuant to OC11.10.3.1 the **TSO** may re-register the value of the **User's** declared **Demand Side Unit MW Availability** ~~**Reduction**~~ in accordance with the provisions of the applicable **Agreed Testing and Monitoring Procedure**.

SCHEDULING AND DISPATCH CODE

SDC1.2 OBJECTIVE

The objectives of SDC1 are:

(a) to enable the **TSO**, in conjunction with the **Other TSO**, to prepare two **Indicative Operations Schedules** (utilising, amongst other things, a **Merit**

Order) one for the present **Trading Day** and one for the following **Trading Day** to be used in the **Scheduling** and **Dispatch** process for these **Trading Days**;

(b) to thereby ensure (so far as possible) the integrity of the **Transmission System** and to ensure that the **TSO** acts in conjunction with the **Other TSO** so that the **Other TSO** can ensure the integrity of the **Other Transmission System** (with the **Other TSO** having a similar objective);

(c) to ensure the security and quality of supply in relation to the **Transmission System** and to ensure that the **TSO** acts in conjunction with the **Other TSO** so that the **Other TSO** can ensure the security and quality of supply in relation to the **Other Transmission System** (with the **Other TSO** having a similar objective);

(d) to ensure that there is sufficient capacity to meet the electrical power **Demand** ~~demand~~, and thereby in conjunction with the **Other TSO** to ensure that there is sufficient capacity to meet the **Demand** ~~demand~~ on the Island of Ireland at all times and in both cases together with an appropriate margin of reserve;

(e) to publish an **Indicative Operations Schedule** as provided for in this SDC1.

SDC2.2 OBJECTIVE

The procedure for the issue of **Dispatch Instructions** by the **TSO**, is intended to enable (as far as possible) the **TSO** to match continuously **CDGU**, **Demand Side Unit, Aggregated Generating Units** output (or reduction as the case may be) and/or **Interconnector** transfers to **Demand**, and thereby in conjunction with the **Other TSO**, the **Demand** ~~demand~~ on the Island of Ireland, by utilising the **Merit Order** derived pursuant to SDC1 and the factors to be taken into account listed there and by taking into account any **NCDGU MW Output** in both cases together with an appropriate margin of reserve, whilst maintaining (so far as possible) the integrity of the **Transmission System** together with the security and quality of

supply (with the **Other TSO** having a similar objective with regard to its **Transmission System**).

SDC 1.4 PROCEDURE

SDC1.4.1 **Availability Notice**

SDC1.4.1.1 Requirement

(a) Each **User** shall, by not later than **Gate Closure** each day, notify the **TSO** by means of an **Availability Notice** (in such form as the **TSO** may reasonably notify from time to time or in the form published on the **TSO** website) of the **Availability**, available transfer capacity and/or **Demand** Side Unit MW Availability ~~Reduction~~ (as the case may be) of each of its:

(i) **CDGUs**;

(ii) **Controllable WFPSs**;

(iii) **Pumped Storage Plant Demand**;

(iv) **Interconnectors** (to be submitted by the **Interconnector Owner**);

(v) **Demand Side Units**; or

(vii) **Aggregated Generating Units** as the case may be.

(b) A **User** may satisfy this obligation by submitting the data under the **TSC**, unless the **TSO** requires, by notice to the **User**, the data to be submitted to it directly under the **Grid Code**.

(c) A **Generator Aggregator** will satisfy the obligation in this SDC1.4.1.1 by notifying to the **TSO** in an **Availability Notice** in the form described in paragraph (a) above the **Availability** of its **Aggregated Generating**

Units as the case may be.

SDC1.4.1.2 Content

(a) The **Availability Notice** shall state the:

(i) **Availability** of the relevant:

- **CDGU;** or
- **Controllable WFPSs;** or

(ii) the **Demand** Side Unit MW Availability ~~Reduction~~ of the **Demand Side Unit** or **Pumped Storage Plant Demand**; or

SDC1.4.3.4 **Availability of Demand Side Units**

Each **Dispatchable Demand Customer** shall, subject to the exceptions in SDC1.4.3.5, use reasonable endeavours to ensure that it does not at any time declare the **Demand** Side Unit MW Availability ~~Reduction~~ and the **Demand Side Unit** characteristics of its **Demand Side Unit** at levels or values different from those that the **Demand Side Unit** could achieve at the relevant time. The **TSO** can reject declarations to the extent that they do not meet these requirements.

SDC1.4.3.5 SDC1.4.3.4 shall not apply to the extent:

(a) it would require the **Dispatchable Demand Customer** to declare levels or values better than ~~Registered~~ Demand Side Unit MW **Capacity** and **Technical Parameters** as submitted under the Planning Code in respect of a **Demand Side Unit**;

(b) necessary during periods of **Planned Outage** or **Planned Maintenance Outage** or otherwise with the consent of the **TSO**;

(c) necessary while repairing or maintaining the **Demand Side Unit** or equipment necessary to the operation of the **Demand Side Unit** where such repair or maintenance cannot reasonably, in accordance with

Prudent Operating Practice, be deferred to a period of **Planned Outage** or **Planned Maintenance Outage**

(d) necessary to avoid an imminent risk of injury to persons or material damage to property (including the **Demand Side Unit**);

(e) it is not lawful for the **Dispatchable Demand Customer** to ~~reduce its Demand~~ change its **Demand Side Unit MW Response** ~~or~~ or to operate its **Demand Side Unit**.

SDC1.4.3.6 Changes in **Availability**:

(a) Increasing: If a **Generator**, a **Generator Aggregator** or a **Dispatchable Demand Customer** in respect of a **CDGU**, an **Aggregated Generating Unit,** a **Demand Side Unit** or **Pumped Storage Plant** in relation to **Demand**, issues an **Availability Notice** or a **Re-declaration** increasing (from zero or otherwise) the level of **Availability** or **Demand** **Side Unit MW Availability** ~~**Reduction**~~ from a specified time, such notice shall be construed as meaning that:

(i) in the case of a **CDGU** and/or **Aggregated Generating Unit**, the **CDGU** and/or **Aggregated Generating Unit** is capable of being synchronised to the **Transmission System** or **Distribution System** at that specified time or increasing its **MW Output** at that specified time as the case may be;

(ii) in the case of a **CDGU** which is an **Open Cycle Gas Turbine**, the **CDGU** is capable of being started at that specified time; or

(iii) in the case of a **Demand Side Unit**, the **Demand Side Unit** is capable of delivering ~~subsequent Demand Reduction(s)~~ a greater **Demand Side Unit MW Response** at that specified time.

SDC1.4.4.2 **Additional Grid Code Characteristics Notice**

The following items are required to be submitted by each **User**, with the exception of Aggregators, direct to the **TSO**:

(e) In relation to each Demand Side Unit, the **Demand** Side Unit Energy **Profile** and the **Initial Demand** Side Unit MW Response ~~Reduction~~ **Time**

SDC1.4.4.4 Other Relevant Data

(a) By not later than **Gate Closure** each day, each **User** in respect of each of its **Plant**, shall in respect of the following **Trading Day** submit to the **TSO** in writing in the form set out on the **TSO** website or in such other form as the **TSO** may reasonably notify to each **User** from time to time), details in relation to the following **Trading Day** of any newly arisen special factors, including abnormal risk to loss, which in the reasonable opinion of the **User** may have a material effect on the likely **MW Output** or **Demand** Side Unit MW Response ~~Reduction~~ of such **Plant** (including, for a **CCGT Installation** in relation to each of the **CCGT Modules** therein). The notice shall be consistent with the **User's** obligations under SDC1.4.3.2. The provisions of this paragraph also apply to **Interconnector Owners** in relation to their **Interconnector Filters**.

SDC1.4.8.4 Taking account of and applying the factors referred to in SDC1.4.8.3, the **Indicative Operations Schedule** shall be compiled by the **TSO** in conjunction with the **Other TSO** to **Schedule** such **CDGUs, Controllable WFPS, Pumped Storage Plant Demand**, **Demand Side Units**, **Aggregated Generating Units** and/or such **Interconnector** tranches, and equivalent units or tranches of equivalent units in the Republic of the Ireland, which have been declared **Available** in an **Availability Notice** (and the equivalents on the **Other Transmission System**):

(ii) as will in aggregate (after taking into account electricity delivered other than from **CDGUs**, **Controllable WFPSs**, **Aggregated Generating Units**, and/or **Interconnector** tranches and variation in **Demand** from **Pumped Storage Plant Demand** and **Demand Side Units**) be sufficient to match at all times (to the extent possible having regard to the **Availability** or **Demand** Side

Unit MW Availability ~~Reduction~~ of **CDGUs, Controllable WFPSs, Pumped Storage Plant Demand**, **Demand Side Units**, **Aggregated Generating Units** and **Interconnector** tranches) the forecast aggregated **Demand** (derived under OC1 of the **Grid Code** and the **Other Grid Code**) together with such margin of reserve as the **TSO** working in conjunction with the **Other TSO** shall consider to be appropriate; and

SDC1.4.8.5 After the completion of the **Scheduling** process, and the issuing of the **Indicative Operations Schedule**, the **TSO** may consider it necessary to make adjustments to the MW output as determined by the **Scheduling** process. Such adjustments could be made necessary by any of the following factors (and the equivalent factors on the **Other Transmission System** which will be so dealt with separately by the **Other TSO**):

(a) changes to **Availability** or **Demand** Side Unit MW Availability ~~Reduction~~ and/or **Technical Parameters** of **CDGUs** and/or **Controllable WFPS** and/or **Aggregated Generating Units** and/or **Demand Side Units** notified to the **TSO** after the commencement of the **Scheduling** process;

SDC1.4.8.7 (a) The **Synchronising** and **De-Synchronising** times (and, in the case of **Pumped Storage Plant Demand**, the relevant effective time) shown in the **Indicative Operations Schedule** are indicative only and it should be borne in mind by **Users** that the **Dispatch Instructions** could reflect more or different **CDGU**, **Aggregated Generating Unit** and/or **Controllable WFPS, Pumped Storage Plant Demand** and/or **Aggregate Generating Unit** requirements than in the **Indicative Operations Schedule**. The **TSO** may issue **Dispatch Instructions** in respect of any **CDGU** and/or **Aggregated Generating Unit**, **Controllable WFPS, Pumped Storage Plant Demand** or **Aggregated Generating Unit** which has not declared an **Availability** or **Demand** Side Unit MW Availability ~~Reduction~~ of 0 **MW** in an **Availability Notice**. **Users** with **CDGUs** and/or **Aggregated Generating Units**, **Controllable WFPS, Pumped Storage Plant Demand** shall ensure that their units are able to be **Synchronised**, or in the case of **Pumped**

Storage Plant Demand, used at the times **Scheduled**, but only if so **Dispatched** by the **TSO** by issue of a **Dispatch Instruction**. **Users** shall, as part of a revision to the **Technical Parameters**, indicate to the **TSO** the latest time at which a **Dispatch Instruction** is required to meet the scheduled **Synchronising** time or in the case of **Pumped Storage Plant Demand**, the **Scheduled** relevant effective time.

(b) The provisions of SDC1.4.8.7(a) shall apply to **Demand Side Units** with the exception that reference to relevant effective time shall be read as a reference to **Initial Demand** Side Unit Response ~~Reduction~~ **Time**.

SDC1 – APPENDIX A

Part 1. Technical Parameters

Technical Parameter	CDGU				Control WFPS	DSU		Agg. Gen		Pump Storage Demand
	Thermal	Hydr/ En Ltd	Disp. WFPS	Pump S Gen	-	Individual Demand Site	Aggregated Demand Sites			-
Block Load Cold	✓	✓	✓	✓	✓					
Block Load Hot	✓									
Block Load Warm	✓									
Demand Side Unit Energy Profile						✓	✓			
Deload Break Point	✓	✓	✓	✓	✓					
De-Loading Rate 1	✓	✓	✓	✓	✓					
De-Loading Rate 2	✓	✓	✓	✓	✓					
Dwell Time 1	✓	✓	✓	✓	✓					
Dwell Time 2	✓	✓	✓	✓	✓					
Dwell Time 3	✓	✓	✓	✓	✓					
Dwell Time Trigger Point 1	✓	✓	✓	✓	✓					
Dwell Time Trigger Point 2	✓	✓	✓	✓	✓					
Dwell Time Trigger Point 3	✓	✓	✓	✓	✓					
End Point of Start Up Period	✓	✓	✓	✓	✓					
Energy Limit		✓								
Energy Limit Factor		✓								
Energy Limit Start		✓								
Energy Limit Stop		✓								
Forecast Minimum Output Profile				✓						✓
Forecast Minimum Generation Profile	✓	✓	✓	✓		✓	✓			
Initial ~~Demand Reduction~~ Demand Side Unit Response Time						✓	✓			
Load Up Break Point Cold (1)	✓	✓	✓	✓	✓					
Load Up Break Point Cold (2)	✓	✓	✓	✓	✓					
Load Up Break Point Hot (1)	✓									
Load Up Break Point Hot (2)	✓									
Load Up Break Point Warm (1)	✓									
Load Up Break Point	✓									

Technical Parameter	CDGU				Control WFPS	DSU		Agg. Gen		Pump Storage Demand
	Thermal	Hydr/ En Ltd	Disp. WFPS	Pump S Gen	-	Individual Demand Site	Aggregated Demand Sites			-
Warm (2)										
Loading Rate Cold (1)	✓	✓	✓	✓	✓					
Loading Rate Cold (2)	✓	✓	✓	✓	✓					
Loading Rate Cold (3)	✓	✓	✓	✓	✓					
Loading Rate Hot (1)	✓									
Loading Rate Hot (2)	✓									
Loading Rate Hot (3)	✓									
Loading Rate Warm (1)	✓									
Loading Rate Warm (2)	✓									
Loading Rate Warm (3)	✓									
Max Ramp Down Rate (shall be a number greater than zero)						✓	✓			
Max Ramp Up Rate (shall be a number greater than zero)						✓	✓			
Maximum Down Time						✓	✓			
Maximum Generation / Registered Capacity	✓	✓	✓	✓	✓					
Maximum On Time	✓	✓	✓	✓	✓					
Maximum Storage Capacity				✓						
Minimum Down Time						✓	✓			
Minimum Generation	✓	✓	✓	✓	✓					
Minimum off time	✓	✓	✓	✓	✓					
Minimum on time	✓	✓	✓	✓	✓					
Minimum Storage Capacity				✓						✓✓
(Other relevant technical parameters)	✓	✓	✓	✓	✓			✓		
Pumping capacity				✓						✓
Ramp Down Break Point 1	✓	✓	✓	✓	✓			✓		
Ramp Down Break Point 2	✓	✓	✓	✓	✓			✓		
Ramp Down Break Point 3	✓	✓	✓	✓	✓			✓		
Ramp Down Break Point 4	✓	✓	✓	✓	✓			✓		
Ramp Down Rate 1	✓	✓	✓	✓	✓			✓		
Ramp Down Rate 2	✓	✓	✓	✓	✓			✓		
Ramp Down Rate 3		✓	✓	✓	✓			✓		
Ramp Down Rate 4	✓	✓	✓	✓	✓			✓		
Ramp Down Rate 5	✓	✓	✓	✓	✓			✓		
Ramp Up Break Point 1	✓	✓	✓	✓	✓			✓		
Ramp Up Break Point 2	✓	✓	✓	✓	✓			✓		
Ramp Up Break Point 3	✓	✓	✓	✓	✓			✓		

Technical Parameter	CDGU				Control WFPS	DSU		Agg. Gen		Pump Storage Demand
	Thermal	Hydr/ En Ltd	Disp. WFPS	Pump S Gen	-	Individual Demand Site	Aggregated Demand Sites			-
Ramp Up Break Point 4	✓	✓	✓	✓	✓			✓		
Ramp Up Rate 1	✓	✓	✓	✓	✓			✓		
Ramp Up Rate 2	✓	✓	✓	✓	✓			✓		
Ramp Up Rate 3	✓	✓	✓	✓	✓			✓		
Ramp Up Rate 4	✓	✓	✓	✓	✓			✓		
Ramp Up Rate 5	✓	✓	✓	✓	✓			✓		
Short Term Maximisation Capability	✓	✓	✓	✓	✓					
Soak Time Cold (1)	✓	✓	✓	✓	✓					
Soak Time Cold (2)	✓	✓	✓	✓	✓					
Soak Time Hot (1)	✓									
Soak Time Hot (2)	✓									
Soak Time Trigger Point Cold (1)	✓	✓	✓	✓	✓					
Soak Time Trigger Point Cold (2)	✓	✓	✓	✓	✓					
Soak Time Trigger Point Hot (1)	✓									
Soak Time Trigger Point Hot (2)	✓									
Soak Time Trigger Point Warm (1)	✓									
Soak Time Trigger Point Warm (2)	✓									
Soak Time Warm (1)	✓									
Soak Time Warm (2)	✓									
Synchronous Start-Up Time Cold	✓	✓	✓	✓	✓					
Synchronous Start-Up Time Hot	✓	✓	✓	✓	✓					
Synchronous Start-Up Time Warm	✓									
Target Reservoir Level Percentage				✓						✓
Start of Restricted Range 1	✓	✓	✓	✓	✓					
End of Restricted Range 1	✓	✓	✓	✓	✓					
Start of Restricted Range 2	✓	✓	✓	✓	✓					
End of Restricted Range 2	✓	✓	✓	✓	✓					

SDC2.4.2.9 (a) To preserve **System** integrity under emergency circumstances where, for example, **Licence Standards** cannot be met the **TSO** may, however, issue **Dispatch Instructions** to change **CDGU**, **Aggregated Generating Units**, **Demand Side Unit, Interconnector** transfers and/or **Pumped Storage Plant Demand MW Output** or **Demand** Side Unit MW Response ~~**Reduction**~~ even when this is outside parameters so registered or so amended. This may, for example, be an instruction to trip or partially load a **CDGU**. The instruction will be stated by the **TSO** to be one in relation to emergency circumstances under SDC2.4.2.9

SDC2.4.2.13 (a) Subject to the exception set out below in this SDC2.4.2.13, **Generators** will only **Synchronise** or **de-Synchronise CDGUs** to the **Dispatch Instructions** of the **TSO** or unless it occurs automatically as a result of **Special Protection Schemes** or **Low Frequency Relay** operations. Subject to the exception set out below in this SDC2.4.2.13, **Dispatchable Demand Customers** will only reduce or increase their **Demand** Side Unit MW Response ~~**Reduction**~~ to the **Dispatch Instructions** of the **TSO** or unless it occurs automatically as a result of **Special Protection Schemes** or **Low Frequency Relay** operations.

(b) **De-Synchronisation** may otherwise only take place without the **TSO's** prior agreement if it is to avoid, in the **Generator's** reasonable opinion, an imminent risk of injury to persons or material damage to property (including the **CDGU**). **Demand Side Units**, who can not maintain the provision of any **Demand** Side Unit MW Response ~~**Reduction**~~**,** may otherwise only take place without the **TSO's** prior agreement if it is to avoid, in the **Dispatchable Demand Customer's** reasonable opinion, an imminent risk of injury to persons or material damage to property (including the **Demand Side Unit**).

SDC2.A.2.2 The **Dispatch Instruction** given by **Electronic Interface**, telephone, or facsimile transmission will normally follow the form:

(a) where appropriate, the specific **CDGU** or **User's Plant** to which the instruction applies;

(b) the **MW Output** (or **Demand Side Unit MW Response ~~Reduction~~**) to which it is instructed;

SDC2.A.12 **Dispatching a Demand Side Unit** to ~~increase or decrease~~ change **Demand ~~Reduction~~ Side Unit MW Response**

SDC2.A.12.1 If the time of the **Dispatch Instruction** is 1400 hours, the Unit is Unit 1 and the **Demand Side Unit MW Response ~~Reduction~~** to be achieved is 10 **MW**, the relevant part of the instruction would be, for example:

"Time 1400 hours. Unit 1 ~~to 25~~10 **MW**"

SDC2.A.12.2 If the start time is 1415 hours, it would be, for example:

"Time 1400 hours. Unit 1 ~~to 25~~ 10 **MW**, start at 1415 hours"

SDC2.A.13 **Dispatching a Demand Side Unit** to an **Initial Demand Side Unit Response ~~Reduction~~**

SDC2.A.13.1 In this instance, for **Demand Side Units**, the **Dispatch Instruction** issue time will always have due regard for the **Initial Demand Side Unit Response ~~Reduction~~ Time** declared to the **TSO** by the **Dispatchable Demand Customer** as a **Technical Parameter** or as part of **Additional Grid Code Characteristics Notice** data.

The instruction will follow the form, for example:

"Time 1300 hours. Unit 1, **Initial Demand Side Unit Response ~~Reduction~~** at 1600 hours"

In relation to an instruction to the **Initial Demand Side Unit Response ~~Reduction~~**, the start time referred to in SDC2.A.12.1 will be deemed to be the time at which **Initial Demand Side Unit MW Response ~~Reduction~~** is to take place.

SCHEDULE 1

DATA REGISTRATION CODE

GENERATING UNIT AND POWER STATION TECHNICAL DATA

POWER STATION NAME: DATE:

DATA DESCRIPTION	UNITS	DATA CAT.	**GENERATING UNIT** OR **POWER STATION** DATA							
			G1	G2	G3	G4	G5	G6	G7	STN
GENERAL **POWER STATION** DATA										
Point of connection to the **NI System** in terms of geographical and electrical location and **System** voltage	-	**SPD**	-	-	-	-	-	-	-	
Capacity of **Power Station** in **MW** sent out for **R.C., Min. Gen.** (assumed to be zero in the case of **WFPSs** unless a different value is notified by the User) and, where relevant **Max. Gen.**	**MW**	**SPD**	-	-	-	-	-	-	-	
In the case of **Controllable WFPSs** or **Dispatchable WFPSs**, a diagram that shows for the **Controllable WFPS** or **Dispatchable WFPS** wind speed and direction against electrical output in MW, in "rose" format.		**SPD**								
Maximum auxiliary **Demand (Active Power** and **Reactive Power)**	**MW**	**SPD**	-	-	-	-	-	-	-	
	Mvar	**SPD**	-	-	-	-	-	-	-	
Where **Generating Units** form part of a **User's System**, the number of such **Units** together with their total capacity. If required by the **TSO**, details of the **Generating Units** together with their energy output profile.		**SPD**								
Operating regime of **Generating Units** not subject to **Central Dispatch** (e.g. continuous, intermittent, peak lopping).		**SPD**								
		SPD								-
GENERAL **GENERATING UNIT** DATA Prime mover type		**SPD**								
Generating Unit type	MVA	**SPD**								
Generating Unit rating and terminal voltage	KV									-
Generating Unit rated power factor		**SPD**								-

DATA DESCRIPTION	UNITS	DATA CAT.	**GENERATING UNIT** OR **POWER STATION** DATA							
			G1	G2	G3	G4	G5	G6	G7	STN
Registered Capacity sent out	**MW**	**SPD**								-
Max.Gen. and **Min.Gen.** capability sent out	**MW**	**SPD**								-
Reactive Power capability (both leading and lagging) at the lower voltage terminals of the **Generator Transformer** for **Max.Gen.,** normal **Full Load** and normal minimum **Load**.	**Mvar**	**SPD**								-
Maximum Auxiliary **Demand**~~demand~~	**MW** **Mvar**	**SPD**								
Inertia constant	**MW** sec MVA	**SPD**								

ABBREVIATIONS:

SPD =	**Standard Planning Data**	**DPD** =	**Detailed Planning Data**
Min Gen =	**Minimum Generation**	**Max Gen** =	**Maximum Generation**
% on MVA =	& on Rated MVA	**RC** =	**Registered Capacity**
% on 100 =	% on 100 MVA	**OC1,SDC1,**etc=	**Grid Code** for which data is required

DATA DESCRIPTION	UNITS	DATA CAT	**GENERATING UNIT** OR **POWER STATION** DATA							
			G1	G2	G3	G4	G5	G6	G7	STN
Short circuit ratio		**SPD**								-
Direct axis transient reactance	% on MVA	**SPD**								-
Direct axis sub-transient time constant	S	**SPD**								-
Generator Transformer rated MVA, positive sequence reactance and tap change range	MVA % on MVA +%/- %	**SPD**								-
Sustained Load Diagram In relation to the wind turbines comprised within a **WFPS**, such General **Generating Unit** Data equivalent to that listed above as the **TSO** shall reasonably require.	Diagram	**SPD** **SPD**								-
A list of the **CCGT Modules** in the **CCGT Installation** identifying each **CCGT Module**, and the **CCGT Installation** of which it forms part unambiguously, together with other relevant information.	List	**SPD**								
Auxiliary Demand The normal **Generating Unit**-supplied auxiliary **Load** for each **Generating Unit** at rated **MW** output	**MW**	**DPD**								-
The **Power Station** auxiliary **Load**, if any, additional to the **Generating Unit** supplied auxiliary **Load** where the **Power Station** auxiliary **Load** is supplied from the **NI System**	**MW**	**DPD**	-	-	-	-	-	-	-	
Generating Unit parameters Rated terminal voltage	kV	**DPD**								-

Rated MVA	MVA	**DPD**								-
Rated **MW**	**MW**	**DPD**								-
Min.Gen.	**MW**	**DPD**								-
Short circuit ratio		**DPD**								-
Direct axis synchronous reactance	% on MVA	**DPD**								-
Direct axis transient reactance	% on MVA	**DPD**								-
Direct axis sub-transient reactance	% on MVA	**DPD**								-
Direct axis transient time constant	S	**DPD**								-
Direct axis sub-transient time constant	S	**DPD**								-

DATA DESCRIPTION	UNITS	DATA CAT	**GENERATING UNIT** OR **POWER STATION** DATA							
			G1	G2	G3	G4	G5	G6	G7	STN
Quadrature axis synchronous reactance	% on MVA	**DPD**								-
Quadrature axis transient reactance	% on MVA	**DPD**								-
Quadrature axis sub-transient reactance	% on MVA	**DPD**								-
Quadrature axis transient time constant	S	**DPD**								-
Quadrature axis sub-transient time constant	S	**DPD**								-
Stator time constant	S	**DPD**								-
Stator resistance		**DPD**								-
Stator leakage reactance	% on MVA	**DPD**								-
Turbogenerator inertia constant, or, for wind turbines comprised within a **WFPS**, Plant inertia constant	**MW**sec/ MVA	**DPD**								-
Other than for wind turbines comprised within a **WFPS**, rated field current	A	**DPD**								-

Other than for wind turbines comprised within a **WFPS**, field current (amps) open circuit saturation curve for **Generating Unit** terminal voltages ranged from 50% to 120% of rated value in 10% steps as derived from appropriate manufacturers' certificates	A	**DPD**								-
Parameters for **Generating Unit** Step-Up Transformers										
Rated MVA	MVA	**DPD**								-
Voltage ratio		**DPD**								-
Positive sequence reactance (at max., min. & nominal tap)	% on MVA	**DPD**								-
Positive sequence resistance (at max., min. & nominal tap)	% on MVA	**DPD**								-
Zero phase sequence reactance	% on MVA	**DPD**								-
Tap changer range	+%/ -%	**DPD**								-
Tap changer step size	%	**DPD**								-
Tap changer type: on **Load** or off circuit	on/off	**DPD**								-
Power Station Transformer Parameters										
Rated MVA	MVA	**DPD**								-
Voltage ratio		**DPD**								-
Zero sequence reactance as seen from the higher voltage side	% on MVA	**DPD**								-
Excitation control system parameters (not for **WFPSs**)										
DC gain of excitation loop		**DPD**								-
Rated field voltage		**DPD**								-
Maximum field voltage		**DPD**								-

SCHEDULE 2

DATA REGISTRATION CODE

GENERATION PLANNING PARAMETERS, RESPONSE CAPABILITY DATA AND SDC1 DATA

Part 1 of this schedule contains the **CDGU and Controllable WFPS** or **Dispatchable WFPSs Generation Planning Parameters** required by the **TSO** to facilitate studies in **Operational Planning** timescales. It also contains the response capability data for **CDGUs.**

Part 2 of this schedule contains the data required with respect to **CDGUs**, **Pumped Storage Plant Demand, Interconnectors**, **Interconnector Units**, **Demand Side Units**, **Aggregated Generating Units** and/or **Controllable WFPS** to be supplied by **Users** by **Gate Closure** pursuant to SDC1. Many of these parameters are the same as those required in Part 1, but the data supplied under Part 1 will not be used for real time operation.

Power Station: _____

Part 1 - **Generation Planning Parameters**

DATA DESCRIPTION	UNITS	DATA CAT.	**GENERATING UNIT** OR **POWER STATION** DATA							
			G1	G2	G3	G4	G5	G6	G7	STN
Generation Planning Parameters for **CDGUs**										
The minimum notice required to **Synchronise** a **Generating Unit** from **De-synchronisation**	Mins	OC2								-
The minimum time between **Synchronising** different **Generating Units** in a **Power Station**	Mins	OC2								
The minimum block **Load** requirements on **Synchronising**		OC2								
Maximum **Generating Unit Loading** rates from **Synchronising** for the following conditions:-										
hot	**MW/** min	OC2								-
Warm	**MW/** min	OC2								-
cold	**MW/** min	OC2								-
Minimum time off **Load**		OC2								
Maximum **Generating Unit Deloading** rates for the following conditions:-										
Hot	**MW/** min	OC2								-
warm	**MW/** min	OC2								-
cold	**MW/** min	OC2								-

DATA DESCRIPTION	UNITS	DATA CAT.	**GENERATING UNIT** OR **POWER STATION** DATA							
			G1	G2	G3	G4	G5	G6	G7	STN
Maximum allowable starts per year:-										
hot		OC2								-
warm		OC2								-
cold		OC2								
Generation Planning Parameters for **Controllable WFPSs** or **Dispatchable WFPSs**										
The minimum time to connect/reconnect the **Controllable WFPS** or **Dispatchable WFPS** (or part thereof) to the **NI System** following a **Dispatch** instruction		OC2								
The minimum time to connect/reconnect the **Controllable WFPS** or **Dispatchable WFPS** (or part thereof) to the **NI System** automatically following a trip of the **Controllable WFPS** or **Dispatchable WFPS** (or part thereof) that does not cause damage to the **Controllable WFPS** or **Dispatchable WFPS** (or part thereof)		OC2								
The maximum rate at which Load can be increased following connection of the **Controllable WFPS** or **Dispatchable WFPS** (or part thereof) to the **NI System**		OC2								
The minimum fault level or voltage at the **Connection Point** below which the **Controllable WFPS** or **Dispatchable WFPS** cannot be connected		OC2								
Operating Reserve to Frequency change										-
Operating Reserve to **Frequency** change to be given in a tabular form, describing **Primary Operating Reserve, Secondary Operating Reserve, Tertiary Operating Reserve band 1**, **Tertiary Operating Reserve band 2** at different levels of **Load**, ranging from **Minimum Generation** to **Registered Capacity**	Table	OC3								
Governor Droop Characteristics										
Governor Droop	%	OC3								
Unit Control Options										
Maximum Droop	%	OC3								
Normal Droop	%	OC3								
Minimum Droop	%	OC3								

Part 2: **Availability**, **Technical Parameters** Data and other data required under SDC1

The following information is required daily by not later than **Gate Closure** to cover the next following **Trading Day** in relation to each **CDGU**, **Pumped Storage Plant Demand, Interconnector**, **Interconnector Units** (only in relation to paragraph 6 below), **Demand Side Unit**, **Aggregated Generating Unit** and/or **Controllable WFPS**. In so far as the **Availability** data is not so submitted, the data to have been submitted in respect of the last **Trading Period** of the current **Trading Day** will be deemed to have been resubmitted. Any further revisions to this data are required to be notified to the **TSO** when they become known.

1 **Availability**

Each **User** must notify the **TSO** by means of an **Availability Notice** of the **Availability** of each of its **CDGUs** (and in the case of a **CCGT Installation**, the **CCGT Modules** within it), **Pumped Storage Plant Demand, Interconnectors**, **Demand Side Units**, **Aggregated Generating Units** and/or **Controllable WFPS**.

The **Availability Notice** shall state the **Availability** of the relevant **CDGU** for each **Trading Period** in the following **Trading Day** (subject to revision under SDC1.4.5.1 (a)).

In addition, **Users** other than **Aggregators** and **Dispatchable Demand Customers** must submit an **Additional Grid Code Availability Notice** under SDC1.4.2 by no later than **Gate Closure** each day. The information contained in an **Additional Grid Code Availability Notice** broadly relates to a **CDGU**'s different **Availabilities** depending on which fuel a **CDGU** is firing on (for a **CDGU** that is capable of firing on different fuels), the **Availability** of each **CCGT Module** within a **CCGT Installation** and to the various long-term constraints (such as fuel and emissions constraints) which can affect the **Availability** of a **CDGU**.

2. **Technical Parameters**

For each **CDGU**, **Controllable WFPS**, **Dispatchable WFPS**, **Demand Side Unit**, **Aggregated Generating Unit** and **Pumped Storage Plant Demand**, the **Technical Parameters** listed in the table set out in Appendix A to SDC1 and copied below. The factors applicable to a particular **Plant** are indicated with a tick.

Technical Parameter	CDGU				Control WFPS	DSU		Agg. Gen	Pump Storage Demand
	Thermal	Hydr/ En Ltd	Disp. WFPS	Pump S Gen	-	Individual Demand Site	Aggregated Demand Sites		-
Block Load Cold	✓	✓	✓	✓	✓				
Block Load Hot	✓								
Block Load Warm	✓								
Demand Side Unit Energy Profile						✓	✓		
Deload Break Point	✓	✓	✓	✓	✓				
De-Loading Rate 1	✓	✓	✓	✓	✓				
De-Loading Rate 2	✓	✓	✓	✓	✓				
Dwell Time 1	✓	✓	✓	✓	✓				
Dwell Time 2	✓	✓	✓	✓	✓				

Technical Parameter	CDGU				Control WFPS	DSU		Agg. Gen	Pump Storage Demand
	Thermal	Hydr/ En Ltd	Disp. WFPS	Pump S Gen	-	Individual Demand Site	Aggregated Demand Sites		-
Dwell Time 3	✓	✓	✓	✓	✓				
Dwell Time Trigger Point 1	✓	✓	✓	✓	✓				
Dwell Time Trigger Point 2	✓	✓	✓	✓	✓				
Dwell Time Trigger Point 3	✓	✓	✓	✓	✓				
End Point of Start Up Period	✓	✓	✓	✓	✓				
Energy Limit		✓							
Energy Limit Factor		✓							
Energy Limit Start		✓							
Energy Limit Stop		✓							
Forecast Minimum Output Profile				✓					✓
Forecast Minimum Generation Profile	✓	✓	✓	✓		✓	✓		
Initial Demand Side Unit Response ~~Reduction~~ Time						✓	✓		
Load Up Break Point Cold (1)	✓	✓	✓	✓	✓				
Load Up Break Point Cold (2)	✓	✓	✓	✓	✓				
Load Up Break Point Hot (1)	✓								
Load Up Break Point Hot (2)	✓								
Load Up Break Point Warm (1)	✓								
Load Up Break Point Warm (2)	✓								
Loading Rate Cold (1)	✓	✓	✓	✓	✓				

Technical Parameter	CDGU				Control WFPS	DSU		Agg. Gen	Pump Storage Demand
	Thermal	Hydr/ En Ltd	Disp. WFPS	Pump S Gen	-	Individual Demand Site	Aggregated Demand Sites		-
Loading Rate Cold (2)	✓	✓	✓	✓	✓				
Loading Rate Cold (3)	✓	✓	✓	✓	✓				
Loading Rate Hot (1)	✓								
Loading Rate Hot (2)	✓								
Loading Rate Hot (3)	✓								
Loading Rate Warm (1)	✓								
Loading Rate Warm (2)	✓								
Loading Rate Warm (3)	✓								
Max Ramp Down Rate (shall be a number greater than zero)						✓	✓		
Max Ramp Up Rate (shall be a number greater than zero)						✓	✓		
Maximum Down Time						✓	✓		
Maximum Generation / Registered Capacity	✓	✓	✓	✓	✓				
Maximum On Time	✓	✓	✓	✓	✓				
Maximum Storage Capacity				✓					
Minimum Down Time						✓	✓		
Minimum Generation	✓	✓	✓	✓	✓				
Minimum off time	✓	✓	✓	✓	✓				
Minimum on time	✓	✓	✓	✓	✓				
Minimum Storage Capacity				✓					✓✓
(Other relevant technical parameters)	✓	✓	✓	✓	✓			✓	

Technical Parameter	CDGU				Control WFPS	DSU		Agg. Gen	Pump Storage Demand
	Thermal	Hydr/ En Ltd	Disp. WFPS	Pump S Gen	-	Individual Demand Site	Aggregated Demand Sites		-
Pumping capacity				✓					✓
Ramp Down Break Point 1	✓	✓	✓	✓	✓			✓	
Ramp Down Break Point 2	✓	✓	✓	✓	✓			✓	
Ramp Down Break Point 3	✓	✓	✓	✓	✓			✓	
Ramp Down Break Point 4	✓	✓	✓	✓	✓			✓	
Ramp Down Rate 1	✓	✓	✓	✓	✓			✓	
Ramp Down Rate 2	✓	✓	✓	✓	✓			✓	
Ramp Down Rate 3		✓	✓	✓	✓			✓	
Ramp Down Rate 4	✓	✓	✓	✓	✓			✓	
Ramp Down Rate 5	✓	✓	✓	✓	✓			✓	
Ramp Up Break Point 1	✓	✓	✓	✓	✓			✓	
Ramp Up Break Point 2	✓	✓	✓	✓	✓			✓	
Ramp Up Break Point 3	✓	✓	✓	✓	✓			✓	
Ramp Up Break Point 4	✓	✓	✓	✓	✓			✓	
Ramp Up Rate 1	✓	✓	✓	✓	✓			✓	
Ramp Up Rate 2	✓	✓	✓	✓	✓			✓	
Ramp Up Rate 3	✓	✓	✓	✓	✓			✓	
Ramp Up Rate 4	✓	✓	✓	✓	✓			✓	
Ramp Up Rate 5	✓	✓	✓	✓	✓			✓	
Short Term Maximisation Capability	✓	✓	✓	✓	✓				
Soak Time Cold (1)	✓	✓	✓	✓	✓				
Soak Time Cold (2)	✓	✓	✓	✓	✓				
Soak Time Hot (1)	✓								
Soak Time Hot (2)	✓								

Technical Parameter	CDGU				Control WFPS	DSU		Agg. Gen	Pump Storage Demand
	Thermal	Hydr/ En Ltd	Disp. WFPS	Pump S Gen	-	Individual Demand Site	Aggregated Demand Sites		-
Soak Time Trigger Point Cold (1)	✓	✓	✓	✓	✓				
Soak Time Trigger Point Cold (2)	✓	✓	✓	✓	✓				
Soak Time Trigger Point Hot (1)	✓								
Soak Time Trigger Point Hot (2)	✓								
Soak Time Trigger Point Warm (1)	✓								
Soak Time Trigger Point Warm (2)	✓								
Soak Time Warm (1)	✓								
Soak Time Warm (2)	✓								
Synchronous Start-Up Time Cold	✓	✓	✓	✓	✓				
Synchronous Start-Up Time Hot	✓	✓	✓	✓	✓				
Synchronous Start-Up Time Warm	✓								
Target Reservoir Level Percentage				✓					✓
Start of Restricted Range 1	✓	✓	✓	✓	✓				
End of Restricted Range 1	✓	✓	✓	✓	✓				
Start of Restricted Range 2	✓	✓	✓	✓	✓				
End of Restricted Range 2	✓	✓	✓	✓	✓				

Users should also refer to SDC1.4.5.2 for the submission of revised **Technical Parameters** data.

3. **Additional Grid Code Characteristics**

The following data are required to be submitted by each **User**, with the exception of **Aggregators**, direct to the **TSO**:

1. Individual **CCGT Module** data equivalent to the data required for a **CCGT Installation**. It shall also show any revisions to the **Technical Parameters** for each of the **CCGT Modules** within it.

2. In the case of a **CDGU** capable of firing on different fuels, an **Additional Grid Code Characteristics Notice** in respect of any additional fuel for the **CDGU**, each containing the information set out in the **Technical Parameters** for each fuel and each marked clearly to indicate to which fuel it applies.

3. In the case of **Interconnector Owners**, **Interconnector** data, including but not limited to the **Availability** of **Interconnector Filters**.

4. In relation to each **Demand Side Unit**, the **Demand Profile** and the **Initial Demand Reduction Time**.

5. Where there is a **System Support Services Agreement** in place, the **System Support Services** which are **Available**.

6. The parameters listed in the table in Part 2 of Appendix A to SDC 1 and copied below, where relevant to a **User**.

7. In the case of Kilroot **Power Station** and Ballylumford **Power Station**, which configuration referred to in PC.A3.3.12 the **Power Station** is operating at for each **Trading Period**.

The table contained in Part 2 of Appendix A to SDC1 and referred to at paragraph 6 above is copied below:

Variable	**Applies to**
Time from initiation of a start to achieving **Dispatched Load**	**CDGUs** which are **Open Cycle Gas Turbines** or **CCGTs**
Governor Droop	All **CDGUs**, except **Aggregated Generating Units**
Sustained Response Capability	All **CDGUs**, except **Aggregated Generating Units**
Two shifting limitation (limitation on the number of **Start-ups** per **Trading Day**)	All **CDGUs**, except **Aggregated Generating Units**
The **MW** and **Mvar** capability limits within which the **CDGU** is able to operate as shown in the relevant **Generator Performance Chart**	All **CDGUs**, except **Aggregated Generating Units**
Maximum number of on **Load** cycles per 24 hour period, together with the maximum **Load** increases involved	All **CDGUs**, except **Aggregated Generating Units**
^Maximum number of changes to the **Dispatched Fuel** per 24 hour period	All **CDGUs**, except **Aggregated Generating Units**

Variable	Applies to
Maximum quantity of oil in "ready-use tanks" and associated pipework	All **CDGUs**, except **Aggregated Generating Units**
^Maximum number of changes to the **Designated Fuel** per 24 hour period	All **CDGUs**, except **Aggregated Generating Units**
^Minimum notice to change the **Designated Fuel**.	All **CDGUs**, except **Aggregated Generating Units**
Settings of the **Unit Load Controller** for each **CDGU** for which a **Unit Load Controller** is required under CCS1.5.5 of the **SONI Grid Code**	All **CDGUs**, except **Aggregated Generating Units**
Declared Maximisation Capacity	All **CDGUs**, except **Aggregated Generating Units**
Time between **De-Synchronising** different **CDGUs** in a Power Station which, in the case of Coolkeeragh Power Station only, shall be stated for both paired and single **CDGUs**.	All **CDGUs**, except **Aggregated Generating Units**

Users should also refer to SDC1.4.5.2 for the submission of revised **Additional Grid Code Characteristics** data.

4. Reserve capability

Each **Generator** and **Generator Aggregator** shall submit reserve capability data in accordance with SDC1.4.4.3 and, in the case of **PPA Generation**, Appendix B to SDC1.

5. **Other Relevant Data**

For each **Plant** which has been declared **Available** in an **Availability Notice** (and, in the case of a **CCGT Installation**, **CCGT Modules** within):-

(i) any newly arisen special factors which in the reasonable opinion of the **User** may have a material effect on the likely **Output** or **Demand Reduction** of such **Plant** (and, in the case of a **CCGT Installation**, **CCGT Modules** therein) or, in the case of an **Interconnector**, the **Availability** of the **Interconnector Filters**; and

(ii) any temporary changes, and their likely duration, to the Registered Data of such **Plant** (and, in the case of a **CCGT Installation**, **CCGT Modules** therein) (other than those already notified under the foregoing provisions of this Part II of Schedule 2).

6. **Commercial Offer Data**

Each **Generator**, **Pumped Storage Generator** (in respect of **Pumped Storage Plant Demand**), **Interconnector User** (in respect of an **Interconnector Unit**), **Dispatchable Demand Customer** and **Generator Aggregator** shall submit **Commercial Offer Data** to the **TSO** (either directly or by means of an **Intermediary**) by **Gate Closure** for the following **Trading Day** in accordance with the **TSC**. Specific requirements for **Energy Limited Generating Units** and **Pumped Storage Plants** are listed in SDC1.4.4.5.