EirGrid plc

Secondary Fuel Testing

Proposed Grid Code Modifications

15 April 2009

1. Introduction

1.1 On 12 January 2009, the Commission for Energy Regulation published a Decision paper on secondary fuel obligations on licensed generation capacity. The purpose of this paper was to strengthen the obligations on generators with respect to their role in relation to security of electricity supply and to introduce a remuneration mechanism for meeting some of the obligations.

2. General overview of changes

2.1 Following the publication of this decision paper, EirGrid is now in a position to propose changes to the Grid Code in order to put in place the necessary obligations surrounding secondary fuels. The issues addressed in this proposal include data collection, connection conditions relating to capabilities of generators on secondary fuel, if applicable, and provision of signals, definitions and testing.

3. Section by Section Review

3.1 Planning Code

Information that must be supplied in the planning time frame by the Generator is contained in PC.A4. Changes are necessary here for a generator unit to supply information for both primary fuel and secondary fuel and the number of available running hours at registered capacity from on-site fuel storage stocked to its full capacity.

3.2 Connection Conditions

Changes are required in this section so that generators comply with the connection conditions for both primary and secondary fuel.

3.3 Operational Conditions

EirGrid has been directed by the CER to test generators periodically on secondary fuels and the associated capability on-line fuel changeover. The proposed clauses give EirGrid the right to carry out the necessary tests and monitoring.

3.4 Glossary

Two new definitions are required in the glossary table of the Grid Code, namely Fuel Switch Over Output and Secondary Fuel.

Proposed Modifications

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

Planning Conditions

PC.A4.3 Generator Operating Characteristics And Registered Data

Minimum requirements for generator operating conditions are specified in the **Connection Conditions**.

* For thermal plant, provide a functional block diagram of the main plant components, showing boilers, alternators, any heat or steam supplies to other processes etc. indicate whether single shaft or separate shaft.

For each individual unit, on **Primary Fuel** and on **Secondary Fuel**, fill in the following:

- § Unit Number:
- § **Registered Capacity** (MW):
- § Fuel:

	Symbol	Units
* Normal Maximum Continuous Generation Capacity:		MW
* Normal Maximum Continuous Export Capacity		MW
* Power Station auxiliary load		MW
§ Power Station auxiliary load		Mvar
* Maximum (Peaking) Generating Capacity		MW
* Maximum (Peaking) Export Capacity		MW
* Normal Minimum Continuous Generating Capacity		MW
* Normal Minimum Continuous Export Capacity		MW
* Generator Rating:	Mbase	MVA
* Normal Maximum Lagging Power Factor		Mvar
* Normal Maximum Leading Power Factor		Mvar
§ Governor Droop	R	
§ Forbidden zones		MW
§ Terminal Voltage adjustment range		kV
§ Short Circuit Ratio		
§ Rated Stator Current		Amps
* Number of available hours of running at **Registered**		

Capacity from on-site fuel storage stocked to its full capacity

Connection Conditions

A. 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**.

in relation to their connection to the **Transmission System**.

Number of available hours of running at **Registered Capacity** from on-site fuel storage stocked to its full capacity

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 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) Remaining **Secondary Fuel** capability (where applicable) in MWh equivalent when running at **Registered Capacity**.

(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** who represent a **Demand Side Unit** which consists on an **Individual Demand Site**:

(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**.

(o), (p) (q) and (r) are applicable to **Dispatchable Demand Customers** who represent a **Demand Side Unit** which consists on an **Aggregated Demand Site:**

(o) The aggregated MW and +/- Mvar aggregated at alternator terminals of each **Generator** where applicable;

(p) Where requested by the **TSO**, the MW and Mvar of each **Individual Demand Site** at the alternator terminals of each **Generator** where applicable;

(q) The aggregated, measured or derived MW output for each **Generator,** aggregated at the **HV** terminals of the **Grid Connected Transformer** where applicable: and

(r) The aggregated **Demand Reduction** aggregated at the **HV** terminals of the **Grid Connected Transformer**.

Operating Conditions

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)** and **Demand Side Units** comply with **Dispatch Instructions**;

(b) whether **Generators**, **Dispatchable Demand Customers** and **Generator 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]; ~~and~~

(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;** and

(e) whether **Generators** have the ability to generate on **Secondary Fuel** (where applicable) and have the ability to carry out on on-line fuel changeover.

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

OC10.4.4.1 compliance with **Dispatch Instructions**;

OC10.4.4.2 compliance with **Declarations** including, without limitation, in respect of:

(a) **Primary**, **Secondary** and **Tertiary Operating Reserve** provided by each of a **Generator's Generation Units,** following a low **Frequency Event** on the **Transmission System**;

(b) **Frequency Regulation** provided by each **Generation Unit** (to confirm that it is consistent with the **Declared Governor Droop**); and

(c) Tertiary Operating Reserve 2 and Replacement Reserve provided by each of a Generator's Generation Units.

OC10.4.4.3 Compliance with **IEC Power Quality** standards; ~~and~~

OC10.4.4.4 Provision of static and dynamic **Reactive Power**; and

OC10.4.4.5 Monitoring of **Primary Fuel** and **Secondary Fuel** capability, on-line changeover capability and fuel storage levels.

OC10.5.5 The **TSO** may, from time to time, carry out **Tests** in order to determine that a **User** is complying with its **Connection Conditions**, **Registered Operating Characteristics** and **Declarations**. The **TSO** may:

(a) from time to time and for the purposes of **Testing**, issue a **Dispatch Instruction**;

(b) induce controlled **Power System Frequency** or **Voltage** conditions or variations for the purpose of determining that the **Generation Unit's** response is in accordance with its **Declared Availability**, **Ancillary Service** capabilities and **Operating Characteristics**; ~~and~~

(c) having given three **Business Days** notice, or less where agreed, (identifying the **Ancillary Service** and/or **Operating Characteristic** to be tested), send a representative to the **Generator's Site** to verify by **Testing** in accordance with the **Test** procedures specified in OC10.5.8, that the **Generator** is in compliance with its **Declared** values; and

(d) request Start-Up on Secondary Fuel, or on-line changeover from Primary Fuel to Secondary Fuel or from Secondary Fuel to Primary Fuel, where applicable.

Glossary

Two new definitions are required in the glossary table of the Grid Code.

II. FUEL SWITCH OVER OUTPUT	III. THE **MW** OUTPUT, NOT LOWER THAN **MINIMUM LOAD** AT WHICH A **GENERATION UNIT** CAN ACHIEVE A SWITCH OVER FROM **PRIMARY FUEL** TO **SECONDARY FUEL** OR FROM **SECONDARY FUEL** TO **PRIMARY FUEL**.
IV. SECONDARY FUEL	V. THE FUEL OR FUELS REGISTERED IN ACCORDANCE WITH THE **GRID CODE** AS THE SECONDARY OR BACK-UP FUEL(S) AUTHORISED FOR **ENERGY** PRODUCTION BY THE **GENERATION UNIT.**