

1 **THE DISTRIBUTION CODE**
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3 **OF LICENSED DISTRIBUTION**
4 **NETWORK OPERATORS**
5 **OF GREAT BRITAIN**
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8 **Issue ~~[29-xx]~~ – 01 ~~Feb-May~~ 2018**
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The following items do not form part of the approved Distribution Code and are for information only:

- Guidance Notes 1 to 3
- The Introduction to the Distribution Code, ie DIN1 to DIN 7

GUIDANCE NOTE 1

(Dated 01.04.1993 England and Wales Distribution Code

Adopted for the Distribution Code of Great Britain)

ENGINEERING RECOMMENDATION P2/6

The **Distribution Code Review Panel** has reviewed Engineering Recommendation P2/6 and for **Customers** falling within the remit of the **Distribution Code** has agreed that:-

The main section of this document deals with the establishment of recommendations for the security of electricity transmission and distribution systems of network operators. It does not apply to the supply connection of a **Customer**.

Each **Customer** supply connection needs to be considered on its own merits by discussion between the **Customer** and the network operator. The costs of providing a **Customer** supply connection by the network operator will be partly dependent upon the nature of the network operator's electrical system and the location of the **Customer's** premises. It will be for the **Customer** to decide, in negotiations with the network operator, the level of security required for the electricity supply to be provided to the **Customer's** premises. In general, the greater the level of security of supply required by the **Customer**, the greater the capital investment required by the network operator, as a consequence this will require the **Customer** to meet a higher level of supply connection charge.

GUIDANCE NOTE 2/54

First issued 03 March 2011 – updated 06 October 2011

Second Issue 29 March 2012

Third Issue December 2012.

Fourth Issue September 2013

Fifth Issue [May 2018]

ENGINEERING RECOMMENDATIONS G83 AND G59

This guidance note was originally issued on 03 March 2011 and its main provision was to allow the use small scale generation of capacity greater than 16A per phase, provided it had been type tested to the requirements of G83/1-1 but with a modified over frequency protection setting.

The guidance note only applies to small scale generation first connected before 17 May 2019. When the requirements of the EU Network Code “Requirements for all generators” comes into effect on 17 May 2019 it will be necessary for all small scale generation connected on or after that date to comply with the requirements of EREC G98 or EREC G99 as appropriate.

~~It has been updated on~~ Previous updates to this note changed the applicable dates ~~above~~ to allow a period of grace following the introduction of revised versions of G59 and G83 in which manufacturers can adapt their equipment to the changed requirements of these documents.

~~Now that For~~ G83/2 and G59/3 ~~have been published~~ the Distribution Code Review Panel wishes to see the following continuing interpretation:

- For all small scale embedded ~~generation set~~ **Power Generating Modules** of up to and including 16A per phase (provided that the aggregate capacity of installed generation is less than or equal to 16A per phase), until 1 March 2014 it is permissible to connect to the general requirements of previous versions of G83 provided this is through an inverter or controller with a protection/control system that has either been fully type tested in accordance with G83/1-1, G83/2 or in accordance with G59/2. After 1 March 2014 it will only be allowable to connect small scale embedded generation of up to and including 16A per phase that complies with G83/2 (or with G59/3-1 for small scale embedded ~~generation set~~ **Power Generating Modules** non-compliant with G83/2). Note that from 17 May 2019 it will only be possible to connect in accordance with EREC G98 (or EREC G99 for small scale embedded **Power Generating Modules** not compliant with EREC G98).
- Connection of small scale embedded generation of above 16A per phase (including the connection of small scale embedded generation of less than 16A per phase where the aggregate capacity of installed generation is greater than 16A per phase) made before 1 December 2014 can be in accordance with either G59/2-1 or G59/3-2. Such connections made after 1 December 2014 must be made in accordance with G59/3-2. Note that from 17 May 2019 it will only be possible to connect in accordance with EREC G99.

GUIDANCE NOTE 3

First issued 1 December 2012

Second Issue 1 May 2018

ENGINEERING RECOMMENDATIONS G83

The Panel is aware that small scale generation using the Stirling engine as a prime mover has been designed using resonance to operate within $\pm 1\%$ of the nominal frequency of 50Hz. Accordingly it is not technically possible for generation using this technology currently to remain connected down to 47.0 Hz as required by G83/2.

Recognizing the limitations of the current technology, and noting that currently the adoption of this technology is niche and far from mass market, the Panel believes that those G83/2 tests relating to behaviour at frequencies out side of the $\pm 1\%$ range should be waived or modified, thus allowing this technology to continue its niche use.

In the longer term the Panel expects that either the requirements of the EU Network Code “Requirements for all Generators” when enacted in UK law will require Stirling engine designs to be modified to comply, or to seek a specific derogation. Similarly if the growth of this technology showed a risk of being material, then again full compliance with G83 would be required. The Panel believes that a sensible threshold of materiality, considering the technical and commercial effects of the technology, to be 50MW.

~~This note applied from 1 December 2012 and applied in force until 31 December 2016.~~

This DCRP ~~derogation~~ Guidance Note has now ~~expired~~ been extended and it is now expected that the “Stirling Engine” as an emerging technology must ~~now~~ comply from 18 May 2019 with the requirements laid down in Articles 66-70 of the EU Network Code Requirements for all Generators. See EREC G98 and EREC G99 for details.

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DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

DGD 1. EXPRESSIONS

195 In this **Distribution Code** the following words and expressions shall, unless the
196 subject matter or context otherwise requires or is inconsistent therewith, bear the
197 listed meanings:-

Act	The Electricity Act 1989 (as amended by the Utilities Act 2000 and the Energy Act 2004).
Active Power	The product of voltage and the in-phase component of alternating current measured in units of watts, normally measured in kilowatts (kW) or megawatts (MW).
Annex 1 Standard	A electricity industry national standard that implements Distribution Code requirements and which is listed in Annex 1 of the Distribution Code , and forms part of the Distribution Code .
Annex 2 Standard	A electricity industry national standard that has a material effect on Users but does not implement any Distribution Code requirements and does not form part of the Distribution Code technical requirements.
Annual Average Cold Spell (ACS) Conditions	A particular combination of weather elements that give rise to a level of Peak Demand within a financial year which has a 50% chance of being exceeded as a result of weather variation alone.
Apparatus	All Equipment in which electrical conductors are used, supported or of which they may form a part.
Authorised Electricity Operator or AEO	Any person (other than the DNO in its capacity as an operator of a Distribution System) who is authorised to generate, participate in the transmission of, distribute or supply electricity.
Authority	The Gas and Electricity Markets Authority established under Section 1 of the Utilities Act 2000.
Average Conditions	That combination of weather elements within a period of time which is the average of the observed values of these weather elements during equivalent periods over many years (Sometimes referred to as normal weather).
Balancing and Settlement Code (BSC)	The code of that title as from time to time amended.
Balancing Mechanism	Has the meaning set out in NGC's Transmission Licence .

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

BM Unit	Has the meaning set out in the BSC , except that for the purposes of the Distribution Code the reference to “Party” in the BSC shall be a reference to a User .
BM Participant	A person who is responsible for and controls one or more BM Units or where a CUSC Bilateral Agreement specifies that a User is required to be treated as a BM Participant for the purpose of the Grid Code . For the avoidance of doubt, it does not imply that they must be active in the Balancing Mechanism .
Black Start	The procedure necessary for a recovery from a Total Shutdown or Partial Shutdown .
Black Start Station	A Power Station which is registered pursuant to a CUSC Bilateral Agreement with NGC, as having a Black Start Capability.
CENELEC	European Committee for Electrotechnical Standardisation.
Citizens Advice (CA)	National Association of Citizens Advice Bureaux
Citizens Advice Scotland (CAS)	Scottish Association of Citizens Advice Bureaux
Civil Emergency Direction	Directions given by the Secretary of State to AEOs for the purpose of mitigating the effects of any natural disaster or other emergency which, in the opinion of the Secretary of State , is or may be likely to disrupt electricity supplies.
Committed Project Planning Data	Data relating to a User Development once the offer for a Connection Agreement is accepted.
Connection Agreement	An agreement between the DNO and the User or any Customer setting out the terms relating to a connection with the DNO’s Distribution System (excluding any CUSC Bilateral Agreement).
Connection Point	An Entry Point or an Exit Point of the Distribution System as the case may be.
Control Centre	A location used for the purpose of control and operation of all, or of part of a Distribution System , National Electricity Transmission System or the System of a User .
Control Person	A person who has been nominated by an appropriate officer of the DNO, Transmission Licensee or a User to be responsible for controlling and co-ordinating safety activities necessary to achieve Safety From The System .
Control Phase	The period 0-24 hours inclusive ahead of real time operation. The Control Phase follows on from the Programming Phase and covers the period down to real time.
CUSC	Has the meaning set out in NGC’s Transmission Licence

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

CUSC Bilateral Agreement	An agreement pursuant to the CUSC Framework Agreement made between NGC and a User of the National Electricity Transmission System
CUSC Disputes Resolution Procedure	The procedure described in CUSC relating to disputes resolution.
CUSC Framework Agreement	Has the meaning set out in NGC's Transmission Licence .
Customer	Any person supplied or entitled to be supplied with electricity at any premises within Great Britain but shall not include any Authorised Electricity Operator in its capacity as such.
Customer With Own Generation or CWOOG	A Customer with one or more Power Generating Modules connected to the Customer's System , providing all or part of the Customer's electricity requirements, and which may use the DNO's Distribution System for the transport of any surplus of electricity being exported.
DC Converter	Any Apparatus used to convert alternating current electricity to direct current electricity, or vice versa. A DC Converter is a standalone operative configuration at a single site comprising one or more converter bridges, together with one or more converter transformers, converter control equipment, essential protective and switching devices and auxiliaries, if any, used for conversion. In a bipolar arrangement, a DC Converter represents the bipolar configuration.
DNO's Distribution System	The System consisting (wholly or mainly) of electric lines owned or operated by the DNO and used for the distribution of electricity between the Grid Supply Points or Power Generating Modules or other Entry Points to the points of delivery to Customers or Authorised Electricity Operators , or any Transmission Licensee within Great Britain and Offshore in its capacity as operator of the licensee's Transmission System or the National Electricity Transmission System and includes any Remote Transmission Assets (owned by a Transmission Licensee within Great Britain), operated by the DNO and any electrical plant and meters and metering equipment owned or operated by the DNO in connection with the distribution of electricity, but shall not include any part of the National Electricity Transmission System
Decimal Week	The week numbering system where week 1 commences in the first week of January on a date as advised by the DNO .
Demand	The demand of MW or MVA _r of electricity (ie both Active Power and Reactive Power respectively) unless otherwise stated.

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

Demand Control	Any or all of the following methods of achieving a Demand reduction: (a) Customer voltage reduction initiated by the DNO (other than following an instruction from NGC); (b) Customer Demand reduction by disconnection initiated by the DNO (other than following an instruction from NGC); (c) Demand reduction instructed by NGC ; (d) automatic low frequency Demand disconnection; (e) emergency manual Demand disconnection
Demand Control Notification Level	The level above which the DNO has to notify NGC of its proposed or achieved use of Demand Control which is 12 MW in England and Wales and 5 MW in Scotland.
Detailed Planning Data (DPD)	Detailed additional data which the DNO requires under the Distribution Planning and Connection Code in support of Standard Planning Data .
Distribution Business	The authorised business of the DNO or any affiliate or related undertaking of the DNO (whether the business is undertaken by the DNO or another licence holder), comprising: (a) the distribution of electricity through the DNO's Distribution System , including any business in providing connections to such System ; and (b) the provision of Distributor Metering and Data Services as defined in the Distribution Licence .
Distribution Code	A code required to be prepared by a DNO pursuant to condition 9 (Distribution Code) of a Distribution Licence and approved by the Authority as revised from time to time with the approval of, or by the direction of, the Authority .
Distribution Code Review Panel or Panel	The standing body established under the Distribution General Conditions .
Distribution Data Registration Code	That portion of the Distribution Code which is identified as the Distribution Data Registration Code .
Distribution General Conditions or DGC	That portion of the Distribution Code which is identified as the Distribution General Conditions .
Distribution Glossary and Definitions	That portion of the Distribution Code which is identified as the Distribution Glossary and Definitions .
Distribution Introduction (DIN)	That portion of the Distribution Code which is identified as the Distribution Introduction .
Distribution Licence	A distribution licence granted under Section 6(1)(c) of the Act .
Distribution Network Operator (DNO)	The person or legal entity named in Part 1 of the Distribution Licence and any permitted legal assigns or successors in title of the named party.

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

Distribution Operating Code (DOC)	That portion of the Distribution Code which is identified as the Distribution Operating Code .
Distribution Planning and Connection Code (DPC)	That portion of the Distribution Code which is identified as the Distribution Planning and Connection Code .
Distribution System	The electrical network operated by an Other Authorised Distributor .
Distribution Use of System Agreement	The standard form of agreement of that name, as amended from time to time.
Earthing Device	A means of providing a connection between an Isolated conductor and earth.
Electricity Safety, Quality and Continuity Regulations (ESQCR)	The statutory instrument entitled The Electricity Safety, Quality and Continuity Regulations 2002 as amended from time to time and including any further statutory instruments issued under the Act in relation to the distribution of electricity.
Embedded	Having a direct electrical connection to a Distribution System .
Embedded Generator	<p>A Generator including a Customer With Own Generation whose Power Generating Modules are directly connected to the DNO's Distribution System or to an Other Authorised Distributor connected to the DNO's Distribution System.</p> <p>The definition of Embedded Generator also includes the OTSO in relation to any Embedded Transmission System</p>
Embedded Transmission Licensee	Offshore Transmission Licensee for an Embedded Transmission System
Embedded Transmission System	An Offshore Transmission System directly connected to the DNO's Distribution System or to an Other Authorised Distributor connected to the DNO's Distribution System .
Entry Point	The point at which an Embedded Generator or other Users connect to the DNO's Distribution System where power flows into the DNO's Distribution System under normal circumstances.
Equipment	Plant and/or Apparatus .
Electricity Supply Industry (ESI)	Electricity Supply Industry.

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

Event	An unscheduled or unplanned (although it may be anticipated) occurrence on or relating to a System including, without limiting that general description, faults, incidents and breakdowns and adverse weather conditions being experienced. It includes an occurrence where the compliance of Customer's Equipment with this Distribution Code or where relevant the Grid Code is or might be compromised.
Existing Offshore Generators	A Generator with a Power Station located in offshore waters that has an agreement for connection to the DNO's Distribution System via lines of 132kV or above that are wholly or partly in offshore waters.
Exit Point	The point of supply from the DNO's Distribution System to a User where power flows out from the DNO's Distribution System under normal circumstances.
External Interconnection	A connection to a party outside the Total System .
Fault Level	Prospective current that would flow into a short circuit at a stated point in the System and which may be expressed in kA or, if referred to a particular voltage, in MVA.
Feasibility Project Planning Data	Data relating to a proposed User Development until such time that the User applies for a Connection Agreement .
Frequency	The number of alternating current cycles per second (expressed in Hertz) at which a System is running.
Fuel Security Code	The document of that title designated as such by the Secretary of State , as from time to time amended.
Generating Plant	A Power Station including any Generation Set therein.
Generating Plant Output	That portion of the output of Generating Plant which is contributing to meeting Demand.
Generation Set	Any Apparatus which produces electricity.
Generator	<p>A person who generates electricity under licence or exemption under the Act.</p> <p>A person who has connected a Generation SetPower Generating Module(s) in accordance with Item 13-12 DGD Engineering Recommendation G83/2 ("Recommendations For The Connection of Type Tested Small-Scale Embedded Generators (Up To 16 A Per Phase) in Parallel With Public Low-Voltage Distribution Networks") <u>or with Item 13 Engineering Recommendation G98 (Requirements for the connection of type-tested micro generators (up to and including 16 A per phase) in parallel with public low voltage distribution networks on or after 17 May 2019)</u> and where this is (are) their only <u>Power Generating Module</u>Generation Set(s), is not classed as a Generator for the purpose of this Distribution Code.</p>

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

Great Britain or GB	“The landmass of England & Wales and Scotland, including internal waters”.
Grid Code	The code which NGC is required to prepare under its Transmission Licence and have approved by the Authority as from time to time revised with the approval of, or by the direction of, the Authority .
Grid Supply Point	Any point at which electricity is delivered from the National Electricity Transmission System to the DNO’s Distribution System .
High Voltage (HV)	A voltage exceeding 1000 Volts.
High Voltage Customer	A Customer connected to a part of the Distribution System which is operating at HV .
Implementing Control Person	Pursuant to DOC8, the person implementing Safety Precautions at an Operational Boundary.
Individual DNO Standard	A standard adopted by an individual DNO and which is published as such by an individual DNO and that has a material effect on Users .
IEC	International Electrotechnical Commission.
Independent Distribution Network Operator	A DNO that does not have a Distribution Services Obligation Area in its Distribution Licence and is not an ex Public Electricity Supplier
Industry Codes Technical Group (ITCG)	A a standing body comprised of representatives of all the DNOs to carry out the functions referred to in its own Constitution and Rules
Isolated	Disconnected from associated Plant and Apparatus by an Isolating Device(s) in the isolating position or by adequate physical separation or sufficient gap.
Isolating Device	A device for rendering Plant and Apparatus Isolated .
Joint System Incident	Is an Event occurring on the System or installation, which, in the opinion of the DNO , has or may have a serious and/or widespread effect on the System or installation of another.

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

Large Power Station	<p>As defined in the <u>Grid Code</u>, A <u>Power Station</u> which is connected to a <u>System</u> notionally connected to a <u>Grid Supply Point</u> in;</p> <ul style="list-style-type: none"> a. <u>NGC's</u> Transmission Area with a <u>Registered Capacity</u> of 100 MW or more; b. <u>SP</u> Transmission Limited's Transmission Area with a <u>Registered Capacity</u> of 30MW or more; c. <u>Scottish Hydro Electric Transmission Limited's</u> Transmission Area with a <u>Registered Capacity</u> of 10MW or more.
Limited Frequency Sensitive Mode	A mode whereby the operation of a <u>Generation Set</u> is <u>Frequency</u> insensitive except when the <u>System Frequency</u> exceeds 50.4Hz, from which point <u>Limited High Frequency Response</u> must be provided.
Limited High Frequency Response	A response of a <u>Generation Set</u> to an increase in <u>System Frequency</u> above 50.4Hz leading to a reduction in <u>Active Power</u> in accordance with the provisions of <u>Grid Code</u> BC3.7.2.
Load Managed Area	Has the meaning given to that term in the Distribution Use of System Agreement .
Low Voltage or LV	In relation to alternating current, a voltage exceeding 50 volts but not exceeding 1 000 volts.
Maximum Generation	The additional output obtainable from <u>a Power Generating Module</u> <u>Generating Plant</u> in excess of Registered Capacity .
Medium Power Station	<p>A Power Station which is connected to a System notionally connected to a Grid Supply Point in NGC's Transmission Area with a Registered Capacity of 50 MW or more but less than 100 MW.</p> <p>For the avoidance of doubt an installation comprising one or more DC Converters with an aggregate capacity of between 50 and 100MW will be classed as a Medium Power Station for the purposes of this Distribution Code.</p>
Meter Operation Code of Practice Agreement	The agreement of that name, as amended from time to time.
Meter Operator	A person, registered with the Registration Authority , appointed by either a Supplier or Customer to provide electricity meter operation services. (This Distribution Code does not place any direct obligation on Meter Operators other than through the appointment by either a Supplier or a Customer .)
Minimum Generation	The minimum output which a <u>Power Generating Module</u> can reasonably generate as registered under the Distribution Data Registration Code ,

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

National Electricity Transmission System	The Onshore Transmission System and Offshore Transmission System .
National Electricity Transmission System Demand	The amount of electricity supplied from the Grid Supply Points plus:- (a) that supplied by Embedded Large Power Stations, and (b) that supplied by Embedded Transmission System, and (c) exports from the National Electricity Transmission System across External Interconnections, and National Electricity Transmission System losses, and, for the purposes of this definition, includes the Demand taken by Station Transformers and Pumped Storage Units. <u>As defined in the Grid Code.</u>
NGC	National Grid Electricity Transmission plc.
Normal Operating Frequency	The number of Alternating Current cycles per second, expressed in Hertz at which the System normally operates, ie 50 Hertz.
Offshore	Means in Offshore Waters, as defined in Section 90(9) of the Energy Act 2004.
Offshore Transmission Implementation Plan	As defined in the Transmission Licence Transmission Licence
Offshore Transmission System Operator (OTSO)	The NGC acting as operator of an Offshore Transmission System .
Offshore Transmission Licensee	The holder of a licence granted under Section 6 (1)(b) of the Act excluding NGC, SPT and SHETL.
Offshore Transmission System	Has the meaning set out in the Grid Code.
Onshore Transmission Licensees	NGC, SHETL and SPT
Onshore Transmission System	Has the meaning set out in the Grid Code.
Operation	A scheduled or planned action relating to the operation of the System.
Operation Diagrams	Diagrams which are a schematic representation of the HV Apparatus and the connections to all external circuits at a Connection Point, incorporating its numbering, nomenclature and labelling.
Operational Boundary	The boundary between the Apparatus operated by the DNO or a User and the Apparatus operated by Other Authorised Distributor(s) or other User(s), as specified in the relevant Site Responsibility Schedule.

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

Operational Data (OD)	Information to be supplied pursuant to the Distribution Operating Codes and as set out in the Schedules to the DDRC .
Operational Day	The period from 0500 hours on one day to 0500 on the following day.
Operational Effect	Any effect on the Operation of the relevant other System which causes the National Electricity Transmission System or DNO's Distribution System or the System of the other User or Users , as the case may be, to operate (or be at a materially increased risk of operating) differently from the way in which they would or may have operated in the absence of such an effect.
Operational Planning	The procedure set out in Distribution Operating Code DOC2 comprising, through various timescales, the co-ordination of planned outages of Users' Plant and Apparatus .
Operational Planning Phase	The period from 8 weeks to 3 years inclusive ahead of real time operation.
Other Authorised Distributor	A User authorised by Licence or exemption to distribute electricity and having a User Distribution System connected to the DNO's Distribution System .
Output Usable or OU	That portion of Registered Capacity which is not unavailable due to a Planned Outage or breakdown.
Ownership Boundary	The electrical boundary between the Equipment owned by one DNO or User and the Equipment owned by another User .
Partial Shutdown	The same as a Total Shutdown except that all generation has ceased in a separated part of the Total System and there is no electricity supply from External Interconnections or other parts of Total System to that part of the Total System and, therefore, that part of the Total System is shutdown with the result that it is not possible for that part of the Total System to begin to function again without NGC's directions relating to a Black Start .
Peak Demand	The highest level of Demand recorded/forecast for a 12-month period, as specified in the relevant sections of the Distribution Code .
Phase (Voltage) Unbalance	The ratio (in percent) between the rms values of the negative sequence component and the positive sequence component of the voltage.
Planned Outage	An outage of <u>a Power Generating Module, its constituent units (eg generating transformer) or parts, or a relevant part of a User's System</u> Generating Plant or of part of the National Electricity Transmission System or of part of a Distribution System .
Plant	Fixed and movable items used in the generation and/or supply and/or transmission of electricity other than Apparatus .

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

Power Factor	The ratio of Active Power to apparent power (apparent power being the product of voltage and alternating current measured in volt-amperes and standard multiples thereof, ie VA, kVA, MVA).
<u>Power Generating Module</u>	<u>Any Apparatus which produces electricity</u>
Power Island	<u>Power Generating Modules</u> Generation Sets at an isolated Power Station , together with complementary local Demand . In Scotland a Power Island may include more than one Power Station .
Power Station	An installation comprising one or more Generation Sets (even where sited separately) and/or controlled by the same Generator and which may reasonably be considered as being managed as one Power Station. <u>A Power Generating Facility</u>
<u>Power Generating Facility</u>	<u>An installation comprising one or more Power Generating Modules (even where sited separately) and/or controlled by the same Generator and which may reasonably be considered as being managed as one Power Generating Facility</u>
Preliminary Project Planning Data	Data relating to a proposed User Development at the time the User applies for a Connection Agreement but before an offer is made.
Programming Phase	The period between the Operational Planning Phase and the Control Phase . It starts at the 8 weeks ahead stage and finishes at 17:00 on the day ahead of real time
Protection	The provisions for detecting abnormal conditions in a System and initiating fault clearance or actuating signals or indications.
Qualifying Standard	Electrical standards in use by DNOs and included in the Distribution Code Review Panel's governance procedures, and falling into one of the categories below: <ul style="list-style-type: none"> i. Annex 1 Standard ii. Annex 2 Standard iii. Individual DNO Standard
Reactive Power	The product of voltage and current and the sine of the phase angle between them which is normally measured in kilovar (kVAr) or megavar (MVar).
Registered Capacity	The normal full load capacity of a <u>Power Generating Module</u> as declared by the Generator less the MW consumed when producing the same; ie for all Generators , including Customer With Own Generation , this will relate to the maximum level of Active Power deliverable –to the DNO's Distribution System . For <u>Power Generating Modules</u> connected to the DNO's Distribution System via an inverter, the inverter rating is deemed to be the <u>Power Generating Module's</u> rating.

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

Registered Data	Data referred to in the schedules to the Distribution Data Registration Code .
Remote Transmission Assets.	Any Plant and Apparatus or meters owned by NGC which: <ol style="list-style-type: none"> are Embedded in the DNO's Distribution System and which are not directly connected by Plant and/or Apparatus owned by NGC to a sub-station owned by NGC; and are by agreement between NGC and the DNO operated under the direction and control of the DNO.
Requesting Control Person	Pursuant to DOC8, the person requesting Safety Precautions at an Operational Boundary .
Safety From The System	That condition which safeguards persons working on or testing Apparatus from the dangers which are inherent in working on items of Apparatus which are used separately or in combination in any process associated with the generation, transmission or distribution of electricity.
Safety Management System	The procedure adopted by the DNO or a User to ensure the safe Operation of the System and the safety of personnel required to work on that System .
Safety Precautions	The procedures specified within a Safety Management System .
Safety Rules	The rules or procedure of the DNO or a User to ensure Safety From The System .
Scheduling	The procedure for determining intended usage of <u>Power Generating Modules</u> Generating Plant .
Secretary of State	Has the same meaning as in the Act .
SHETL	Scottish Hydro-Electric Transmission Limited
Significant Incident	An Event on the Transmission System or DNO's Distribution System or in a User's System which has or may have a significant effect on the System of others.
Site Responsibility Schedule	A schedule defining the ownership, operation and maintenance responsibility of Plant and Apparatus at a Connection Point of the DNO .

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

Small Power Station	<p>As defined in the Grid Code. A Power Station which is connected to a System notionally connected to a Grid Supply Point in:</p> <p>a. NGC's Transmission Area with a Registered Capacity of less than 50MW;</p> <p>b. SP Transmission Limited's Transmission Area with a Registered Capacity of less than 30MW;</p> <p>Scottish Hydro Electric Transmission Limited's Transmission Area with a Registered Capacity of less than 10 MW.</p>
SPT	Scottish Power Transmission Limited
Standard Planning Data (SPD)	General information required by the DNO under the Distribution Planning Code .
Standby	The supply of electricity by a Supplier to a Customer on a periodic or intermittent basis to make good any shortfall between the Customer's total supply requirements and that met by his own generation.
Superimposed Signals	Those electrical signals present on a Distribution System for the purposes of information transfer.
Supplier	<p>(a) A person supplying electricity under an Electricity Supply Licence; or</p> <p>(b) A person supplying electricity under exemption under the Act; in each case acting in its capacity as a supplier of electricity to Customers in Great Britain .</p>
Supply Agreement	An agreement for the supply of electricity made between a Supplier and a consumer of electricity.
System	An electrical network running at various voltages.
System Control	The administrative and other arrangements established to maintain as far as possible the proper safety and security of the System .
System Incident Centre	A centre set up by the DNO pursuant to the declaration of a Joint System Incident , under DOC 9, to assume control of the incident.
System Stability	The ability of the System for a given initial operating condition to regain a state of operating equilibrium after being subjected to a given disturbance, with most -System variables being within acceptable limits so that practically the whole System remains intact.
System Test	That test or tests which involve simulating conditions or the controlled application of irregular, unusual or extreme conditions on the Total System or any part of it, but not including routine testing, commissioning or recommissioning tests.

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

Test Coordinator	A suitably qualified person appointed to coordinate System Test pursuant to DOC12.
Test Panel	A panel, the composition of which is detailed in DOC12, and which will be responsible for formulating System Test proposals and submitting a test programme.
Top - Up	The supply of electricity by any Supplier to the Customer on a continuing or regular basis to make good any shortfall between the Customer's total supply requirements and that met from other sources.
Total Shutdown	The situation existing when all generation has ceased and there is no electricity supply from External Interconnections and therefore the Total System has shutdown with the result that it is not possible for the Total System to begin to function again without NGC's directions relating to a Black Start .
Total System	The National Electricity Transmission System and all Systems of Users of this National Electricity Transmission System in Great Britain and Offshore .
Transmission Licence	The licence granted under Section 6(1)(b) of the Act .
Transmission Licensee	Any Onshore Transmission Licensee or Offshore Transmission Licensee .
Transmission System	Has the same meaning as the term "licensee's transmission system" in the Transmission Licence of a Transmission Licensee .
Unmetered Supply	A supply of electricity to premises which is not, for the purposes of calculating charges for electricity supplied to the Customer at such premises, measured by metering equipment.
User	A term used in various sections of the Distribution Code to refer to the persons using the DNO's Distribution System , more particularly identified in each section of the Distribution Code , including for the avoidance of doubt the OTSO for Embedded Transmission System .
User Development	Either a User's Plant and/or Apparatus and/or System to be connected to the DNO's Distribution System , or a modification relating to a User's Plant and/or Apparatus and/or System already connected to the DNO's Distribution System , or a proposed new connection or modification to the connection within the User's System .
Voltage Reduction	The method to temporarily control Demand by reduction of System voltage.

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

Weekly Average Cold Spell (ACS) Condition That particular combination of weather elements that gives rise to a level of **Peak Demand** within a week, taken to commence on a Monday and end on a Sunday, which has a particular chance of being exceeded as a result of weather variation alone. This particular chance is determined such that the combined probabilities of **Demand** in all weeks of the year exceeding the annual **Peak Demand** under **Annual ACS Conditions** is 50%, and in the week of maximum risk the weekly **Peak Demand** under **Weekly ACS Conditions** is equal to the annual **Peak Demand** under **Annual ACS Conditions**.

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DGD 2. CONSTRUCTION OF REFERENCES

199 In this **Distribution Code**:-

- 200 (i) The Table of contents, the Guide and headings are inserted for convenience only
201 and shall be ignored in construing the **Distribution Code**.
- 202 (ii) Unless the context otherwise requires, all references to a particular paragraph,
203 sub-paragraph, Annex, Appendix or Schedule shall be a reference to that
204 paragraph, sub-paragraph, Annex, Appendix or Schedule in or to that part of the
205 **Distribution Code** in which the reference is made.
- 206 (iii) Unless the context otherwise requires the singular shall include the plural and
207 vice versa, references to any gender shall include any individual, body corporate,
208 unincorporated association, firm or partnership and any other legal entity.
- 209 (iv) References to the words “include” or “including” are to be construed without
210 limitation to the generality of the preceding words.
- 211 (v) Unless there is something in the subject matter or the context which is
212 inconsistent therewith, any reference to an Act of Parliament or any Section of
213 or Schedule to, or other provision of an Act of Parliament shall be construed at
214 the particular time, as including a reference to any modification, extension or re-
215 enactment thereof then in force and to all instruments, orders and regulations
216 then in force and made or deriving validity from the relevant Act of Parliament.
- 217 (vi) References to “in writing” or “written” include typewriting, printing,
218 lithography and other modes of reproducing words in a legible and non-
219 transitory form and, except where otherwise stated, includes suitable means of
220 electronic transfer, such as electronic mail. In all cases the form of notification
221 and the nominated persons or departments and addresses of the sender and
222 recipient of the data or information shall be agreed by the **DNO** and **User** and
223 the sender shall be able to confirm receipt of the information by the recipient. In
224 the case of electronic transfer the sender and recipient shall be able to reproduce
225 the information in non-transitory form.
- 226 (vii) Where the **Distribution Glossary and Definitions** refers to any word or term
227 which is more particularly defined in a part of the **Distribution Code**, the
228 definition in that part of the **Distribution Code** will prevail over the definition
229 in the **Distribution Glossary and Definitions** in the event of any inconsistency.
- 230 (viii) A cross reference to another document or part of the **Distribution Code** shall
231 not of itself impose any additional or further or co-existent right in the part of
232 the text where such cross-reference is contained.

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

233 (ix) Nothing in the **Distribution Code** is intended to or shall derogate from the
234 **DNO's** statutory or licence obligations.
235

ANNEX 1 - QUALIFYING STANDARDS

236 This Annex forms part of the **Distribution Code** technical requirements.

237 **Distribution Code** Requirements Implemented via Electricity Supply Standards

238 Copies of the following Engineering Recommendations and Technical Specifications are freely
239 available from the **Distribution Code** website at <http://www.dcode.org.uk/> or from Energy
240 Networks Association, 6th Floor, Dean Bradley House, 52 Horseferry Road, London SW1P 2AF,
241 <http://www.energynetworks.org/>. A copy of Engineering Memorandum 7907 is available from
242 Scottish Hydro Electric Power Distribution Ltd on request.

243 1 **Engineering Recommendation G5/4-1**

244 Planning levels for harmonic voltage distortion and the connection of non-linear
245 equipment to transmission and distribution systems in the United Kingdom.

246 2 **Engineering Recommendation G12/4-1**

247 Requirements for the application of protective multiple earthing to low voltage
248 networks.

249 3 **Engineering Recommendation G59/3-3**

250 Recommendation for the connection of generating plant to the distribution systems of
251 licensed distribution network operators

252 4 (a) **Engineering Recommendation P2/6**

253 Security of Supply.

254 (b) **EM7907**

255 Distribution planning standards of voltage and of security of supply. (Parts of
256 Scottish Hydro Electric Power Distribution Ltd Area)

257 5 **Engineering Recommendation P24**

258 AC traction supplies to British Rail.

259 6 **Engineering Recommendation P25**

260 The short-circuit characteristics of single-phase and three-phase low voltage distribution
261 networks

262 7 **Engineering Recommendation P28**

263 Planning limits for voltage fluctuations caused by industrial, commercial and domestic
264 equipment in the United Kingdom.

265 8 **Engineering Recommendation P29**

266 Planning limits for voltage unbalance in the United Kingdom for 132kV and below.

267 9 **Technical Specification 41-24**

268 Guidance for the design, installation, testing and maintenance of main earthing systems
269 in substations

270 10 **Engineering Recommendation S34**

271 A guide for assessing the rise of earth potential at substation sites.

272	11	Engineering Recommendation G83/2
273		Recommendations For The Connection of Type Tested Small-Scale Embedded
274		Generators (Up To 16 A Per Phase) In Parallel With Public Low-Voltage Distribution
275		Networks.
276	12	Engineering Recommendation G98
277		Requirements for the connection of type-tested micro generators (up to and including
278		16 A per phase) in parallel with public low voltage distribution networks on or after
279		17 May 2019
280	13	Engineering Recommendation G99
281		Requirements for the connection of generating equipment in parallel with public
282		distribution networks on or after 17 May 2019
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DISTRIBUTION CODE INTRODUCTION (DIN)

DISTRIBUTION INTRODUCTION (DIN)

DIN1 INTERPRETATION

292 DIN1.1 This **Distribution Code** has been prepared by the **DNOs**. Words and expressions printed
293 in bold type are listed in the **Distribution Glossary and Definitions**.

294 DIN1.2 The **DNO**, unless indicated otherwise, shall be construed as acting in its
295 **Distribution Business** capacity.

DIN2 DISTRIBUTION LICENCE DUTY

296 DIN2.1 The **Distribution Licence** (Condition 21) requires the **DNO** in consultation with
297 **Authorised Electricity Operators** liable to be materially affected thereby to
298 prepare and at all times have in force and implement and comply with a
299 **Distribution Code** which:

300 (a) Covers all material technical aspects relating to connections to and the
301 operation and use of the **DNO's Distribution System** and the operation of
302 electric lines and electrical **Plant** and **Apparatus** connected to the **DNO's**
303 **Distribution System**. The **Distribution System** of any **Other Authorised**
304 **Distributor** shall comply with the **Distribution Code** at the point of
305 connection with the **DNO's Distribution System**.

306 (b) Is designed so as to:

307 (i) Permit the development, maintenance, and operation of an efficient,
308 coordinated and economical **System** for the distribution of electricity.

309 (ii) Facilitate competition in the generation and supply of electricity.

310 (iii) Efficiently discharge the obligations imposed upon **DNOs** by the
311 **Distribution Licence** and comply with the Regulation (where Regulation
312 has the meaning defined in the **Distribution Licence**) and any relevant
313 legally binding decision of the European Commission and/or Agency for
314 the Co-operation of Energy Regulators.

315 (iv) Promote efficiency in the implementation and administration of the
316 **Distribution Code**.

317 DIN2.2 The **Distribution Code** is in the same form for all **Users** of the same category. In
318 drawing up and implementing the **Distribution Code**, the **Distribution Licence**
319 requires that the **DNO** shall not discriminate against or prefer:

320 (a) any one or any group of persons, or

321 (b) the **DNO** in the conduct of any business other than the **Distribution Business**,
322 in favour of or against any one other or any other group of persons.

323 DIN2.3 It is also a requirement of the **Distribution Licence** that the **DNO** shall comply
324 with the provisions of the **Grid Code** so far as applicable to the licensed business,
325 and the **Distribution Code** is designed to ensure that these obligations can be met
326 by the **DNO**.

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DISTRIBUTION INTRODUCTION (DIN)

DIN3 SCOPE

328 The **Distribution Code** shall be complied with by the **DNO** and by potential and
329 existing **Generators, Suppliers** and **Customers** connected to or seeking
330 connection to the **DNO's Distribution System** being referred to as **Users** as
331 expressly defined in the various parts of the **Distribution Code**.

DIN4 GENERAL REQUIREMENTS

332 DIN4.1 The **Distribution Code** contains procedures to permit equitable management of day
333 to day technical situations in the Electricity Supply Industry, taking account of a
334 wide range of operational conditions likely to be encountered under both normal
335 and exceptional circumstances. It is nevertheless necessary to recognise that the
336 **Distribution Code** cannot predict and address all possible operational situations.
337 **Users** must therefore understand and accept that the **DNO**, in such unforeseen
338 circumstances, will be required, in the course of the reasonable and prudent
339 discharge of its responsibilities, to act in pursuance of any one or any combination
340 of the following "General Requirements":

- 341 (a) The need to preserve or restore the integrity of the **DNO's Distribution System**
342 or the **National Electricity Transmission System**
- 343 (b) The compliance by the **DNO** with its **Distribution Licence** obligations.
- 344 (c) The compliance by others with obligations imposed by Licences issued under
345 the **Act**.
- 346 (d) The avoidance of breakdown, separation or collapse (total or partial) of the
347 **DNO's Distribution System** or the **National Electricity Transmission**
348 **System** or the **Total System**.
- 349 (e) The preservation of safety under all circumstances, including the prevention of
350 personal injury.
- 351 (f) The prevention of damage to **Plant** and/or **Apparatus**.
- 352 (g) The achievement of objectives specifically identified in the **Distribution**
353 **Code**.
- 354 (h) The compliance by the **DNO** with the **Grid Code**.
- 355 (i) In the absence of an applicable provision of the **Distribution Code** or any
356 of these General Requirements:
- 357 (i) The application of a policy aimed at the equitable sharing amongst **User**
358 of any temporary restriction that might be necessary in exceptional
359 circumstances, and
- 360 (ii) The application of then current industry practice.

361 DIN4.2 **Users** shall provide such reasonable co-operation and assistance as the **DNO** may
362 reasonably request in pursuance of the above General Requirements.

DIN5 CODE RESPONSIBILITIES

363 DIN5.1 The **Distribution Code** sets out procedures and principles governing the **DNO's**
364 relationship with all **Users** of the **DNO's Distribution System**.

DISTRIBUTION INTRODUCTION (DIN)

365 DIN5.2 The **DNO** and all **Users** have a duty under this **Distribution Code** to provide such
366 information and resources as are necessary to facilitate compliance with and
367 implementation of the **Distribution Code**. The **DNO** can only plan and operate the
368 **DNO's Distribution System** and provide information for the planning and
369 operation of the **National Electricity Transmission System**, having regard to the
370 requirements which **Users** have informed the **DNO** they wish to make of the **DNO's**
371 **Distribution System**. The **DNO** must be able to rely upon the information which
372 **Users** have supplied to it and will not be held responsible for any consequences
373 which arise from its reasonable and prudent actions on the basis of such information
374 supplied by any **User** or **Users**.

DIN6 CONFIDENTIALITY

375 The **Distribution Code** contains procedures under which the **DNO's Distribution**
376 **Business**, in pursuance of its obligation as a **DNO**, will receive information from
377 **Users** relating to the intentions of such **Users**. The **DNO** shall not, except in
378 pursuance of specific requirements of the **Distribution Code**, disclose such
379 information to any **User** or other person without the prior written consent of the
380 provider of the information, subject to the requirements of the **Distribution**
381 **Licence** (Condition 39).

DIN7 PUBLICATIONS

382 The **Distribution Code** contains references to various Electricity Supply Industry
383 publications which provide guidance on planning and design criteria. A list of the
384 publications referred to is included as an Annex 1 to the **Distribution Code**.

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DISTRIBUTION GENERAL CONDITIONS (DGC)

DISTRIBUTION GENERAL CONDITIONS (DGC)

DGC1 INTRODUCTION

396 The **Distribution Glossary and Definitions** apply to all provisions of the
397 **Distribution Code**. Their objective is to ensure, to the extent possible, that various
398 sections of the **Distribution Code** work together and work in practice for the
399 benefit of all **Users**.

DGC2 SCOPE

400 The **Distribution Glossary and Definitions** apply to the **DNO** and to all **Users**.

DGC3 UNFORESEEN CIRCUMSTANCES

401 If circumstances not envisaged by the provisions of the **Distribution Code** should
402 arise, the **DNO** shall, to the extent reasonably practicable in the circumstances,
403 consult promptly and in good faith with all affected **Users** in an effort to reach
404 agreement as to what should be done. If agreement between the **DNO** and those
405 **Users** cannot be reached in the time available, the **DNO** shall determine what is to
406 be done.

407 Wherever the **DNO** makes a determination, it shall do so having regard, wherever
408 possible, to the views expressed by **Users** and, in any event, to what is reasonable
409 in all the circumstances. Each **User** shall comply with all instructions given to it
410 by the **DNO** following such a determination provided that the instructions are
411 consistent with the then current technical parameters of the particular **User's**
412 **System** registered under the **Distribution Code**. The **DNO** shall promptly refer all
413 such unforeseen circumstances and any such determination to the **Distribution**
414 **Code Review Panel** for consideration in accordance with DGC4.2(e).

DGC4 THE DISTRIBUTION CODE REVIEW PANEL

415 DGC4.1 The **DNOs** shall establish and maintain the **Panel**, which shall be a standing body,
416 to carry out the functions referred to in paragraph DGC4.2.

417 DGC4.2 The **Panel** shall:-

- 418 (a) Keep the **Distribution Code** and its working under review, including
419 any necessary requirements for maintaining variations for Scotland
420 and England and Wales;
- 421 (b) to minimize the necessary differences in the treatment of issues in
422 Scotland from their treatment in England and Wales;
- 423 (c) review all suggestions for modifications to the **Distribution Code**
424 which the **Authority** or any **User** may wish to submit to a **DNO** for
425 consideration by the **Panel** from time to time;
- 426 (d) publish recommendations as to modifications to the **Distribution Code**
427 that a **DNO** or the **Panel** feels are necessary or desirable and the
428 reasons for the recommendations;
- 429 (e) issue guidance in relation to the **Distribution Code** and its
430 implementation, performance and interpretation when asked to do so
431 by any **User**; and

DISTRIBUTION GENERAL CONDITIONS (DGC)

- 432 (f) consider what changes are necessary to the **Distribution Code** arising
433 out of any unforeseen circumstances referred to it by the **DNO** under
434 DGC3.
- 435 (g) produce an Annual Report of the activities of the **Panel**; and
- 436 (h) establish and maintain governance arrangements for **Qualifying**
437 **Standards** that have a material effect on **Users** of the **Distribution**
438 **System** as follows:
- 439 (1) national electricity industry standards that implement **Distribution**
440 **Code** requirements, and which are listed in Annex 1 of the
441 **Distribution Code** and form part of the **Distribution Code**;
- 442 (2) other national electricity industry standards that have a material affect
443 on **Users** but do not implement **Distribution Code** requirements and
444 which do not form part of the **Distribution Code** technical
445 requirements. The **Panel** will maintain a list of these standards. For
446 convenience this list is attached as Annex 2; and
- 447 (3) standards adopted by individual DNOs, which are published as
448 such by those DNOs and which have a material effect on **Users**;
- 449 (i) maintain a detailed procedure for the overall governance arrangements for
450 **Qualifying Standards**, which shall be agreed by resolution of the **Panel**
451 from time to time; and
- 452 (j) have regard for commercial matters insofar as they interact with the
453 **Distribution Code** and take into account the commercial implications of
454 **Distribution Code** provisions when developing modifications to the
455 **Distribution Code** and **Annex 1 Standard** and **Annex 2 Standard**.
456 However the **Panel** shall not be required to discuss issues relating solely
457 to commercial matters.
- 458 DGC4.3 The **Panel** shall consist of:-
- 459 (a) A Chairman and up to 5 members appointed by the **ITCG**, at least one
460 of whom will be a member of the Grid Code Review Panel and at least
461 one of whom will be an **Independent Distribution Network Operator**;
- 462 (b) a person appointed by the **Authority**;
- 463 (c) the following members:-
- 464 (i) 2 persons representing onshore **Generators** with **Power**
465 **Generating Facilities**~~**Embedded Generating Plant**~~ who are **BM**
466 **Participants** and are active (ie submitting bid-offer data) in the
467 **Balancing Mechanism**;
- 468 (ii) 2 persons representing onshore **Generators** with **Embedded**
469 **Power Generating Facilities** ~~**Generating Plant**~~ other than those in
470 (i) above; and
- 471 (iii) 2 persons, other than **Supplier**, representing **Users** without
472 **Power Generating Facilities**~~**Generating Plant**~~;
- 473 (iv) a person representing the **OTSO**;
- 474 (v) a person representing **Suppliers**; and

DISTRIBUTION GENERAL CONDITIONS (DGC)

- 475 (d) A person representing customers appointed by the **CA** and **CAS**.
476 Each of the above shall be appointed pursuant to the rules issued pursuant to
477 DGC4.4.
- 478 DGC4.4 The **Panel** shall establish and comply at all times with its own Constitution and
479 Rules and procedures relating to the conduct of its business, which Constitution
480 Rules and procedures shall be approved by the **Authority** and are set out in the
481 “Constitution and Rules of the **Distribution Code Review Panel**”.
- 482 DGC4.5 As part of the **DNO**’s obligation to review periodically the **Distribution Code** and
483 its implementation as required by Condition 21 of the **DNO**’s **Distribution**
484 **Licence**, the **DNO** shall consult all **Authorised Electricity Operators** liable to be
485 affected in relation to all proposed modifications to the **Distribution Code** and shall
486 submit all proposed modifications to the **Distribution Code** to the **Panel** for
487 discussion prior to such consultation. Such review of the **Distribution Code**
488 undertaken by the **DNO** shall involve an evaluation of whether any modification
489 would better facilitate the achievement of the **Distribution Code** objectives, as
490 provided in the **DNO**’s **Distribution Licence**, and, where the impact on greenhouse
491 gasses is likely to be material, this shall include an assessment of the quantifiable
492 impact of any proposed modification on greenhouse gas emissions, to be conducted
493 in accordance with any guidance (on the treatment of carbon costs and evaluation
494 of greenhouse gas emissions) as may be issued by the **Authority** from time to time
495 and in accordance with the rules pursuant to DGC4.4.
- 496 DGC4.6 The **DNOs** shall establish and maintain a group to be known as the **ITCG**, which
497 shall be a standing body comprised of representatives of the **DNOs** to carry out the
498 functions referred to in its own constitution and rules.
- 499 DGC4.7 The **ITCG** shall establish and comply at all times with its own constitution and
500 rules relating to the conduct of its business, which constitution and rules shall be
501 approved by the **Authority**.
- 502 DGC4.8 The **DNOs** shall fund and share the costs incurred by or on behalf of the **DNOs** in
503 relation to the operation of the **Panel** and the **ITCG** in accordance with the cost
504 apportionment mechanism set out in the constitution and rules of the **ITCG**.
- DGC5 COMMUNICATION BETWEEN THE DNO AND USERS**
- 505 Unless otherwise specified in the **Distribution Code**, the methods of operational
506 communication (other than relating to the submission of data and notices) shall be
507 agreed between the **DNO** and **User** from time to time. The **DNO** shall operate an
508 enquiry service for dealing with incidents on the **DNO**’s **Distribution System** and
509 interruptions in supply.
- DGC6 DATA AND NOTICES**
- 510 DGC6.1 Data and notices to be exchanged between the **DNO** and **User** under the
511 **Distribution Code** (other than data which is the subject of a specific requirement
512 of the **Distribution Code** as to the manner of its delivery) shall be delivered in
513 writing in accordance with DGD2 (vi).
- 514 DGC6.2 All data items, where applicable, will be referenced to nominal voltage and
515 **Frequency** unless otherwise stated.

DISTRIBUTION GENERAL CONDITIONS (DGC)

DGC7 OWNERSHIP OF PLANT AND/OR APPARATUS

516 References in the **Distribution Code** to **Plant** and/or **Apparatus** of a **User** include
517 **Plant** and/or **Apparatus** used by a **User** under an agreement with a third party.

DGC8 SYSTEM CONTROL

518 Where a **User's System** (or part thereof) is, by agreement, under the control of the
519 **DNO**, then for the purposes of communication and co-ordination in operational
520 timescales the **DNO** can (for those purposes only) treat that **User's System** (or part
521 thereof) as part of the **DNO's Distribution System** but as between the **DNO** and
522 **Users**, it shall remain to be treated as the **User's System** (or part thereof).

DGC9 EMERGENCY SITUATIONS

523 **Users** should note that the provisions of the **Distribution Code** may be suspended
524 in whole or in part during a Security Period as more particularly provided for in the
525 **Fuel Security Code**, or in accordance with a **Civil Emergency Direction** issued
526 under a Civil Emergency in accordance with **Distribution Operating Code** DOC9.

DGC10 DISTRIBUTION CODE RESPONSIBILITIES

527 The **Distribution Code** sets out procedures and principles governing the
528 relationship between the **DNO** and all **Users** of the **DNO's Distribution System**.

DGC11 MODIFICATIONS TO THE DISTRIBUTION CODE

529 **DGC11.1** Modifications to the **Distribution Code** shall be made in accordance with the
530 procedures set out in the Constitution and Rules of the **Distribution Code Review**
531 **Panel**.

532 **DGC11.2** Modifications to the **Distribution Code** that change the obligations on **Users** and
533 **DNOs** in relation to the specification of **Equipment** that each has to provide to
534 comply with the **Distribution Code** will not apply retrospectively to **Equipment**
535 already existing at the date of the implementation of the **Distribution Code** change,
536 unless specifically required in the relevant **Distribution Code** clause. However,
537 where the **DNO** or the **User** makes a material alteration to the relevant **Equipment**,
538 then the **DNO** or the **User** will comply with the requirements of the **Distribution**
539 **Code** currently in force at the date of the material alteration.

540 **DGC11.3** The **DNOs** shall appoint a Code Administrator (as defined in the **Distribution**
541 **Licence**). The Code Administrator shall (in addition to any powers, duties or
542 functions set out in the **Distribution Code** or the Constitution and Rules of the
543 **Distribution Code Review Panel**):

544 (a) together with other code administrators, publish, review, and (where
545 appropriate) amend from time to time the Code of Practice (Code of
546 Practice in DGC11.3 has the meaning defined in the **Distribution**
547 **Licence**);

548 (b) facilitate the procedures for making a modification to the **Distribution**
549 **Code**;

550 (c) have regard to, and in particular (to the extent relevant) be consistent with,
551 the principles contained in the Code of Practice;

DISTRIBUTION GENERAL CONDITIONS (DGC)

552 (d) provide assistance, insofar as it is reasonably practicable and on reasonable
553 request, to **Authorised Electricity Operators** (including in particular
554 Small Participants as defined in the **Distribution Licence**) and, to the
555 extent relevant, consumer representatives that request the Code
556 Administrator's assistance, in relation to the **Distribution Code** including,
557 but not limited to, understanding the operation of the **Distribution Code**,
558 their involvement in, and representation during, the modification processes
559 (including, but not limited to, **Panel** and/or working group meetings), and
560 accessing information relating to modification proposals and/or
561 modifications.

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DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

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DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

571 DISTRIBUTION PLANNING AND CONNECTION CODE 1

DPC1 GENERAL INTRODUCTION

572 DPC1.1 The **Distribution Planning and Connection Code** specifies the technical and
573 design criteria and the procedures to be applied by the **DNO** in the planning and
574 development of the **DNO's Distribution System** and to be taken into account by
575 **Users**, as defined in DPC3 below, in the planning and development of their own
576 **Systems** insofar as the latter affect the operation and use of the **DNO's Distribution**
577 **System**. Developments on the **DNO's Distribution System** may have an impact
578 on the **National Electricity Transmission System** and this will be taken into
579 account in the planning and development of the **DNO's Distribution System** and
580 the conditions of the **Grid Code** complied with as appropriate.

581 DPC1.2 This **Distribution Planning and Connection Code** also specifies the technical,
582 design and operational criteria which must be complied with by the **Users**, defined
583 in DPC3 below connected to, or seeking connection to the **DNO's Distribution**
584 **System**, in the planning and development of their **Systems** in so far as they affect
585 the **DNO's Distribution System**.

586 DPC1.3 A requirement for reinforcement or extension of the **DNO's Distribution System**
587 or the **National Electricity Transmission System** may arise due to the
588 requirements of a **User** or for a number of other reasons including, but not limited
589 to:

- 590 (a) A development on a **User's System** already connected to the **DNO's**
591 **Distribution System** as a **User Development**.
- 592 (b) The introduction of a new **Connection Point** between a **User's System** and the
593 **DNO's Distribution System**.
- 594 (c) Transient, or steady state stability considerations.
- 595 (d) The development of an existing, or the connection of a new **Customer**.
- 596 (e) The cumulative effect of any combination of the above.

597 DPC1.4 Accordingly, the reinforcement or extension of the **DNO's Distribution System** or
598 the **National Electricity Transmission System** may involve work:

- 599 (a) At the **Connection Point** between a **User's System** and the **DNO's**
600 **Distribution System**.
- 601 (b) On distribution or transmission lines or substations or other facilities which
602 join the **Connection Point** to the remainder of the **DNO's Distribution**
603 **System** or the **National Electricity Transmission System**
- 604 (c) At or between points on the **DNO's Distribution System** remote from the
605 **Connection Point**.

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606	DPC1.5	The time required for the planning and development of the DNO's Distribution System and any consequential requirement of the DNO's interface with the National Electricity Transmission System will depend on the type and extent of the necessary reinforcement and/or extension work, the need or otherwise to obtain statutory or other consents by all parties, the associated possibility for a public inquiry and the degree of complexity in undertaking the new work whilst maintaining satisfactory security and quality of supply on the DNO's Distribution System . The Distribution Licence imposes appropriate timescales on the exchange of information between the DNO and Users .
615	DPC1.6	Planning Data
616	DPC1.6.1	Standard Planning Data
617		Standard Planning Data is that data first to be provided by a User at the time of an application for a Connection Agreement . It comprises data, which is expected normally to be sufficient for the DNO to investigate the impact on the DNO's Distribution System of any User Development associated with an application by the User for a Connection Agreement . The DNO will inform Users where more detailed information is required.
623	DPC1.6.2	Detailed Planning Data
624		Detailed Planning Data comprises additional, more detailed, data not normally expected to be required by the DNO to investigate the impact on the DNO's Distribution System of any User Development associated with an application by the User for a Connection Agreement .
628		The User may, however, be required by the DNO to provide the Detailed Planning Data before the DNO can make an offer for a Connection Agreement . The DNO shall only request Detailed Planning Data where it considers the provision of such data to be necessary and in such cases the DNO shall specify which elements of Detailed Planning Data are required.
633	DPC1.6.3	Standard Planning Data and Detailed Planning Data requirements are specified for different User Developments of different types in DPC5 and DPC7 of this Distribution Planning and Connection Code and summarised in the Distribution Data Registration Code .
637	DPC1.6.4	Estimated Data
638		Where data is not available at the feasibility stage or preliminary stage of a User Development then the User may provide a reasonable estimate of the data to be requested by the DNO and in such cases the data shall be identified as estimated data by the User . Estimated data supplied by Users in pursuance of this Distribution Planning and Connection Code should, where practicable, be replaced by actual validated values prior to connection.
644	DPC1.6.5	Assumed Data
645		Where data is not available or has not been provided by the User at the feasibility stage or preliminary stage of a User Development then the DNO may make reasonable assumptions of the data required for assessment of the User Development and in such cases the User shall be notified of the assumed values

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

649 adopted. Where the **DNO** has notified the **User** that assumed data has been adopted
650 by the **DNO** in pursuance of this **Distribution Planning and Connection Code**
651 then the **User** should, where practicable provide actual validated values to replace
652 the assumed values prior to connection.

653 DPC1.7 Status of Planning Data

654 It is in the interests of all **Users** to initiate early discussion with the **DNO** regarding
655 any proposed **User Development**, which may have an impact on the **DNO's**
656 **Distribution System**.

657 For the purposes of this **Distribution Planning and Connection Code** it is
658 considered that development will consist of four stages: -

659 (a) Feasibility Project Stage

660 At this optional stage the **User** will be considering a **User Development**. The
661 **DNO** will be pleased to conduct a short meeting to discuss the **User's**
662 requirements and provide guidance on the likely implications for the **DNO's**
663 **Distribution System**.

664 If at this stage the **User** requires further information then the **DNO** will request
665 **Standard Planning Data** from the **User** and provide a feasibility assessment
666 identifying items of significant cost to the extent permitted by the information
667 provided by the **User**. In accordance with the **DNO's** Statement of Charges a
668 charge will be payable by any potential **User** for such an assessment.

669 At the feasibility project stage a number of iterative studies may be carried out
670 by the **DNO** at the request of the **User** (or by the **User**) to identify opportunities
671 for connection and corresponding costs and technical issues. The **Feasibility**
672 **Project Data** requested by the **DNO** from the **User** to carry out these feasibility
673 studies may include both **Standard Planning Data** and **Detailed Planning Data**
674 depending on the complexity of the assessment studies required to be carried out
675 by the **DNO**.

676 (b) Preliminary Project Stage

677 At this stage the **User** will have submitted an application for a **Connection**
678 **Agreement**. The **Preliminary Project Planning Data** requested by the **DNO**
679 from the **User** for assessing the connection and costs may include both **Standard**
680 **Planning Data** and **Detailed Planning Data**.

681 c) Committed Project Stage

682 At this stage a **Connection Agreement** will have been established. The
683 **Committed Project Planning Data** on which the **Connection Agreement** is
684 based may include both **Standard Planning Data** and **Detailed Planning Data**.

685 (d) Registered Project Stage

686 At this stage the connection will be physically established. The **Registered Data**
687 for the connection shall include replacements for estimated and assumed values,
688 where practicable, using validated actual values and updated forecasts for future
689 data items.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

- 690 DPC1.8 Reference is made in the **Distribution Planning and Connection Code** to the
691 **DNO** supplying information or advice to **Users**. For the avoidance of doubt, unless
692 the context otherwise requires, such information or advice will be furnished by the
693 **DNO** upon request by the **User** (whether during the application for connection
694 process or otherwise).
- 695 DPC1.9 The provisions of the **Distribution Planning and Connection Code** shall, subject
696 to DPC1.8, be applicable to:
- 697 (a) All existing connections as at the date of commencement of **DNO's**
698 **Distribution Licence**.
- 699 (b) All new or modified connections thereafter.
- 700 DPC1.10 In considering the approval of existing connections at the date of commencement
701 of its **Distribution Licence**, the **DNO** shall have regard to the fact that previous
702 changes in technical and design standards have not been applied retrospectively in
703 every case, and the **DNO** shall not seek, under the terms of these **Distribution**
704 **Planning and Connection Code** Conditions, to impose retrospective changes
705 where these had not been required in the past, except where the **DNO** can
706 reasonably demonstrate that significant change has occurred to conditions which
707 existed when the matter was previously considered by the **DNO** or its
708 predecessors.
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DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

710 DISTRIBUTION PLANNING AND CONNECTION CODE 2

DPC2 OBJECTIVES

711 The objectives of the Distribution Planning and Connection Code are to:-

712 (a) Enable the **DNO's Distribution System** to be planned, designed and
713 constructed to operate economically, securely and safely.

714 (b) Facilitate the use of the **DNO's Distribution System** by others and to specify
715 a standard of supply to be provided.

716 (c) Establish technical conditions which facilitate the interfacing of **Systems** at
717 points of entry to and exit from the **DNO's Distribution System**.

718 (d) Formalise the exchange of **System** planning data.

719 (e) Provide sufficient information for a **User** to assess opportunities for connection
720 and to plan and develop his **System** such as to be compatible with the **DNO's**
721 **Distribution System**.

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DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

724 DISTRIBUTION PLANNING AND CONNECTION CODE 3

DPC3

SCOPE

725 DPC3.1 The **Distribution Planning and Connection Code** specifies the planning, design
726 and connection requirements for **Distribution Systems** owned by the **DNO** and for
727 connections to those **Systems**.

728 DPC3.2 The **Users** to whom the **Distribution Planning and Connection Code** applies are
729 those who use or intend to use the **DNO's Distribution System** and comprise the
730 following:-

731 (a) **Embedded Generators**.

732 (b) **Suppliers**.

733 (c) **Customers** including those with **Unmetered Supplies** who are connected to
734 the **DNO's Distribution System**.

735 (d) **Other Authorised Distributors** connected to the **DNO's Distribution**
736 **System**.

737 (e) **Meter Operators** which perform services in respect of **Equipment** connected
738 to the **DNO's Distribution System**.

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DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

741 DISTRIBUTION PLANNING AND CONNECTION CODE 4

DPC4 DESIGN PRINCIPLES AND STANDARDS

742 DPC4.1 Introduction

743 DPC4.1.1 Planning criteria are based on the requirement to comply with statutory
744 requirements, **Distribution Licence** conditions and other obligations placed on the
745 **DNO** and **Users**.

746 DPC4.1.2 The **DNO** has a duty to develop and maintain an efficient, secure and co-ordinated
747 **System** of electricity supply that is both economical and safe.

748 DPC4.1.3 **DPC4** sets out current principles and standards to be applied in the design of the
749 **DNO's Distribution System** and any **User** connections to that **System**. Each
750 scheme for reinforcement or modification of the **DNO's Distribution System** is
751 individually designed in the light of economic and technical features associated
752 with the particular **System** limitations under consideration.

753 DPC4.1.4 Nothing in DPC4 is intended to inhibit design innovation. DPC4 is, therefore,
754 based upon the performance requirements of the **DNO's Distribution System**
755 necessary to meet the above criteria.

756 DPC4.1.5 The technical and design criteria applied in the planning and development of the
757 **DNO's Distribution System** are listed in Annex 1 to the **Distribution Code**.
758 These standards may be subject to revision from time to time in accordance with
759 the provision of the **Distribution Licence**.

760 DPC4.2 Standard of Supply

761 DPC4.2.1 Security

762 In accordance with the Condition ~~5-24~~ of the **Distribution Licence**, **DNOs** shall
763 plan and develop their **DNO's Distribution Systems** to a standard not less than that
764 set out in DGD Annex 1 Item 4, Engineering Recommendation P2/6 – “Security of
765 Supply” or such other standard of planning as **DNOs** may, with the approval of the
766 **Authority**, adopt from time to time

767 In accordance with the **Distribution Licence** Scottish Hydro Electric Power
768 Distribution Ltd shall plan and develop its **DNO's Distribution System** in Scotland
769 to a standard set out in EM7907. Engineering Recommendation P2/6 – “Security
770 of Supply” has been modified by Scottish Hydro Electric Power Distribution Ltd as
771 EM7907 and this is accepted by the **Authority**.

772 DPC4.2.2 Frequency and Voltage

773 DPC4.2.2.1 The **DNO's Distribution System** and any **User** connections to that **System** shall
774 be designed to enable the **Normal Operating Frequency** and voltages supplied to
775 **Customers** to comply with the **ESQCR**.

776 DPC4.2.2.2 The **Frequency** of the **DNO's Distribution System** shall be nominally 50 Hz and
777 shall normally be controlled within the limits of 49.5 - 50.5 Hz in accordance with
778 principles outlined in the **ESQCR**.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

- 779 DPC4.2.2.3 In exceptional circumstances, **System Frequency** could rise to values of the order
780 of 52 Hz or fall to values of the order of 47 Hz. Sustained operation outwith the
781 range 47 - 52 Hz is not taken into account in the design of **Plant** and **Apparatus**.
- 782 DPC4.2.2.4 Any extension or connection to the **DNO's Distribution System** shall be designed
783 in such a way that it does not adversely affect the voltage control employed on the
784 **DNO's Distribution System**. Information on the voltage regulation and control
785 arrangements will be made available by the **DNO** if requested by the **User**.
- 786 DPC4.2.3 **Voltage Disturbances and Harmonic Distortion**
- 787 DPC4.2.3.1 General
- 788 Under fault and circuit switching conditions the rated **Frequency** component of
789 voltage may fall or rise transiently. The fall or rise in voltage will be affected by
790 the method of earthing of the neutral point of the **DNO's Distribution System** and
791 voltage may fall transiently to zero at the point of fault. BS EN 50160:2010
792 'Voltage Characteristics of Electricity Supplied by Public Distribution Systems', as
793 amended from time to time, contains additional details of the variations and
794 disturbances to the voltage which shall be taken into account in selecting
795 **Equipment** from an appropriate specification for installation on or connected to the
796 **System**.
- 797 DPC4.2.3.2 Voltage Disturbances
- 798 Distortion of the **System** voltage waveform, caused by certain types of **Equipment**,
799 may result in annoyance to **Users** of the **DNO's Distribution System** or damage to
800 connected **Apparatus**. In order to limit these effects the following shall apply to
801 **Users' loads** connected to the **DNO's Distribution System**:-
- 802 (a) Voltage fluctuations shall comply with the limits set out in DGD Annex 1,
803 Item 7 Engineering Recommendation P28, "Planning limits for voltage
804 fluctuations caused by industrial, commercial and domestic equipment in the
805 United Kingdom".
- 806 (b) The harmonic content of a load shall comply with the limits set out in DGD
807 Annex 1, Item 1 Engineering Recommendation G5/4-1, "Planning levels for
808 harmonic voltage distortion and the connection of non-linear equipment to
809 transmission and distribution systems in the United Kingdom."
- 810 (c) **Phase (Voltage) Unbalance** shall comply with the levels laid down in DGD
811 Annex 1, Item 8 Engineering Recommendation P29, "Planning limits for
812 voltage unbalance in the United Kingdom for 132kV and below".
- 813 (d) Traction supplies shall comply as appropriate with the requirements of DGD
814 Annex 1, Item 6. Engineering Recommendation P24 "A.C. traction supplies
815 to British Rail".
- 816 Under certain circumstances the **DNO** may agree to other limits or levels.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

817 DPC4.2.3.3 Voltage Step Changes

818 The effect of voltage step changes caused by the connection and disconnection of
819 **User's Equipment** or **Customer's Demand** to or from the **DNO's Distribution**
820 **System** must be considered and be subject to limits to avoid unacceptable voltage
821 changes being experienced by other **Customers** connected to the **DNO's**
822 **Distribution System**. The magnitude of a voltage step change depends on the
823 method of voltage control, types of load connected and the presence of local
824 generation. Typical limits for voltage step changes caused by the connection and
825 disconnection of **User's Equipment** or **Customer's Demand** to the **DNO's**
826 **Distribution System**, are $\pm 3\%$ for infrequent planned switching events or outages
827 (in accordance with Engineering Recommendation P28). For unplanned outages
828 such as faults it will generally be acceptable to design to a voltage step change of
829 $\pm 10\%$.

830 For the purpose of the **Distribution Code** a voltage step change should be
831 considered to be the change from the initial voltage level to the resulting voltage
832 level after all the **Power Generating Module** automatic voltage regulator and static
833 VAR compensator actions, and transient decay (typically 5 seconds after the fault
834 clearance or system switching) have taken place, but before any other automatic or
835 manual tap-changing and switching actions have commenced

836 The voltage depression arising from transformer magnetising inrush current is a
837 short-time phenomenon not generally easily captured by the definition of voltage
838 step change used above. In addition the size of the depression is dependent on the
839 point on wave of switching, and the duration of the depression is relatively short,
840 in that the voltage recovers substantially in under one second.

841 **User's** installations should be designed such that transformer magnetising inrush
842 current associated with normal routine switching operations does not cause voltage
843 fluctuations outside those in Engineering Recommendation P28 (ie a maximum of
844 $\pm 3\%$). To achieve this it may be necessary install switchgear so that sites containing
845 multiple transformers can be energised in stages.

846 Situations will arise from time to time when complete sites including a significant
847 presence of transformers are energised as a result of post fault switching, post
848 maintenance switching, or carrying out commissioning tests on the **DNO's**
849 **Distribution System** or on **Users' Systems**. In these situations it will generally be
850 acceptable to design to an expected depression of around $\pm 10\%$, recognizing that a
851 worst case energization might cause a larger depression, on the basis that such
852 events are considered to be rare and it is difficult to predict the exact depression
853 because of the point on wave switching uncertainty. Should these switching events
854 become more frequent than once per year, then the design should revert to aiming
855 to limit depressions to less than 3%.

856 DPC4.2.4 Auto-reclosing and Single Phase Protection Operation

857 In connecting to the **DNO's Distribution System** the **User** should be aware that
858 auto-reclosing or sequential switching features may be in use on the **DNO's**
859 **Distribution System**. The **DNO** will on request provide details of the auto-
860 reclosing or sequential switching features in order that the **User** may take this into
861 account in the design of the **User System**, including **Protection** arrangements.

862 **Users** should be aware that the **Protection** arrangements on some **Distribution**
863 **Systems** may cause disconnection of one phase or two phases only of a three phase
864 supply for certain types of fault.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

865 DPC4.3 Design Principles

866 This section sets out design principles for **Users** (excluding **Generators**, the **OTSO**
867 and **Users** with **Unmetered Supply**), connected at **Low Voltage** and having single
868 phase or three phase supplies protected by fuse(s) or other device(s) rated at 100
869 amps or less.

870 DPC4.3.1 Any **User's** installation which complies with the provisions of the Requirements of
871 Electrical Installations BS 7671 -as amended from time to time, shall be deemed to
872 comply with the requirements of the **Distribution Code** as regards design and
873 safety.

874 DPC4.3.2 On the request of a **User** the **DNO** will provide such information, as may be
875 reasonably required, on the design and other characteristics of the **DNO's**
876 **Distribution System**.

877 Guidance on the short circuit characteristics of the **Low Voltage System** and
878 associated supplies is provided in **Electricity Supply Industry (ESI)** engineering
879 publications, including Item 6 in Annex 1 - Engineering Recommendation P25,
880 "The short-circuit characteristics of single-phase and three-phase low voltage
881 distribution networks".

882 Design practice for protective multiple earthing is detailed in the **Electricity**
883 **Supply Industry** engineering publications (including Item 2 in Annex 1
884 Engineering Recommendation G12/4, "Application of protective multiple earthing
885 to low voltage networks") and in the references contained in those publications.

886 The **DNO's** information requirements are detailed in DPC5.2.1.

887 DPC4.4 Design Principles for all other Users not included in DPC4.3

888 DPC4.4.1 Specification of Equipment, Overhead Lines and Underground Cables

889 (a) The principles of design, manufacture, testing and installation of distribution
890 **Equipment**, overhead lines and underground cables, including quality
891 requirements, shall conform to applicable statutory obligations and shall
892 comply with relevant **CENELEC** standards, **IEC** publications, European and
893 British Standards. Further advice will be made available upon request to the
894 **DNO**.

895 (b) The documents specified in paragraph (a) contain options for purchaser
896 selection which together with other requirements that are necessary to meet
897 **System** design needs, shall be specified so as to provide performances and
898 ratings in line with **Electricity Supply Industry (ESI)** Technical
899 Specifications (some of which are published as **Electricity Supply Industry**
900 **(ESI)** Standards), British Electricity Board Specifications, Engineering
901 Recommendations and Area Chief Engineers (ACE) Reports and Engineering
902 Technical Reports and **Electricity Supply Industry (ESI)** documents as listed
903 in Annex 1 of the **Distribution Code** or such other specifications as the **DNO**
904 may adopt from time to time by agreement with the **Authority**.

905 (c) The specifications of **Equipment**, overhead lines and cables shall be such as
906 to permit **Operation** of the **DNO's Distribution System** within the **Safety**
907 **Management System** of the **DNO**, details of which will be made available by
908 the **DNO** upon request.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

- (d) **Equipment** shall be suitable for use at the operating **Frequency**, within the intended operating voltage range and at the design short-circuit rating of the **DNO's Distribution System** to which it is connected having due regard to fault carrying capabilities and making and breaking duties. In appropriate circumstances, details of the **System** to which connection is to be made will be provided by the **DNO**. Guidance on the short circuit characteristics of the three phase **Low Voltage System** and associated supplies is provided in **Electricity Supply Industry (ESI)** engineering publications, including Item 6 in DGD Annex 1 Engineering Recommendation P25 "The short-circuit characteristics of single-phase and three-phase low voltage distribution networks".
- (e) Connections to the **DNO's Distribution System** at 132kV may be subject to the requirements of Annex 2 item 5 (ER P18). **DNOs** will have network specific complexity limits for **Systems** operating at voltages below 132kV which they will make available on request.
- (f) Cables, overhead lines transformers and other **Equipment** shall be operated within the thermal rating conditions contained in the appropriate standards, specifications, and other relevant publications, taking into account the intended use. Such information will be made available by the **DNO** upon request.
- (g) The standards, publications and specifications referred to in paragraphs (a) to (f) above are such standards, publications and specifications current at the time that the **Plant** and/or **Apparatus** was manufactured (and not commissioned) in the case of **Plant** and/or **Apparatus** on the **Total System**, or awaiting use or re-use. If any such **Plant/Apparatus** is subsequently moved to a new location or used in a different way, or for a different purpose, or is otherwise modified then such standards, publications and specifications current at the time that the **Plant** and/or **Apparatus** was manufactured (and not commissioned) will apply provided that in applying such standards, publications and specifications the **Plant** and/or **Apparatus** is reasonably fit for its intended purpose having due regard to the obligations of the **DNO** and the **User** under their respective licences.

DPC4.4.2 Earthing

- (a) The arrangements for connecting the **DNO's Distribution System** with earth shall be designed to comply with the requirements of the **ESQCR** and relevant European and British Standards. Guidance as to the design of earthing systems is contained in **Electricity Supply Industry (ESI)** engineering publications, including Items 11, and 12 in DGD Annex 1 Technical Specification 41-24, "Guidance for the design, installation, testing and maintenance of main earthing systems in substations" and Engineering Recommendation S.34, "A guide for assessing the rise of earth potential at substation sites". Additional requirements associated with **Power Generating Modules** **Generating Plant** are given in DPC7 for generation connected before 17 May 2019 and in EREC G99 for generation connected on or after 17 May 2019.
- (b) The method of earthing of the **DNO's Distribution System**, for example, whether it is connected solidly to earth or through an impedance, shall be advised by the **DNO**. The specification of associated **Equipment** shall meet the voltages which will be imposed on the **Equipment** as a result of the method of earthing.

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956 (c) Design practice for protective multiple earthing is detailed in the **Electricity**
957 **Supply Industry (ESI)** engineering publications including Item 2 DGD Annex
958 1 Engineering Recommendation G12/4, “Application of protective multiple
959 earthing to low voltage networks”, and in the references contained in those
960 publications.

961 (d) **Users** shall take precautions to limit the occurrence and effects of circulating
962 currents in respect of the neutral points of any interconnected system (eg where
963 there is more than one source of energy.)

964 DPC4.4.3 **Voltage Regulation and Control**

965 Any extension or connection to the **DNO’s Distribution System** shall be designed
966 in such a way that it does not adversely affect the voltage control employed by the
967 **DNO’s Distribution System**. Information on the voltage regulation and control
968 arrangements will be made available by the **DNO** if requested by the **User**.

969 DPC4.4.4 **Protection**

970 (a) The **DNO’s Distribution System** and the **System** of any **User** connected to
971 the **DNO’s Distribution System** shall incorporate protective devices in
972 accordance with the requirements of the **ESQCR**.

973 (b) In order to ensure satisfactory operation of the **DNO’s Distribution System**,
974 **Protection** systems, operating times, discrimination, and sensitivity across the
975 **Ownership Boundary**, as well as testing and maintenance regimes, shall be
976 agreed between the **DNO** and the **User** during the application for connection
977 process, and may be reviewed from time to time by the **DNO**, with the
978 concurrence of the **User**.

979 (c) In order to cover a circuit breaker, or **Equipment** having a similar function,
980 failing to operate correctly to interrupt fault current on a **HV System**, back-up
981 protection by operation of other circuit breakers or **Equipment** having a similar
982 function must normally be provided. The **DNO** will advise the **User** if the
983 same is not required. If the **Equipment** providing the back-up protection is
984 owned by the **DNO**, then this **Protection** may be limited to that needed to meet
985 statutory requirements in respect of the **DNO’s Distribution System**.

986 (d) Unless the **DNO** should advise otherwise, it is not acceptable for **Users** to limit
987 the fault current infeed to the **DNO’s Distribution System** by the use of
988 **Protection** and associated **Equipment** if the failure of that **Protection** and
989 associated **Equipment** to operate as intended in the event of a fault, could cause
990 **Equipment** owned by the **DNO** to operate outside its short-circuit rating.

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994 DPC4.4.5 **Superimposed Signals**

995 Where **Users** install mains borne signalling equipment it shall comply with BS
996 EN50065 as amended from time to time. Where a **User** proposes to use such
997 equipment to superimpose signals on the **DNO’s Distribution System**, the prior
998 agreement of the **DNO** is required.

999

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1000 DPC4.5 Network Statements

1001 DPC4.5.1 In accordance with Condition 4 of its **Distribution Licence** the **DNO**, on the
1002 request of a **User**, will prepare a statement showing present and future circuit
1003 capacity, forecast power flows and loading on the part or parts of the **DNO's**
1004 **Distribution System** specified in the request and **Fault Levels** at each distribution
1005 node covered by the request and containing:

1006 a) such further information as shall be reasonably necessary to enable such
1007 person to identify and evaluate the opportunities available when connecting
1008 to and making use of the part or parts of the licensee's distribution system
1009 specified in the request ;and

1010 b) if so requested, a commentary prepared by the licensee indicating the
1011 licensee's views as to the suitability of the part or parts of the licensee's
1012 distribution system specified in the request for new connections and the
1013 distribution of further quantities of electricity..

1014 The **Distribution Licence** sets out conditions on the time scales and charges
1015 associated with providing such a statement

1016 DPC4.5.2 In accordance with Condition 25 of its Distribution Licence the **DNO** will prepare
1017 on the request of the **Authority** a statement, also known as the Long Term
1018 Development Statement. The form and content of this statement will be specified
1019 by the **Authority** and will cover future years on a rolling basis. This statement
1020 gives information to assist any person who contemplates entering into distribution
1021 arrangements with the **DNO** to identify and evaluate the opportunities for doing so.

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DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

1023 DISTRIBUTION PLANNING AND CONNECTION CODE 5

DPC5 GENERAL REQUIREMENTS FOR CONNECTION

1024 DPC5.1 Introduction

1025 DPC5.1.1 **Distribution Planning and Connection Code (DPC5)** ensures that all **Users** of the
1026 **DNO's Distribution System** are subject to the same requirements for connection.

1027 DPC5.1.2 Data exchange requirements specified in this **Distribution Planning and**
1028 **Connection Code** apply to any **User Development**, which has an impact on the
1029 **DNO's Distribution System**.

1030 DPC5.1.3 DPC5.2.2 specifies the information required from **Users** by the **DNO** in order to
1031 ensure that adequate technical provision is made for new supplies or increases in
1032 existing load; DPC5.2.2 also applies to **Embedded Generators** who operate in
1033 parallel with the **DNO's Distribution System**, where a supply is required from the
1034 **DNO** under normal or emergency conditions. Information required from
1035 **Embedded Generators**, with connections at **HV** or **Low Voltage**, in respect of the
1036 import of energy to the **DNO's Distribution System**, is covered in DPC7 for
1037 generation connected before 17 May 2019 and in EREC G99 for generation
1038 connected on or after 17 May 2019. Transfer of Planning Data for **Users** connected
1039 at **HV** is set out in DPC 8.

1040 DPC5.2 Declaration of Load Characteristics

1041 DPC5.2.1 For supplies at **Low Voltage** under terms in the **Supply Agreement** it is possible
1042 in most cases to assess whether a proposed connection is acceptable, and to
1043 determine the necessary supply arrangements, from analysis of the following
1044 limited data:-

1045 (a) Maximum power requirements (kVA or kW);

1046 (b) Type and electrical loading of **Equipment** to be connected, eg number and size
1047 of motors, cookers, showers, space and water electrical heating arrangements,
1048 including details of equipment which is subject to switching by the **Supplier**;
1049 and

1050 (c) The date when the connection is required.

1051 These requirements will be specified on the appropriate application for a connection
1052 form obtainable from the **DNO**.

1053 Should a preliminary examination of this data indicate that more detailed
1054 information is required then it shall be provided to the **DNO** upon request if
1055 reasonably required.

1056 **Users**, shall contact the **DNO** in advance if it is proposed to make any significant
1057 change to the connection, electric lines or electrical **Equipment**, install or operate
1058 any generating equipment or do anything else that could affect the **DNO's**
1059 **Distribution System** or require alterations to the connection.

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1060		Users shall provide the DNO with any information it asks for about the nature, or
1061		use by the User , of electrical equipment on the User's premises (including that
1062		specified in DPC5.2.1 (a), (b), and (c) above). The DNO will only ask for
1063		information that is needed by it in relation to its Distribution Licence or the
1064		Distribution Code or to comply with the ESQCR or the Act .
1065	DPC5.2.2	The provisions of DPC5.2.1 also apply to supplies other than those at Low Voltage .
1066		It may be necessary for the following more comprehensive information, in addition
1067		to that detailed in DPC5.2.1, to be provided on request:-
1068	DPC5.2.2.1	Standard Planning Data
1069		It is possible in most cases to assess whether a proposed connection is acceptable,
1070		and to determine the necessary supply arrangements, from analysis of the following
1071		limited Planning Data which will be specified on the appropriate standard
1072		application form obtainable from the DNO :
1073		(a) Point of Connection to the DNO's Distribution System (geographical and
1074		electrical).
1075		(b) The date when connection is required.
1076		(c) Single line diagrams of existing and proposed arrangements of main Plant and
1077		Apparatus showing equipment rating.
1078		(d) Type and electrical loading of equipment to be connected, eg number and size
1079		of motors, electrical heating arrangements, etc.
1080		(e) Maximum power requirements MVA.
1081		(f) Maximum Active Power Demand (MW).
1082		(g) Maximum and minimum Reactive Power requirements (MVA _r).
1083		(h) The maximum Phase (Voltage) Unbalance which the User would expect the
1084		Demand to impose on the DNO's Distribution System .
1085		(i) The maximum harmonic content which will be imposed on the DNO's
1086		Distribution System .
1087		(j) Details of change of Demand (Active Power and Reactive Power) .
1088		(k) Details of any load management scheme to be applied by the User on the User
1089		System .
1090		(l) Peak Demand profiles at the Exit Point , both 2 hourly on day of User's Peak
1091		Demand and monthly Peak Demand variations.
1092		(m) Three phase short circuit infeed from all sources within the User's System ,
1093		based on Power Generating Module sub-transient reactance and the minimum
1094		zero phase sequence impedance of the User's System .
1095		(n) Standard load profiles
1096		Should a preliminary examination of this data indicate that more detailed
1097		information is required then it shall be provided to the DNO on request.
1098	DPC5.2.2.2	Detailed Planning Data
1099		It may be necessary for the User in addition to that in DPC5.2.2.1, to provide the
1100		following more comprehensive Detailed Planning Data on request.

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1101		In relation to Demand :
1102		(a) Type of load and control arrangements (eg controlled rectifier or large motor
1103		drives and type of starter employed).
1104		(b) Maximum load on each phase at the time of Peak Demand
1105		(c) Demand profiles (48 x half hour average estimates) for Active and Reactive
1106		Power Demand for the day of the Exit Point Peak Demand and for the day of
1107		the National Electricity Transmission System Peak Demand at Annual
1108		Average Cold Spell (ACS) Conditions .
1109		In relation to fluctuating loads:-
1110		(a) The rates of change of Demand (Active Power and Reactive Power) both
1111		increasing and decreasing.
1112		(b) The shortest repetitive time interval between fluctuations in Demand (Active
1113		Power and Reactive Power) .
1114		(c) The magnitude of the largest step changes in Active Power and Reactive
1115		Power , both increasing and decreasing.
1116		In some cases, more detailed information may need to be provided to permit a full
1117		assessment of the effect of the User's load on the DNO's Distribution System .
1118		Such information may include an indication of the pattern of build up of load and a
1119		proposed commissioning programme. This information will be specifically
1120		requested by the DNO when necessary.
1121	DPC5.2.3	A DNO is only entitled to use any information provided by a User under this
1122		Distribution Code for the purpose of fulfilling its obligations in respect of its
1123		Distribution System required by the Distribution Licence or the Distribution
1124		Code , including operating the procedures for Load Managed Areas and associated
1125		Security Restriction Notices specified in the Distribution Use of System
1126		Agreement .
1127	DPC5.3	Connection Arrangements
1128	DPC5.3.1	The design of connections between the DNO's Distribution System and Users
1129		shall be in accordance with the principles set out in DPC4, subject to any
1130		modification to which the DNO may reasonably consent.
1131	DPC5.3.2	During the application for connection process the DNO will agree with the User
1132		the voltage level to which a User will be connected in accordance with its normal
1133		practice for the type of load to be supplied. The DNO may on occasion specify a
1134		different connection voltage from normal in order to avoid potential disturbance
1135		caused by the User's Apparatus to other Users of the DNO's Distribution System
1136		or for other technical reasons or may agree alternative methods for minimising the
1137		effects of disturbing loads.
1138	DPC5.3.3	Before entering into a Connection Agreement and before making a connection to
1139		a User at a Connection Point , it will be necessary for the DNO to be reasonably
1140		satisfied that the User's System at the boundary with the DNO's Distribution
1141		System will comply with all appropriate requirements of the Distribution Code .
1142	DPC5.3.4	The User's installation shall comply with the principles expected in Regulation
1143		25(2)(a) of the ESQCR , or relevant European and British Standard as appropriate.

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1144 DPC5.4 Ownership Boundaries

1145 DPC5.4.1 The point or points at which supply is given or taken between the **DNO's**
1146 **Distribution System** and **Users** will be agreed between the **DNO** and the **User** as
1147 required. For supplies at **Low Voltage** the general rule is that the point of supply
1148 will be at the outgoing (ie **User's** side) terminals of the item of **DNO** or **Meter**
1149 **Operator** owned **Apparatus** where the transition is made to the **User's** tails or
1150 other **User** owned **Apparatus**. For **HV** supplies, including connections between
1151 the **DNO** and **User**, and where necessary busbar connected supplies at **Low**
1152 **Voltage**, the points of supply will be subject to specific agreement between the
1153 parties in each case.

1154 DPC5.4.2 The respective ownership of **Plant** or **Apparatus** will be recorded in a written
1155 agreement between the **DNO** and the **User** as required. In the absence of a separate
1156 agreement between the parties to the contrary, construction, commissioning,
1157 control, operation and maintenance responsibilities follow ownership.

1158 DPC5.4.3 For supplies to **Embedded Generators** who operate in parallel with the **DNO's**
1159 **Distribution System** and all supplies at **HV** the **DNO** will with the **User's**
1160 agreement prepare a **Site Responsibility Schedule** and, where determined by the
1161 **DNO** during the application for connection process, **Operation Diagrams** showing
1162 the agreed **Ownership Boundary**.

1163 The **Site Responsibility Schedule** shall detail the demarcation of responsibility for
1164 safety of persons carrying out work or testing at sites having a **Connection Point** to
1165 the **DNO's Distribution System** and/or circuits which cross an **Ownership**
1166 **Boundary** at any point.

1167 More detailed information on procedures and responsibilities involved in the
1168 provision of safety at interfaces between the **DNO's Distribution System** and a
1169 **User's System** is set out in **Distribution Operating Code** DOC8.

1170 Copies of these documents will be retained by the **DNO** and the **User**. Changes in
1171 the boundary arrangements proposed by either party must be agreed in advance and
1172 will be recorded on the **DNO Operation Diagrams**.

1173

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

1174 DISTRIBUTION PLANNING AND CONNECTION CODE 6

DPC6 TECHNICAL REQUIREMENTS FOR CONNECTIONS

1175 DPC6.1 Introduction

1176 **Distribution Planning and Connection Code DPC6** specifies the technical
1177 arrangements required at the **Ownership Boundary** between the **DNO's**
1178 **Distribution System** and the **System** of the **User** and is applicable at all voltage
1179 levels, but excludes **Users** (including those with **Unmetered Supplies**) connected
1180 at **Low Voltage**, without Generation, and protected by fuse(s) or other device(s)
1181 rated at 100 amps or less.

1182 DPC6.2 Equipment at the Ownership Boundary

1183 All **Equipment** at the **Ownership Boundary** shall meet the design principles
1184 contained within DPC4.4.1. Except in the case of the boundary between the **DNO**
1185 and an **Other Authorised Distributor**, connections for entry to and exit from the
1186 **DNO's Distribution System** shall incorporate a means of disconnection of the
1187 **User's** installation by the **DNO**. For the avoidance of doubt, this exemption does
1188 not apply at the interface between **DNO's Distribution System** and a multiple
1189 occupancy **Customer** premise.

1190 DPC6.3 Protection Requirements

1191 **Protection** requirements vary widely depending on established practices and the
1192 needs of the particular **DNO's Distribution System**. The basic requirement in all
1193 cases is that **Users'** arrangements for **Protection** at the **Ownership Boundary**,
1194 including types of **Equipment** and **Protection** settings, must be compatible with
1195 standards and practices on the **DNO's Distribution System**, maintaining necessary
1196 operating times, sensitivity, discrimination and co-ordination, as specified by the
1197 **DNO** during the application for connection process and which may be reviewed
1198 from time to time and complied with by the **User**.

1199 In particular:-

- 1200 (a) Maximum fault clearance times (from fault current inception to arc extinction)
1201 must be within the limits established by the **DNO** in accordance with
1202 **Protection** and **Equipment** short circuit rating policy adopted for the **DNO's**
1203 **Distribution System**.
- 1204 (b) In connecting to the **DNO's Distribution System** the **User** should be aware
1205 that auto-reclosing or sequential switching features may be in use on the
1206 **DNO's Distribution System**. The **DNO** will on request provide details of the
1207 auto-reclosing or sequential switching features in order that the **User** may take
1208 this into account in the design of the **User System**, including **Protection**
1209 arrangements.
- 1210 (c) **Users** should also be aware that the **Protection** arrangements on some **DNO's**
1211 **Distribution Systems** may cause disconnection of one phase or two phases
1212 only of a three phase supply for certain types of fault.

1213 DPC6.4 Earthing

1214 Earthing of that part of the **User's System** that is connected to the **DNO's**
1215 **Distribution System** shall comply with the arrangements specified in **DPC4**.

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1216 DPC6.5 **Fault Level Considerations**

1217 DPC6.5.1 The short circuit rating of **User's Equipment** at the **Connection Point** should be
1218 not less than the design **Fault Level** of the **DNO's Distribution System** to which
1219 it is connected. The choice of **Equipment** for connection at **Low Voltage** may take
1220 into account attenuation in the service lines as specified in DGD Annex 1, Item 6,
1221 Engineering Recommendation P25, "The short-circuit characteristics of single-
1222 phase and three-phase low voltage distribution networks". The **DNO** in the design
1223 of its **System** will take into account the contribution to **Fault Level** of the **User's**
1224 connected **System** and **Apparatus**.

1225 DPC6.5.2 In order to permit these assessments to be carried out information should be
1226 exchanged on prospective fault power in feed and X/R ratios where appropriate at
1227 points of entry to and exit from the **DNO's Distribution System**.

1228 DPC6.6 **Capacitive and Inductive Effects**

1229 The **User** shall, when applying to make a connection, provide the **DNO** with
1230 information as detailed in DPC8. Details will be required of capacitor banks and
1231 reactors connected at **HV** which could affect the **DNO's Distribution System** and
1232 which it is proposed to connect if agreed by the **DNO**. When requested by the **DNO**
1233 details shall also be provided of distributed circuit capacitance and inductance.
1234 Sufficient detail is required for the following:-

1235 (a) To verify that controlling **Equipment** of the **DNO's Distribution System** is
1236 suitably rated.

1237 (b) To show that the performance of the **DNO's Distribution System** will not be
1238 impaired.

1239 (c) To ensure that arc suppression coils when used by the **DNO** for **System**
1240 earthing purposes are correctly installed and operated.

1241 DPC6.7 **Communications and Telemetry Equipment**

1242 DPC6.7.1 Where required by the **DNO** in order to ensure control of the **DNO's Distribution**
1243 **System**, communications between **Users** and the **DNO** shall be established in
1244 accordance with the following. **Users** shall provide and maintain those parts of the
1245 communications equipment within their location. Provision of any necessary
1246 communications requirements shall be in accordance with the **Connection**
1247 **Agreement** for a specific connection.

1248 DPC6.7.2 **Primary Speech Facility**

1249 **Users** at their own cost shall provide and maintain equipment approved by the **DNO**
1250 by means of which routine and emergency communications may be established
1251 between the **User** and the **DNO**.

1252 Connection to the **DNO's** corporate telephone network and any circuit or circuits
1253 required to connect the **Users** with the point of connections shall be provided in
1254 accordance with the **Connection Agreement**.

1255 The facilities to be provided by the connection and the signalling and logical
1256 requirements for the interface between the **Users** equipment and the connection to
1257 the **DNO's** corporate telephone network will be specified in the **Connection**
1258 **Agreement**.

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1259 DPC6.7.3 Telemetry

1260 The **User** shall provide such voltage, current, frequency, **Active Power** and
1261 **Reactive Power** pulses and outputs and status points from his **System** as are
1262 considered reasonable by the **DNO** to ensure adequate **System** monitoring. The
1263 telemetry outstation in such a situation will be provided, installed and maintained
1264 by the **DNO**.

1265 DPC6.7.4 Telecontrol Outstation

1266 If it is agreed between the parties that the **DNO** shall control the switchgear on the
1267 **User's System**, the **DNO** shall install the necessary telecontrol outstation.
1268 Notwithstanding the above, it shall be the responsibility of the **User** to provide the
1269 necessary control interface for the switchgear of the **User** which is to be controlled.

1270 DPC6.7.5 Instructor Facilities

1271 Where required by the **DNO**, the **User** shall provide accommodation for special
1272 instructor facilities specified by **DNO** for the receipt of operational messages.

1273 DPC6.7.6 Data Entry Terminals

1274 The **User** shall accommodate the **DNO's** data entry terminals for the purpose of
1275 information exchange.

1276 DPC6.7.7 System Monitoring

1277 Monitoring equipment is provided on the **DNO's Distribution System** to enable
1278 the **DNO** to monitor dynamic performance conditions. ~~Under the requirements of~~
1279 ~~the Grid Code, Power Generating Modules~~ and ~~Power Generating~~
1280 ~~Facilities~~ ~~Power Station(s)~~ will need to provide signals for monitoring
1281 purposes. Where this monitoring equipment requires input signals from the **User's**
1282 side of the **DNO/User Ownership Boundary**, the **User** shall be responsible for the
1283 provision of suitable signals in accordance with the **Connection Agreement**.

1284 For **Power Generating Modules** commissioned on or after 17 May 2019,
1285 additional monitoring equipment in accordance with Engineering Recommendation
1286 G99, as applicable, shall be provided by the **Generator**.

1287

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1288 DISTRIBUTION PLANNING AND CONNECTION CODE 7

DPC7 REQUIREMENTS FOR EMBEDDED GENERATORS

1289 DPC7.1 Introduction

1290 DPC7.1.1 In addition to meeting the requirements of this Distribution Planning and
1291 Connection Code DPC7, Embedded Generators will need to meet the
1292 requirements of other relevant sections of the Distribution Code. This applies to
1293 Power Generating Modules that connected both prior to and after 17 May 2019.

1294 ~~DPC7.1.24 This Distribution Planning and Connection Code~~ DPC7 is applicable to all
1295 ~~Embedded Generators~~ including a ~~Customer With Own Generation~~ and ~~Other~~
1296 ~~Authorised Distributors~~, having ~~Power Generating Modules~~ **Generating Plant**
1297 operating or capable of operating in parallel with the **DNO's Distribution System**
1298 ~~that were commissioned on the DNO's Distribution System prior to 17 May 2019.-~~

1299 ~~DPC7.1.32~~ In addition Power Generating Module(s) in construction belonging to Generators
1300 who had concluded a final and binding contract for the purchase of main generating
1301 plant before 17 May 2018 need to comply with the rest of DPC7; they do not need
1302 to comply with Engineering Recommendation G99. The Generator must notify
1303 the DNO of the conclusion of this final and binding contract by 17 November 2018.

1304 DPC7.1.4 Power Generating Modules commissioned on or after 17 May 2019, or which
1305 have been substantially modified after that date, must meet the requirements of
1306 Engineering Recommendation G98 or Engineering Recommendation G99 as
1307 applicable. Such Power Generating Modules do not need to comply with the
1308 requirements of the rest of DPC7.

1309 DPC7.1.5 17 May 2019 is the date from which new or substantially modified Power
1310 Generating Modules must comply with the European Network Code on
1311 Requirements for ConnexionConnection of Generators. Compliance with
1312 Engineering Recommendations G98 and G99 will ensure compliance with this
1313 European Network Code.

1314 ~~In addition to meeting the requirements of DPC7, Embedded Generators will need to meet the~~
1315 ~~requirements of other relevant sections of the Distribution Code.~~

1316 ~~DPC7.1.3 For the avoidance of doubt a User who has installed a Generation Set in~~
1317 ~~accordance with Item 13 DGD Annex 1 Engineering Recommendation G83~~
1318 ~~("Recommendations For The Connection of Type Tested Small Scale Embedded~~
1319 ~~Generators (Up To 16 A Per Phase) in Parallel With Public Low Voltage~~
1320 ~~Distribution Networks") and where this is (are) their only Generation Set(s), and~~
1321 ~~which has been installed, commissioned and operated in accordance with Annex 1,~~
1322 ~~Item 13, that User shall not be required to comply with the requirements of DPC7~~
1323 ~~in respect of that (those) Generation Set.~~

1324 ~~DPC7.1.4 Where Generating Plant is not intended for parallel operation, but where short~~
1325 ~~term paralleling is desirable to avoid loss of supply during changeover, then the~~
1326 ~~Generating Plant may be permitted to operate in parallel with the DNO's~~
1327 ~~Distribution System for no more than 5 minutes in any month, and no more~~
1328 ~~frequently than once per week. If the duration of parallel connection exceeds this~~
1329 ~~period, or this frequency, then the Generating Plant must be considered as if it is,~~
1330 ~~or can be, operated in long term parallel operation mode. An alternative frequency~~

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- 1331 and duration may be agreed between the DNO and the **Generator**, taking account
1332 of particular site circumstances and **Generating Plant** design.
- 1333 ~~DPC7.1.5~~ Where ~~DPC 7.1.4~~ applies, an electrical time interlock should be installed to ensure
1334 that the period of parallel operation does not exceed the agreed period. The timer
1335 should be a separate device from the changeover control system such that failure of
1336 the auto changeover system will not prevent the parallel being broken.
- 1337 **DPC7.2 General Requirements**
- 1338 **DPC7.2.1 Embedded Generators** ~~connected to the DNO's Distribution~~
1339 ~~System will~~ commissioned prior to 17 May 2019 shall comply with the requirements
1340 of Item 3, DGD Annex 1 Engineering Recommendation G59/3-3,
1341 "Recommendation for the connection of generating plant to the distribution systems
1342 of licensed distribution network operators".
- 1343 **DPC7.2.2** Every installation or network which includes a **Power Generating Module**
1344 operating in parallel with the **DNO's Distribution System** must include an
1345 **Isolating Device** capable of disconnecting the whole of the infeed from the **DNO's**
1346 **Distribution System**. This **Isolating Device** will normally be owned by the
1347 **Generator**, but may by agreement be owned by the **DNO**.
- 1348 **DPC7.2.3** The **Generator** must grant the **DNO** rights of access to the **Isolating Device**
1349 without undue delay and the **DNO** must have the right to isolate the **Generator's**
1350 infeed at any time should such disconnection become necessary for safety reasons
1351 and in order to comply with statutory obligations. The **Isolating Device** should
1352 normally be installed at the **Connection Point**, but may be positioned elsewhere
1353 with the **DNO's** agreement.
- 1354 ~~DPC7.2.4~~ To ensure that ~~DNO~~ staff and that of the ~~User~~ and the ~~User's~~ contractors are aware
1355 of the presence of **Generating Plant**, appropriate warning labels should be used.
1356 ~~Where the installation is connected to the DNO's Distribution System at Low~~
1357 ~~Voltage the installer should generally provide labelling at the Connection Point,~~
1358 ~~meter position, consumer's unit and at all points of isolation within the User's~~
1359 ~~premises to indicate the presence of Generating Plant. The labelling should be~~
1360 ~~sufficiently robust and if necessary fixed in place to ensure that it remains legible~~
1361 ~~and secure for the lifetime of the installation. The Health and Safety (Safety Signs~~
1362 ~~& Signals) Regulations 1996 stipulates that labels should display the prescribed~~
1363 ~~triangular shape, and size, using black on yellow colouring.~~
- 1364 ~~DPC7.2.5~~ The disconnection of **Generating Plant** must be achieved by the physical
1365 separation of mechanical contacts unless the disconnection is at **Low Voltage** and
1366 the equipment for achieving the disconnection contain appropriate self-monitoring
1367 of the point of disconnection, in which case an appropriate electronic means such
1368 as a suitably rated semiconductor switching device would be acceptable.
- 1369 ~~DPC7.2.6~~ Where the **Connection Point** provided by the **DNO** for parallel operation is at **HV**,
1370 in addition to the provisions of DOC8, the **Generator** must ensure that a person
1371 with authority, or his staff, is available at all times to receive communications from
1372 the ~~DNO Control Person~~ so that emergencies, requiring urgent action by the
1373 **Generator**, can be dealt with adequately. Where required by the **DNO**, it will also
1374 be a duty of the **Generator's** staff to advise the ~~DNO Control Person~~ of any
1375 abnormalities that occur on the **Generating Plant** which have caused, or might
1376 cause, disturbance to the **DNO's Distribution System**, for example earth faults.
- 1377 **DPC7.2.74** Manual synchronizing can only be done with the specific agreement of the **DNO**.

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~~DPC7.2.8 The DNO's interface circuit breaker will not be used for synchronizing, without the express agreement of the DNO.~~

DPC7.3 Provision of Information

Embedded Generators can have a significant effect on the **DNO's Distribution System** and as a result its **Users**. To enable the **DNO** to assess the impact ~~fo an Embedded Power Generating Module Generating Plant~~ or an **Embedded Transmission System** will have on the **DNO's Distribution System**, the **Embedded Generator** will be required to supply information to the **DNO**.

Embedded Generators shall provide the following minimum information to the **DNO** during the connection application process or otherwise as requested by the **DNO**:-

Relevant Sections:

- | | |
|---|---|
| (a) Power Station and site data for all Embedded Generators excluding the OTSO . | DPC7.3.1 and Schedule 5a of the DDRC |
| (b) <u>Power Generating Module</u> data for all Embedded | DPC7.3.2 and Schedule 5b of the DDRC |
| (c) <u>Power Generating Module</u> data for specified types of Embedded <u>Power Generating Modules</u> | DPC7.3.2 and Schedules 5c of the DDRC |
| 5c(i) Synchronous generators | |
| 5c(ii) Fixed speed induction generators | |
| 5c(iii) Double fed induction generators | |
| 5c(iv) Converter connected generators | |
| 5c(v) Transformers | |
| (d) data for Embedded Medium Power Stations | DPC7.3.3 and Schedules 5c of the DDRC |
| (e) Embedded Transmission System data | DPC7.3.1, DPC7.3.2 and DPC7.3.3 and Schedule 5e of DDRC |

When applying for connection to the **DNO's Distribution System Embedded Generators** shall also refer to DPC5.

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1394 The **DNO** will use the information provided to model the **DNO's Distribution**
1395 **System** and to decide what method of connection will need to be employed and the
1396 voltage level to which the connection should be made. If the **DNO** reasonably
1397 concludes that the nature of the proposed connection or changes to an existing
1398 connection requires more detailed consideration then further information may be
1399 requested. It is unlikely that more information than that specified in DPC7.3.1 will
1400 be required for **Embedded Generators** who are to be connected at **Low Voltage**
1401 and have less than 50kVA in capacity, or connected at other than **Low Voltage** and
1402 have less than 300kVA in capacity.

1403 DPC7.3.1 Information Required from ~~all~~ Embedded Generators

1404 It will be necessary for each **Embedded Generator** to provide to the **DNO**
1405 information on physical and electrical characteristics of the **Power Generating**
1406 **Facility** ~~Power Station~~ and site as a whole as set out in Schedules 5a or 5e of the
1407 **Distribution Data Registration Code** before entering into an agreement to connect
1408 any **Power Generating Module** ~~Generating Plant~~ or an **Embedded**
1409 **Transmission System** onto the **DNO's Distribution System**:-

1410 The information required includes:

1411 (a) Details of the proposed connection point (geographical and electrical) and
1412 connection voltage.

1413 (b) The number and types of **Power Generating Module** ~~generators~~ and the total
1414 capacity of the **Power Generating Facility** ~~power station~~ and auxiliary supplies
1415 under various operating conditions.

1416 (c) Sketches of **System Layout**:

1417 **Operation Diagrams** showing the electrical circuitry of the existing and
1418 proposed main features within the **User's System** and showing as appropriate
1419 busbar arrangements, phasing arrangements, earthing arrangements, switching
1420 facilities and operating voltages.

1421 (d) Interface Arrangements

1422 (i) The means of synchronisation between the **DNO** and **User**;

1423 (ii) Details of arrangements for connecting with earth that part of the
1424 **Embedded Generator's System** directly connected to the **DNO's**
1425 **Distribution System**.

1426 (iii) The means of connection and disconnection which are to be employed.

1427 (iv) Precautions to be taken to ensure the continuance of safe conditions
1428 should any earthed neutral point of the **Embedded Generator's**
1429 **System** operated at **HV** become disconnected from earth.

1430 More or less detailed information than that contained above might need to be
1431 provided, subject to the type and size of generation or the point at which connection
1432 is to be made to the **DNO's Distribution System**. This information will need to be
1433 provided by the **Embedded Generator** at the reasonable request of the **DNO**.

1434 DPC7.3.2 Additional ~~Generation Set~~ **Power Generating Module** and Plant and 1435 **Equipment Data Required from Embedded Generators.**

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1436		The Standard Planning Data and Detailed Planning Data specified in Schedule
1437		5b and Schedule 5c (or Schedule 5e for the OTSO) of the Distribution Data
1438		Registration Code may be requested by the DNO from the User before entering
1439		into an agreement to connect any Power Generating Module Generating Plant
1440		or Embedded Transmission System onto the DNO's Distribution System .
1441		The information specified in Schedule 5b of the Distribution Data Registration
1442		Code includes generic data for all Embedded Power Generating Modules .
1443		The information specified in Schedule 5c of the Distribution Data Registration
1444		Code includes the more detailed electrical parameters of individual Generation
1445		Set Power Generating Modules and associated plant such as transformers, power
1446		factor correction equipment. The information required is classified as Standard
1447		Planning Data and Detailed Planning Data for each of the following categories
1448		of Embedded Power Generating Module :
1449		(i) Synchronous generators
1450		(ii) Fixed speed induction generators
1451		(iii) Doubly fed induction generators
1452		(iv) Series converter connected generators.
1453		(v) Transformers
1454		Under certain circumstances either more or less detailed information than that
1455		specified above might need to be provided and will be made available by the
1456		Embedded Generator at the request of the DNO .
1457	DPC7.3.3	Extra Information From Embedded Generators to be Provided to Meet Grid
1458		Code Requirements
1459	DPC 7.3.3(a)	The DNO has an obligation under PC3.3 of the Grid Code to submit certain
1460		planning data relating to Embedded Medium Power Stations to NGC . The
1461		relevant data requirements of the Grid Code are also listed in PC3.3 of the Grid
1462		Code . It is incumbent on Embedded Medium Power Stations to provide this
1463		data listed in PC3.3 of the Grid Code to the DNO .
1464		Where a Generator in respect of an Embedded Power Station is a party to the
1465		CUSC this DPC 7.3.3 will not apply.
1466	DPC7.3.3(b)	In addition to supplying the DNO with details of Embedded there is a requirement
1467		to provide information to NGC where it has been specifically requested by NGC
1468		in the circumstances provided for under the Grid Code .

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- 1469 DPC7.3.4 **Information Provided by the DNO to Users**
- 1470 In accordance with Condition ~~4-12~~ and Condition 25 of its **Distribution Licence**
- 1471 the **DNO** is required to provide certain information to **Users** so that they have the
- 1472 opportunity to identify and evaluate opportunities to connect to the **DNO's**
- 1473 **Distribution System** as set out in DPC4.5.- Comprehensive information on the
- 1474 **DNO's Distribution System** operating at 33kV and above is made available to
- 1475 **Users** through the Long Term Development Statements provided under Condition
- 1476 25 of the **Distribution Licence**. Schedule 5d of the **Distribution Data**
- 1477 **Registration Code** is indicative of the type of network data the **DNOs** is required
- 1478 to provide to **Users** for identifying opportunities for connection of generation at
- 1479 voltages below 33kV. On the production of Schedule 5d data for a **User**, the **DNO**
- 1480 will update any relevant data that would otherwise be provided from the Long Term
- 1481 Development Statement.
- 1482 DPC7.4 **Technical Requirements**
- 1483 DPC7.4.1 **Power Generating Module Performance Requirements**
- 1484 DPC7.4.1.1 The requirements of this DPC7.4.1 do not apply to ~~Generation Set~~ **Power**
- 1485 **Generating Modules** that are designed and installed for infrequent short term
- 1486 parallel operation only.
- 1487 DPC7.4.1.2 For an Embedded **Power Generating Module**, **Generating Plant**, which does not
- 1488 constitute or contain **BM Units** that are active (ie submitting bid-offer data) in the
- 1489 **Balancing Mechanism**, the electrical parameters required to be achieved at the
- 1490 **Power Generating Module** terminals are defined according to the connection
- 1491 method and will be specified by the **DNO** with the offer for connection. A **Power**
- 1492 **Generating Module** or **Power Station** must be capable of supplying its **Registered**
- 1493 **Capacity** within the **System Frequency** range 49.5 to 50.5 Hz. The output power
- 1494 should not be affected by voltage changes in the permitted operating range.
- 1495 ~~DPC7.4.1.3 In exceptional circumstances, the **Frequency** of the **DNO's Distribution System**~~
- 1496 ~~could rise above 50.5 Hz or fall below 49.5 Hz. **Generation Sets in Embedded**~~
- 1497 ~~**Small Power Stations** shall be capable of continuing to operate in parallel with the~~
- 1498 ~~**DNO's Distribution System** in accordance with the following:~~
- 1499 a. ~~47 Hz – 47.5 Hz – Operation for a period of at least 20 seconds is required~~
- 1500 ~~each time the **Frequency** is within this range~~
- 1501 b. ~~47.5 Hz – 51.5 Hz – Disconnection by overfrequency or underfrequency~~
- 1502 ~~**Protection** is not permitted in this range~~
- 1503 c. ~~51.5 Hz – 52 Hz – Operation for a period of at least 90 seconds is required~~
- 1504 ~~each time the **Frequency** is within this range~~
- 1505 DPC7.4.1.43 These **Frequency** operating range requirements also apply to **Power Generating**
- 1506 **Modules** in **Embedded Power Station** ~~Small Power Stations~~ already connected
- 1507 on or before 1 August 2010, unless the **Registered Capacity** of the **Embedded**
- 1508 **Power Station** ~~Small Power Station~~ is below 5 MW.
- 1509 DPC7.4.1.54 For the avoidance of doubt, the above requirements do not preclude disconnection
- 1510 of **Power Generating Modules** by **Protection** agreed with the **DNO** or when
- 1511 necessary to protect **Plant** or **Apparatus** from being damaged
- 1512 DPC7.4.1.65 **Embedded Medium Power Stations** additionally have to comply with DPC 7.5.

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- 1513
- 1514 DPC7.4.2 **Control Arrangements**
- 1515 DPC7.4.2.1 The **DNO** will specify in writing if a continuously acting fast response automatic
1516 excitation control system is required to control the **Power Generating Module**
1517 voltage without instability over the entire operating range of the **Power Generating**
1518 **Module** or **Power Station**. This will be dependent on the size and type of **Power**
1519 **Generating Module** ~~**Generating Plant**~~ or **Power Station** and the adjacent part of
1520 the **DNO's Distribution System** to which it is connected.
- 1521 DPC7.4.2.2 The **Generator** will notify, and keep notified, the **DNO** of the set points of the
1522 control scheme for voltage control or **Power Factor** control as appropriate and
1523 which have previously been agreed between the **Generator** and **DNO**. The
1524 information to be provided is detailed in Schedule 5a and Schedule 5b.
- 1525 DPC7.4.3 **Protection Requirements**
- 1526 DPC7.4.3.1 **Co-ordinating with Existing Protection**
- 1527 It will be necessary for the **Protection** associated with **any Embedded Power**
1528 **Generating Module** and any **Embedded Transmission System** to co-ordinate
1529 with the **Protection** associated with the **DNO's Distribution System** as follows:-
- 1530 (a) For ~~**Generating Plant**~~ **any Power Generating Module** and any **Embedded**
1531 **Transmission System** directly connected to the **DNO's Distribution System**
1532 the **Embedded Generator** must meet the target clearance times for fault
1533 current interchange with the **DNO's Distribution System** in order to reduce to
1534 a minimum the impact on the **DNO's Distribution System** of faults on circuits
1535 owned by **Embedded Generators** or on an **Embedded Transmission System**.
1536 The **DNO** will ensure that the **DNO Protection** settings meet its own target
1537 clearance times.
- 1538 The target clearance times are measured from fault current inception to arc
1539 extinction and will be specified by the **DNO** to meet the requirements of the
1540 relevant part of the **Distribution System**.
- 1541 (b) The settings of any **Protection** controlling a circuit breaker or the operating
1542 values of any automatic switching device at any point of connection with the
1543 **DNO's Distribution System**, as well as the **User's** maintenance and testing
1544 regime, shall be agreed between the **DNO** and the **User** in writing during the
1545 connection consultation process.
- 1546 The **Protection** settings or operating values shall not be changed without the
1547 express agreement of the **DNO**.
- 1548 (c) It will be necessary for the **Power Generating Module** ~~**Generating Plant**~~
1549 **Protection** and **Embedded Transmission System Protection** to co-
1550 ordinate with any auto-reclose policy specified by the **DNO**. In particular
1551 the **Power Generating Module** ~~**Generating Plant**~~ **Protection** should detect
1552 a loss of mains situation and disconnect the **Power Generating Module**
1553 ~~**Generating Plant**~~ in a time shorter than any auto reclose dead time. This
1554 should include an allowance for circuit breaker operation and generally a
1555 minimum of 0.5s should be allowed for this. For pole mounted auto-reclosers
1556 often set with a dead time of 1s, this implies a loss of mains response time of
1557 0.5s. Similar response time is expected from under and over voltage relays.

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DPC7.4.3.2 Specific **Protection** Required for Embedded **Power Generating Modules** **Generating Plant**

In addition to any **Protection** installed by the **Generator** to meet his own requirements and statutory obligations on him, the **Generator** must install **Protection** to achieve the following objectives:

- i. For all **Power Generating Modules**:
 - a. To disconnect the **Power Generating Module** from the **System** when a **System** abnormality occurs that results in an unacceptable deviation of the **Frequency** or voltage at the **Connection Point**;
 - b. To ensure the automatic disconnection of the **Power Generating Module**, or where there is constant supervision of an installation, the operation of an alarm with an audio and visual indication, in the event of any failure of supplies to the protective equipment that would inhibit its correct operation.
- ii. For polyphase **Power Generating Modules**
 - a. To inhibit ~~connexion~~connection of **Power Generating Modules** to the **System** unless all phases of the **DNO's Distribution System** are present and within the agreed ranges of **Protection** settings;
 - b. To disconnect the **Power Generating Module** from the **System** in the event of the loss of one or more phases of the **DNO's Distribution System**;
- iii. For single phase **Power Generating Modules**
 - a. To inhibit ~~connexion~~connection of **Power Generating Modules** to the **System** unless that phase of the **DNO's Distribution System** is present and within the agreed ranges of **Protection** settings;
 - b. To disconnect the **Power Generating Module** from the **System** in the event of the loss of that phase of the **DNO's Distribution System**;

DPC7.4.3.3 Suitable **Protection** arrangements and settings will depend upon the particular **Generator's** installation and the requirements of the **DNO's Distribution System**. These individual requirements must be ascertained in discussions with the **DNO**. To achieve the objectives above, the **Protection** must include the detection of:

- a. Over Voltage (O/V)
- b. Under Voltage (U/V)
- c. Over **Frequency** (O/F)
- d. Under **Frequency** (U/F)
- e. Loss of Mains (LoM)

There are different **Protection** settings dependent upon the **System** voltage at which the is connected (LV or HV) ~~and also its size (eg **Small Power Station**, **Medium Power Station** and **Large Power Station**).~~

Protection settings for a **Large Power Station** ~~larger~~ **Power Stationss** and any ~~connexion~~connection at 132kV must be considered on an individual basis and be consistent with **Grid Code** requirements. Loss of Mains protection will only be permitted at these sites if sanctioned by **NGC** ~~—see DPC7.4.3.8 below.~~

For the purposes of DPC 7.4.3 the date of commissioning of a **Power Generating Module** is the date on which the tests required by DPC 7.4.9 have been complete to the **DNO's** satisfaction.

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DPC7.4.3.4 The following summarizes the required **Protection** settings that will generally be applied for long term parallel operation are given in EREC G59 paragraph 10.5.7.1.

Prot Function	Small Power Station				Medium Power Station	
	LV Protection ^{\$}		HV Protection ^{\$}			
	Setting	Time	Setting	Time	Setting	Time
U/V _{st-1}	$V_{\phi-n}^{\ddagger}-13\%$ =200.1V	2.5s [*]	$V_{\phi-\phi}^{\ddagger}-13\%$	2.5s [*]	$V_{\phi-\phi}^{\ddagger}-20\%$	2.5s [*]
U/V _{st-2}	$V_{\phi-n}^{\ddagger}-20\%$ =184.0V	0.5s	$V_{\phi-\phi}^{\ddagger}-20\%$	0.5s		
O/V _{st-1}	$V_{\phi-n}^{\ddagger}+14\%$ =262.2V	1.0s	$V_{\phi-\phi}^{\ddagger}+10\%$	1.0s	$V_{\phi-\phi}^{\ddagger}+10\%$	1.0s
O/V _{st-2}	$V_{\phi-n}^{\ddagger}+19\%$ =273.7V	0.5s	$V_{\phi-\phi}^{\ddagger}+13\%$	0.5s		
U/F _{st-1}	47.5Hz	20s	47.5Hz	20s	47.5Hz	20s
U/F _{st-2}	47Hz	0.5s	47Hz	0.5s	47Hz	0.5s
O/F _{st-1}	51.5Hz	90s	51.5Hz	90s	52Hz	0.5s
O/F _{st-2}	52 Hz	0.5s	52Hz	0.5s	-	

ReCoP ³ settings for Power Stations <5MW Registered Capacity		
Date of Commissioning	Asynchronous	Synchronous
Generating Plant Commissioned before 01/02/18	Not to be less than $K2 \times 0.125 \text{ Hz/s}^{\#}$ and not to be greater than $1.0 \text{ Hz/s}^{\#}$; time delay 0.5s	Not to be less than $K2 \times 0.125 \text{ Hz/s}^{\#}$ and not to be greater than $1.0 \text{ Hz/s}^{\#}$; time delay 0.5s
Generating Plant commissioned on or after 01/02/18	$1.0 \text{ Hz/s}^{\#}$; time delay 0.5s	$1.0 \text{ Hz/s}^{\#}$; time delay 0.5s

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RoCoF [§] -settings-for Power Stations ≥ 5 MW Registered Capacity				
Date of Commissioning		Small Power Stations		Medium Power Stations
		Asynchronous	Synchronous	
Generating Plant Commissioned before 01/08/14	Settings permitted until 01/08/16	Not to be less than $K2 \times 0.125 \text{ Hz/s}^\#$ and not to be greater than $1.0 \text{ Hz/s}^\#$; time delay 0.5s	Not to be less than $K2 \times 0.125 \text{ Hz/s}^\#$ and not to be greater than $0.5 \text{ Hz/s}^\#\Omega$; time delay 0.5s	Intertripping Expected
	Settings permitted on or after 01/08/16	$1.0 \text{ Hz/s}^\#$; time delay 0.5s	$0.5 \text{ Hz/s}^\#\Omega$; time delay 0.5s	Intertripping expected
Generating Plant commissioned between 01/08/14 and 31/07/16		$1.0 \text{ Hz/s}^\#$; time delay 0.5s	$0.5 \text{ Hz/s}^\#\Omega$; time delay 0.5s	Intertripping expected
Generating Plant commissioned on or after 01/08/16		$1.0 \text{ Hz/s}^\#$; time delay 0.5s	$1.0 \text{ Hz/s}^\#$; time delay 0.5s	Intertripping expected

Historic Vector Shift Settings			
Date of Commissioning	Small Power Stations		Medium Power Stations
	Asynchronous	Synchronous	
Settings permitted for Generating Plant commissioned before 01/02/18	K1 x 6 degrees	K1 x 6 degrees [#]	Intertripping Expected
Settings permitted for Generating Plant commissioned on or after 01/02/18	Vector Shift not allowed as LoM in these Power Stations		Intertripping Expected

Notes:

ϕ n; ϕ ϕ denote RMS phase to neutral and phase-phase values respectively of the voltage at the **Connection Point**

\S HV and LV Protection settings are to be applied according to the voltage reference at which the protection is measuring, ie:

- If the G59 protection takes its voltage reference from an LV source then LV protection settings shall be applied.
- If the G59 protection takes its voltage reference from an HV source then HV protection settings shall be applied.

\ddagger A value of 230V shall be used for all DNO LV systems

\ddagger A value to suit the voltage of the connexion/connection point

* Might need to be reduced if auto reclose dead times are ≤ 3 s

Intertripping may be considered as an alternative to the use of a Loss of Mains relay

$K1 = 1.0$ (for low impedance networks) or $1.66 - 2.0$ (for high impedance networks)

$K2 = 1.0$ (for low impedance networks) or 1.6 (for high impedance networks)

\S Rate of change of frequency

\P The required protection requirement is expressed in Hertz per second (Hz/s). The time delay should begin when the measured rate exceeds the threshold expressed in Hz/s and be reset if it falls below that threshold. The relay must not trip unless the measured rate remains above the threshold expressed in Hz/s continuously for 500ms. Setting the number of cycles on the relay used to calculate the RoCoF is not an acceptable implementation of the time delay since the relay would trip in less than 500ms if the rate was significantly higher than the threshold.

Ω The minimum setting is 0.5Hz/s. For overall system security reasons, settings closer to 1.0Hz/s are desirable, subject to the capability of the generating plant to work to higher settings.

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~~DPC7.4.3.5 Any **Generating Plant** commissioned on or after 01/02/18 must not employ vector shift as a LoM technique. On or after 01/02/18 no **Generating Plant** may be retrofitted with vector shift as a LoM technique.~~

~~DPC7.4.3.6 Over and Under voltage **Protection** must operate independently for all phases in all cases.~~

~~DPC7.4.3.7 The settings in DPC7.4.3.4 apply to **Embedded Small Power Stations** and **Embedded Medium Power Stations**. In exceptional circumstances **Generators** have the option to agree alternative settings with the **DNO** if there are valid justifications in that the **Generating Plant** may become unstable or suffer damage with the settings specified in DPC7.4.3.4. The agreed settings should be recorded in the **Connection Agreement**.~~

DPC7.4.3.58 The underfrequency and overfrequency **Protection** settings set out in EREC G59 paragraph 10.5.7.1 ~~DPC7.4.3.4~~ also apply to **Power Generating Modules** in an **Embedded Small Power Stations** **Power Stations of Registered Capacity of less than 50MW and at or above 5 MW** already existing on or before 1 August 2010 ~~with a **Registered Capacity** at or above 5 MW~~, except where single stage **Frequency Protection** relays are used, in which case the following settings apply.

Protection Function	Setting	Time
U/F	47.5Hz	0.5 s
O/F	51.5Hz	0.5 s

In exceptional circumstances **Generators** have the option to agree alternative settings with the **DNO** if there are valid justifications in that the **Power Generating Module** may become unstable or suffer damage with the settings specified above. The agreed settings should be recorded in the **Connection Agreement**.

~~DPC7.4.3.9 A loss of mains **Protection** of the RoCoF type will generally be appropriate for **Small Power Stations**, but this type of loss of mains **Protection** must not be installed for **Power Stations** >50MW. In those cases where the **DNO** requires loss of mains **Protection** this must be provided by a means not susceptible to spurious or nuisance tripping, eg intertripping.~~

~~DPC7.4.3.10 Where short term paralleling in accordance with DPC7.1.4 is employed, the protection settings in the following table should be used in preference to those in DPC7.4.3.4.~~

Prot Function	Infrequent Short Term Parallel Operation			
	LV Protection		HV Protection	
	Setting	Time	Setting	Time
U/V	$V_{\phi-n} \pm 10\%$ (207V)	0.5s	$V_{\phi-\phi} \pm 6\%$	0.5s
O/V	$V_{\phi-n} \pm 14\%$ 262.2V	0.5s	$V_{\phi-\phi} \pm 6\%$	0.5s
U/F	49.5Hz	0.5s	49.5Hz	0.5s
O/F	50.5Hz	0.5s	50.5Hz	0.5s

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1662 ~~‡ A value of 230V shall be used in all cases for DNO LV systems~~

1663 ~~‡ A value to suit the voltage of the HV connexionconnection-point~~

1664 DPC7.4.4 Fault Ride Through and Phase Voltage Unbalance

1665 Any ~~Generation Set~~ **Power Generating Module** or **Power Station** connected to
1666 the **DNO's Distribution System**, where it has been agreed between the **DNO** and
1667 the **Generator** that the **Generator's Power Station** will contribute to the **DNO's**
1668 **Distribution System** security, may be required to withstand, without tripping, the
1669 effects of a close up three phase fault and the **Phase (Voltage) Unbalance**
1670 imposed during the clearance of a close-up phase-to-phase fault , in both cases
1671 cleared by the **DNO's** main protection. The **DNO** will advise the **Embedded**
1672 **Generator** in each case of the likely tripping time of the **DNO's** protection, and for
1673 phase-phase faults, the likely value of **Phase (Voltage) Unbalance** during the fault
1674 clearance time.

1675 In the case of phase to phase faults on the **DNO's** system that are cleared by **System**
1676 back-up **Protection** which will be within the **Plant** short time rating on the **DNO's**
1677 **Distribution System** the **DNO**, on request during the **Connection Agreement**
1678 process, will advise the **Embedded Generator** of the expected **Phase Voltage**
1679 **Unbalance**.

1680 DPC7.4.5 System Stability

1681 DPC7.4.5.1 The following requirements for system design within this DPC 7.4.5 will generally
1682 be applied by the **DNO** to any **Power Stations** connected at 33kV and above.
1683 However there will be cases where the specific network conditions, including
1684 existing connected any **Power Stations**, requires the **DNO** to apply these
1685 considerations at lower voltages.

1686 DPC7.4.5.2 With the **System** in its normal operating state, it is desirable that all **Power**
1687 **Generating Modules** remain connected and stable for any of the following
1688 credible fault outages,

1689 (a) any one single circuit overhead line, transformer feeder or cable circuit,
1690 independent of length,

1691 (b) any one transformer or reactor,

1692 (c) any single section of busbar at or nearest the point of connection where busbar
1693 protection with a total clearance time of less than 200ms is installed,

1694 (d) if demand is to be secured under a second circuit outage as required by ER
1695 P2/6, fault outages (a) or (b), overlapping with any pre-existing first circuit
1696 outage, usually for maintenance purposes. In this case the combination of
1697 circuit outages considered should be that causing the most onerous conditions
1698 for **System Stability**, taking account of the slowest combination of main
1699 protection, circuit breaker operating times and strength of the connections to
1700 the system remaining after the faulty circuit or circuits have been disconnected

1701 DPC7.4.5.3 Any **Power Generating Module** that causes the **System** to become unstable under
1702 fault conditions must be rapidly disconnected to reduce the risk of **Plant** damage
1703 and disturbance to the **System**.

1704 DPC7.4.6 Neutral Earthing

1705 The winding configuration and method of earthing connection shall be agreed with
1706 the **DNO**.

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- 1707 In addition, where the **Generator's Connection Point** is at **Low Voltage** the
1708 following shall apply
- 1709 (a) Where an earthing terminal is provided by the **DNO** it may be used by a
1710 **Generator** for earthing the **Power Generating Module**, provided the **DNO**
1711 earth connection is of adequate capacity. If the **Power Generating Module**
1712 is intended to operate independently of the **DNO's** supply, the **Power**
1713 **Generating Module** must include an earthing system which does not rely
1714 upon the **DNO's** earthing terminal. Where use of the **DNO's** earthing terminal
1715 is retained, it must be connected to the **Power Generating Module** earthing
1716 system by means of a conductor at least equivalent in size to that required to
1717 connect the **DNO's** earthing terminal to the installation.
- 1718 (b) Where the **Power Generating Module** may be operated as a switched
1719 alternative only to the **DNO's System**, the **Generator** shall provide an
1720 independent earth electrode.
- 1721 (c) Where it is intended to operate in parallel with the **DNO's Low Voltage**
1722 **System** with the star point connected to the neutral and/or earthing system,
1723 precautions will need to be taken to limit the effects of circulating harmonic
1724 currents. It is permissible to insert an impedance in the supply neutral of the
1725 **Power Generating Module** for this purpose, for those periods when it is
1726 paralleled with the **DNO's System**. However, if the **Power Generating**
1727 **Module** is operating in isolation from the **DNO's Distribution System** it will
1728 be necessary to have the **Power Generating Module** directly earthed.
- 1729 (d) Where the **Power Generating Module** is designed to operate independently
1730 from the **DNO's Distribution System** the switchgear that is used to separate
1731 the two **Systems** shall break all four poles (3 phases and neutral). This prevents
1732 any phase or neutral current, produced by the **Power Generating Module**,
1733 from flowing into the **DNO's Distribution System** when it operates as a
1734 switched alternative only supply

1735 DPC7.4.7 Frequency Sensitive Relays

1736 It is conceivable that a part of the **DNO's Distribution System**, to which
1737 **Embedded Generators** are connected can, during emergency conditions, become
1738 detached from the rest of the **System**. It will be necessary for the **DNO** to decide,
1739 dependent on local network conditions, if it is desirable for the **Embedded**
1740 **Generators** to continue to generate onto the islanded **DNO's Distribution System**.

1741 If no facilities exist for the subsequent resynchronisation with the rest of the **DNO's**
1742 **Distribution System** then the **Embedded Generator** will under **DNO** instruction,
1743 ensure that the **Power Generating Module** and/or **Embedded Transmission**
1744 **System** is disconnected for re-synchronisation.

1745 DPC7.4.8 Black Start Capability

1746 The **National Electricity Transmission System** will be equipped with **Black Start**
1747 **Stations** (in accordance with the **Distribution Operating Code DOC 9**). It will be
1748 necessary for each **Embedded Generator** to notify the **DNO** if its has a restart
1749 capability without connection to an external power supply, unless the **Embedded**
1750 **Generator** shall have previously notified **NGC** accordingly under the **Grid Code**.
1751 Such generation may be registered by **NGC** as a **Black Start Station**.

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1752 DPC7.4.9 Commissioning Tests

1753 DPC7.4.9.1 Where **Power Generating Module** or an **Embedded Transmission System**
1754 requires connection to the **DNO's Distribution System** in advance of the
1755 commissioning date, for the purposes of testing, the **Embedded Generator** must
1756 comply with the requirements of the **Connection Agreement**. The **Embedded**
1757 **Generator** shall provide the **DNO** with a commissioning programme, approved by
1758 the **DNO** if reasonable in the circumstances, to allow commissioning tests to be co-
1759 ordinated.

1760 DPC7.4.9.2 The **Generator** will demonstrate all the commissioning tests performed on his
1761 **Power Generating Module** in order to discharge the requirements of the
1762 **Distribution Code** and Annex 1, item 3 (ER G59/3-3). In general the **DNO** will
1763 witness these tests for **Power Generating Modules** connected to the **DNO's**
1764 **Distribution System** at **HV**. For **Power Generating Modules** connected to the
1765 **DNO's Distribution System** at **Low Voltage** it is expected that the **DNO** will not
1766 witness the commissioning tests in the majority of cases.

1767 DPC7.5 Technical Requirements for Medium Power Stations

1768 DPC7.5.1 Where a **Generator** in respect of an **Embedded Power Station** is a party to the
1769 **CUSC** this DPC 7.5 will not apply.

1770 DPC7.5.2 In addition to the requirements in DPC7.4, the **DNO** has an obligation under CC 3.3
1771 of the **Grid Code** to ensure that all relevant **Grid Code** Connection Condition
1772 requirements are met by **Medium Power Stations**. These requirements are
1773 summarised in CC 3.4 of the **Grid Code**. It is incumbent on **Medium Power**
1774 **Stations** to comply with the relevant **Grid Code** requirements listed in CC3.4 of
1775 the **Grid Code** as part of compliance with this **Distribution Code**. Note that a **DC**
1776 **Converter** installation of capacity greater than 50MW and less than 100MW is
1777 considered to be a **Medium Power Station** for the purposes of **Grid Code**
1778 compliance in this **Distribution Code**.

1779 DPC7.5.3 Where data is required by **NGC** from **Medium Power Stations**, nothing in the
1780 **Grid Code** or **Distribution Code** precludes the **Generator** from providing the
1781 information directly to **NGC** in accordance with **Grid Code** requirements.
1782 However, a copy of the information should always be provided in parallel to the
1783 **DNO**.

1784 DPC7.5.4 Grid Code Connection Conditions Compliance

1785 DPC7.5.4.1 The technical designs and parameters of the **Embedded Medium Power Stations**
1786 will comply with the relevant Connection Conditions of the **Grid Code**. A
1787 statement to this effect, stating compliance with OC5.8 of the **Grid Code** is required
1788 to be presented to the **DNO**, for onward transmission to **NGC**, before
1789 commissioning of the **Power Station**. Note that the statement might need to be
1790 resubmitted post commissioning when assumed values etc have been confirmed.

1791 DPC7.5.4.2 Should the **Generator** make any material change to such designs or parameters as
1792 will have any effect on the statement of compliance referred to in DPC7.5.4.1, the
1793 **Generator** must notify the change to the **DNO**, as soon as reasonably practicable,
1794 who will in turn notify **NGC**.

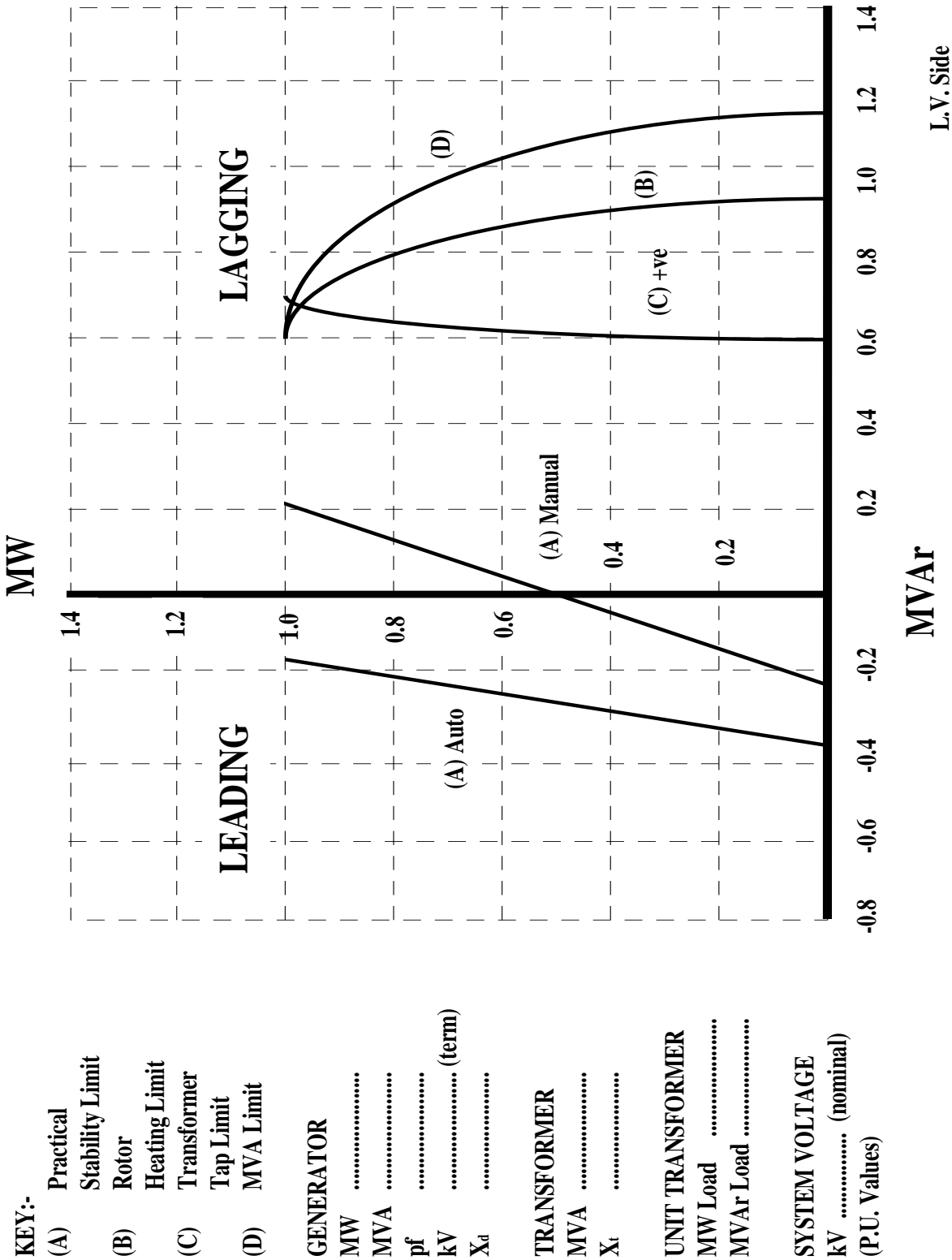
1795 DPC7.5.4.3 Tests to ensure **Grid Code** compliance may be specified by **NGC** in accordance
1796 with the **Grid Code**. It is the **Generator's** responsibility to carry out these tests

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

1797 DPC7.5.4.4 Where NGC can reasonably demonstrate that for **Total System** stability issues the
1798 **Medium Power Station** should be fitted with a power system stabiliser, **NGC**
1799 will notify the **DNO** who will then require it to be fitted for compliance with this
1800 DPC7.5.4.4.

1801

GENERATOR PERFORMANCE CHART



DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

1803 DISTRIBUTION PLANNING AND CONNECTION CODE 8

DPC8 TRANSFER OF PLANNING DATA

1804 DPC8.1 Introduction

1805 DPC8.1.1 **Distribution Planning and Connection Code DPC8** details information to be
1806 exchanged between the **DNO** and **Users** that are connected at **High Voltage**
1807 including **Embedded Generators** and **Other Authorised Distributors**.

1808 It includes data that is necessary in order for the **DNO's Distribution System** to be
1809 developed in an efficient, co-ordinated and economic manner, and to enable the
1810 **DNO** to comply with the conditions contained in its **Distribution Licence**.

1811 DPC8.2 Planning Information to be Provided by Users

1812 DPC8.2.1 Prospective and existing **Users** of the **DNO's Distribution System** must provide
1813 sufficient planning data/information as can reasonably be made available, when
1814 requested by the **DNO** from time to time to enable the **DNO** to comply with the
1815 requirements under its **Distribution Licence**. For those **Users** from whom
1816 **Demand** forecasts are required under **DOC1**, there will be a requirement to prepare
1817 an annual submission to the **DNO**. This submission, which is to be in accordance
1818 with **DOC1**, should include a development plan covering at least the subsequent 3
1819 years and, where the **User** holds planning data or information relating to subsequent
1820 years up to 7 years ahead that data or information, including changes either
1821 increasing or decreasing in **Demand**, transfer requirements or generating capacity
1822 as appropriate.

1823 DPC8.2.2 In addition to periodic updates of planning information a **User** should give adequate
1824 notice of any significant changes to the **User's System** or operating regime to
1825 enable the **DNO** to prepare its development plan, budget for, and implement any
1826 necessary **System** modifications. Such information should include any changes
1827 either increasing or decreasing in **Demand**, transfer requirements or generating
1828 capacity as appropriate. In the event of unplanned changes in a **User's System** or
1829 operating regime a **User** shall notify the **DNO** as soon as is practically possible to
1830 ensure any contingency measures, as necessary, can be implemented by the **DNO**.

1831 DPC8.2.3 The **DNO** has an obligation under the **CUSC** to submit certain planning
1832 data/information relating to **Existing Offshore Generators** to **NGC**. Any
1833 **Existing Offshore Generators** will be required to cooperate with the **DNO** to
1834 contribute to the full and timely completion of the **Offshore Transmission**
1835 **Implementation Plan**.

1836 DPC8.3 Information to be Provided to Users

1837 DPC8.3.1 Where the **DNO** has received from a **User** any information or data under DPC8.3
1838 or where the **DNO** proposes to make modifications to the **DNO's Distribution**
1839 **System** which, in either case, in the reasonable opinion of the **DNO**, may have an
1840 impact upon the **System** of any other **User**, the **DNO** will notify that **User** of the
1841 proposals subject to any constraints relating to the timing of release of information
1842 or confidentiality provisions.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

1843	DPC8.4	Reactive Compensation Plant
1844	DPC8.4.1	A User shall provide the DNO with information on any reactive compensation
1845		Plant directly or indirectly connected to a DNO's Distribution System , other than
1846		at Low Voltage , including:-
1847		(a) The MVAr capacitive or inductive rating of the Equipment and operating
1848		range if variable;
1849		(b) Details of any automatic control logic such that the operating characteristics
1850		can be determined; and
1851		(c) The point of connection to the DNO's Distribution System .
1852	DPC8.5	Lumped Network Susceptance
1853	DPC8.5.1	Under certain circumstances it will be necessary for the User to provide, at the
1854		request of the DNO , details of the equivalent lumped network susceptance at
1855		Normal Frequency of the User's System at nominal Frequency referred back to
1856		the connection with the DNO's Distribution System . This should include any
1857		shunt reactors which are an integrated part of a cable system and which are not
1858		normally in or out of service independent of the cable (ie. they are regarded as part
1859		of the cable).
1860	DPC8.5.2	It should not include:-
1861		(a) Independently switched reactive compensation plant connected to the User's
1862		System (covered in DPC8.4.1)
1863		(b) Any susceptance of the User's System inherent in the Reactive Power
1864		Demand .
1865	DPC8.6	Short Circuit Infeed to the DNO's Distribution System
1866	DPC8.6.1	Information shall be exchanged between the DNO and the User on fault infeed
1867		levels at the point of connection with the DNO's Distribution System in the form
1868		of:-
1869		(a) The maximum and minimum 3-phase symmetrical and phase earth short circuit
1870		infeed.
1871		(b) The X/R ratio under short circuit conditions.
1872		(c) In the case of interconnected Systems , adequate equivalent network
1873		information.
1874	DPC8.7	Interconnection Impedance
1875	DPC8.7.1	For User interconnections that operate in parallel with the DNO's Distribution
1876		System details of the interconnection impedance shall be exchanged between the
1877		DNO and the User . This information shall include an equivalent single impedance
1878		(resistance, reactance and shunt susceptance) of the parallel User or DNO's
1879		Distribution System .

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

1880	DPC8.8	Demand Transfer Capability
1881	DPC8.8.1	Information shall be exchanged on Demand transfer capability where the same
1882		Demand may be supplied from alternative DNO or User points of supply. This
1883		shall include the proportion of Demand normally fed from each point of supply and
1884		the arrangements (manual or automatic) for transfer under planned/fault outage
1885		conditions.
1886	DPC8.9	Other Authorised Distributor's Distribution System Data
1887	DPC8.9.1	Other Authorised Distributors shall provide the DNO with detailed data relating
1888		to the interface between their Distribution System and that of the DNO , covering
1889		circuit parameters, switchgear and Protection arrangements of equipment directly
1890		connected to or affecting the Distribution System to enable the DNO to assess any
1891		implications associated with these points of connection. Reciprocal arrangements
1892		will apply between the DNO and its Users .
1893	DPC8.10	Transient Overvoltage Effects
1894	DPC8.10.1	For User's busbars connected to the DNO's Distribution System sufficient details
1895		may need to be exchanged with respect to the User/DNO Ownership Boundary
1896		to enable an assessment, where necessary, of transient overvoltage effects to be
1897		made. This information may relate to physical and electrical layouts, parameters,
1898		specifications and Protection details.
1899	DPC8.11	More Detailed Information
1900		In certain circumstances more detailed information may be needed and will be
1901		provided upon the reasonable request of the DNO .
1902		

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DISTRIBUTION OPERATING CODE (DOC)

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DISTRIBUTION OPERATING CODE (DOC)

1912 DISTRIBUTION OPERATING CODE 1

DOC1 DEMAND FORECASTS

1913 DOC1.1 Introduction

1914 DOC1.1.1 In order for the **DNO** to operate the **DNO's Distribution System** efficiently and to
1915 ensure maximum **System** security and **System Stability**, there is a need for those
1916 **Users** specified in DOC1.3 to provide loading and generation output information
1917 to the **DNO**.

1918 DOC1.1.2 The **Grid Code** specifies **NGC's** requirements for **Demand** forecasting for **Power**
1919 **Generating Modules** which constitute or contain **BM Units** which are active (ie.
1920 submitting bid-offer data) in the **Balancing Mechanism**. This **Distribution**
1921 **Operating Code** DOC1 specifies the information to be provided by other **Power**
1922 **Generating Modules** and all **Users** of the **DNO's Distribution System** specified
1923 in DOC1.3 below.

1924 DOC1.1.3 This **Demand** forecasting information is required to enable the **DNO** to maintain
1925 the integrity of the **DNO's Distribution System**. The **Licensee** under its
1926 **Distribution Licence** has an obligation under the **Grid Code** to provide **Demand**
1927 forecast information to **NGC** in order that generation output can be matched with
1928 **Demand**. The information, required to be provided by **Users** (specified in DOC1.3
1929 below) under this **Distribution Operating Code**, will enable the **Licensee** to
1930 comply with these requirements of the **Grid Code**.

1931 DOC1.1.4 Where **Demand** data is required from the **User**, this means the MW **Demand** of
1932 electricity at the **DNO** point of supply to the **User**. The **DNO** may, in certain cases,
1933 specify that the **Demand** data shall include the MVA **Demand**.

1934 DOC1.1.5 The information to be provided to the **DNO** shall be in writing as specified in DGD2
1935 (vi).

1936 DOC1.1.6 In this **Distribution Operating Code** Year 0 means the current calendar year at
1937 anytime, Year 1 means the next calendar year at anytime, Year 2 means the calendar
1938 year after Year 1, etc

1939 DOC1.1.7 References in this **Distribution Operating Code** to data to be supplied on a half-
1940 hourly basis refers to it being supplied for each period of 30 minutes ending on the
1941 hour and half-hour in each day.

1942 DOC1.2 Objectives

1943 **The objectives of this Distribution Operating Code DOC1 are to:-**

1944 (a) Set out the **Demand** forecast and **Embedded** or **Embedded Transmission**
1945 **System** output information required to be provided by **Users** to enable the
1946 **DNO** to operate the **DNO's Distribution System**.

1947 (b) Specify the information required to be provided by **Users** to the **DNO** to enable
1948 it to comply with its obligations under the **Grid Code**.

1949 DOC1.3 Scope

1950 This **Distribution Operating Code** applies to the following **Users** of the **DNO's**
1951 **Distribution Systems** which are connected at **HV**:-

DISTRIBUTION OPERATING CODE (DOC)

1952		(a) Customers with a Demand greater than 5 MW.
1953		(b) Embedded Generators whose output is greater than 1MW where the DNO
1954		reasonably considers it appropriate.
1955		(c) Other Authorised Distributors connected to the DNO's Distribution
1956		System .
1957		(d) Suppliers , at the request of the DNO , on behalf of their Customers .
1958	DOC1.4	Information Flow and Co-ordination
1959	DOC1.4.1	Demand Forecast Information
1960		The DNO will co-ordinate all Demand forecast information for each Grid Supply
1961		Point to meet the requirements of the Grid Code . The DNO will aggregate forecast
1962		information provided by Users , where appropriate, and provide forecast
1963		information to NGC where the Demand , or change in Demand , is equal to or
1964		greater than the Demand Control Notification Level at any DNO Connection
1965		Point .
1966	DOC1.4.2	Generation Output Information
1967		Information relating to Power Generating Modules Embedded in the DNO's
1968		Distribution System or in the network of an Other Authorised Distributor or
1969		any Embedded Transmission System shall, where specified be provided to the
1970		DNO in writing. A Customer With Own Generation may be required to furnish
1971		such information should the DNO reasonably consider that it would affect its
1972		Demand forecasts.
1973	DOC1.4.3	Information to be Provided by the DNO
1974		Where reference is made to "as specified by the DNO " or "the National Electricity
1975		Transmission System days or times of Peak Demand or minimum Demand ", the
1976		DNO will provide each User , from whom Demand forecasts are required, with
1977		such information.
1978	DOC1.5	Demand Forecast Data
1979	DOC1.5.1	Planning Periods
1980		Information shall be supplied by Users to the DNO for the following rolling
1981		timescales is required by the DNO :-
1982		(a) Operational Planning Phase – next three years ahead
1983		(b) Programming Phase – 24 hours to 8 weeks ahead
1984		(c) Control Phase – 0 to 24 hours ahead
1985		The information supplied will be as specified below and as set out in the Schedules
1986		of the Distribution Data Registration Code .
1987	DOC1.5.2	Operational Planning Phase (next 3 years ahead).
1988	DOC1.5.2.1	The information required to be provided to the DNO during the Operational
1989		Planning Phase is specified in Appendix 1 of this Distribution Operating Code ,
1990		DOC1.

DISTRIBUTION OPERATING CODE (DOC)

1991	DOC1.5.2.2	The information shall be provided to the DNO by Calendar week 35 each year.
1992	DOC1.5.3	Programming Phase (24 hours to 8 weeks ahead inclusive).
1993	DOC1.5.3.1	The information required to be provided by the User to the DNO during the Programming Phase is specified in Appendix 2 of this Distribution Operating Code , DOC1.
1994		
1995		
1996		
1996	DOC1.5.3.2	For the period 2 to 8 weeks ahead the information shall be supplied to the DNO by 1600 hours each Friday.
1997		
1998	DOC1.5.3.3	For the period 2 to 13 days ahead the information shall be updated and supplied to the DNO by 0900 hours each Wednesday.
1999		
2000	DOC1.5.3.4	The DNO may require the information specified in Appendices 1 and 2 of this Distribution Operating Code to be updated if it reasonably considers it necessary and to be supplied to the DNO by 0800 hours each day (or such other time as specified by the DNO from time to time) for the next day (except that it may be for the next 3 days on Fridays and 2 days on Saturdays) and may be longer (as specified by the DNO at least one week in advance) to cover holiday periods.
2001		
2002		
2003		
2004		
2005		
2006	DOC1.5.4	Control Phase (0 to 24 hours ahead)
2007		The following information shall be supplied to the DNO at reasonable times to be specified by the DNO for the unexpired period covered by the Control Phase :-
2008		
2009		
2010		
2010		(a) Details of any differences of greater than 5MW from the schedules of operation of any Embedded <u>Power Generating Module</u> or Embedded Transmission System on a half hourly basis which were supplied under DOC1.5.3.3;
2011		
2012		(b) Details from Suppliers of any differences of the amount and duration of their proposed use of Customer Demand Control aggregated to 5MW or more (averaged over any half-hour period) on a half-hourly basis which were supplied under DOC1.5.3.4.
2013		
2014		
2015		
2016		(c) Details from each User connected to the Distribution System of any change in aggregated Demand at the point of supply of greater than 5MW of the Demand .
2017		
2018		
2019	DOC1.5.5	Post Control Phase
2020		The following shall be supplied to the DNO by 0300 hours each day:-
2021		(a) Details of half-hour Active Power and Reactive Power output sent out to the DNO's Distribution System by Embedded or any Embedded Transmission System where the DNO reasonably considers it appropriate during the previous day on a half-hourly basis.
2022		
2023		
2024		
2025		(b) Suppliers , and Other Authorised Distributor connected to the DNO's Distribution System will provide details of the amount and duration of Demand Control at the DNO Connection Point aggregated to 5MW or more (averaged over any half-hour) which was implemented during the previous Operational Day
2026		
2027		
2028		
2029		

DISTRIBUTION OPERATING CODE (DOC)

2030	DOC1.6	Forecast Factors
2031	DOC1.6.1	The following factors will be taken into account by the DNO and Users when
2032		conducting Demand forecasts in the Operational Planning Phase:-
2033		(a) Historic Demand data and trends.
2034		(b) Weather forecasts (responsibility for weather correction of User's Demand
2035		rests with the User .)
2036		(c) Incidence of major events or activities
2037		(d) Embedded <u>Power Generating Module</u> or Embedded Transmission System
2038		Schedules.
2039		(e) Demand transfers.
2040		(f) Interconnection with adjacent Other Authorised Distributors .
2041		(g) Demand Control proposed to be operated by Suppliers .
2042		(h) Any other factor reasonably considered necessary.
2043		

DISTRIBUTION OPERATING CODE (DOC)

2044 DISTRIBUTION OPERATING CODE 1

DOC 1 - APPENDIX 1

2045 Demand Forecasts Operational Planning Phase (3 years ahead)

2046 EACH CALENDAR YEAR BY WEEK 35:

2047 For each of the next 3 years forecast information for:

2048 (a) Half-hour **Active Power** and **Power Factor** (or **Reactive Power**) at **Annual ACS**
2049 **Conditions** for the specified time of the annual peak half-hour at the associated **Grid**
2050 **Supply Points** and at the specified time of the **National Electricity Transmission System**
2051 **Peak Demand**.

2052 (b) Half-hour **Active Power** and **Power Factor** (or **Reactive Power**) at **Average Conditions**
2053 at the specified half-hour of the **National Electricity Transmission System** minimum
2054 **Demand**.

2055 (c) Half-hour **Active Power** output of **Embedded** or any **Embedded Transmission**
2056 **System**~~Embedded Transmission System~~ at the specified half-hour of the **National**
2057 **Electricity Transmission System Demand**.

2058 In addition, where the loading or the generation output of a **User** may have a particular impact on
2059 the security or stability of the **System** then the **DNO** may on request require the following
2060 information from a **User**.

2061 (a) **Weekly ACS Conditions** and **Average Conditions Active** and **Reactive Power**
2062 **Demand** at the time of the specified **National Electricity Transmission System Peak**
2063 **Demand** each week together with forecasts of **Demand** to be met and relieved by
2064 **Embedded** and planned **Demand Control** by other **Users**.

2065 (b) **Weekly ACS Conditions Active** and **Reactive Power Demand** at the time of the specified
2066 **Grid Supply Point Peak Demand** each week.

2067 This additional information will, where requested by the **DNO**, be updated throughout the
2068 current year (Year 0) in the **Programming Phase**, the times to be notified by the **DNO** where
2069 this is necessary.

2070 Where reference is made to “specified” or “**National Electricity Transmission System**
2071 **Demand**”, the information will be provided by the **DNO** following the receipt of information
2072 provided by **NGC** in accordance with OC1 of the **Grid Code**.

2073

DISTRIBUTION OPERATING CODE (DOC)

DOC 1 - APPENDIX 2

- 2074 **Demand forecasts - Programming Phase (24 hours to 8 weeks ahead inclusive)**
- 2075 The following information shall be provided to the **DNO** in the timescales specified in DOC1.5.3:-
- 2076 (a) Schedules for the operation of **Embedded Power Generating Module** or any **Embedded**
2077 **Transmission System** whose output is greater than 1MW on a half-hourly basis where
2078 the **DNO** reasonably considers it appropriate
- 2079 (b) From **Suppliers**, details of their proposed use of **Demand Control** measures aggregated
2080 to 5MW or more (averaged over any half-hour) on a half hourly basis for each of the
2081 **DNO's Connection Points**;
- 2082 (c) From **Customers** and **Other Authorised Distributors** connected to the **DNO's**
2083 **Distribution System** whose operations are likely to result in an aggregated change in
2084 **Demand** at the **DNO's Connection Point** of supply of greater than 5MW of the **Demand**
2085 at that time on a half-hourly basis.
- 2086 (d) Any other relevant **Demand** forecast information reasonably required by the **DNO**.
- 2087

DISTRIBUTION OPERATING CODE (DOC)

2088 DISTRIBUTION OPERATING CODE 2

DOC2 OPERATIONAL PLANNING

2089 DOC2.1 Introduction

2090 DOC2.1.1 **Operational Planning** within the terms of the **Distribution Code** comprises the
2091 co-ordination through various timescales, of planned outages of **Plant** and
2092 **Apparatus** which affect the **Operation** of the **DNO's Distribution System** or
2093 require the commitment of the **DNO's** resources.

2094 DOC2.1.2 This **Distribution Operating Code** also enables the **DNO** to meet its **Distribution**
2095 **Licence** obligation to provide certain information specified in the **Grid Code** and
2096 establishes procedures to enable the collection of such data from **Users** specified in
2097 DOC2.3 below.

2098 DOC2.1.3 Information to be provided to the **DNO** shall be in writing as specified in DGD2f).

2099 DOC2.1.4 In order for the **DNO** to fulfil the requirements of this DOC2 it should be noted that
2100 the information set out in the **Grid Code** OC2, to be provided by **NGC**, will form
2101 the basis of **Operational Planning** under this DOC2.

2102 DOC2.1.5 In this **Distribution Operating Code** Year 0 means the current calendar year at
2103 any time, Year 1 means the next calendar year at any time, Year 2 means the
2104 calendar year after Year 1, etc. Where Week 52 is specified read Week 53 in
2105 appropriate years.

2106 DOC2.2 Objectives

2107 The objectives of this **Distribution Operating Code** are:

2108 (a) To set out the **DNO's Operational Planning** procedure and a typical timetable
2109 for the co-ordination of outage requirements of **Plant** and **Apparatus** to be
2110 provided by **Users** to enable the **DNO** to operate the **DNO's Distribution**
2111 **System**.

2112 (b) To specify the information to be provided by **Users** to the **DNO** to enable the
2113 **DNO** to comply with its obligations under the **Grid Code**.

2114 (c) To provide guidance for **High Voltage Customer** on how to comply with
2115 their obligations under Article 7 of the European Transparency Regulations
2116 (The European Commission Regulation No 543/2013) to provide information
2117 to **NGC** in their role as Transmission System Operator.

2118 DOC2.3 Scope

2119 This **Distribution Operating Code** applies to the **DNO** and the following **Users** of
2120 the **DNO's Distribution System** which are connected at **HV**:-

2121 (a) **HV Customers** where the **DNO** considers it appropriate.

2122 (b) **Customer With Own Generation** where the **DNO** reasonably considers it
2123 appropriate.

2124 (c) **Embedded Power Generating Module** in the **DNO's Distribution System**
2125 whose **Registered Capacity** is greater than 1MW and any **Embedded**
2126 **Transmission System** where the **DNO** reasonably considers it appropriate.

DISTRIBUTION OPERATING CODE (DOC)

2127		(d) Any Other Authorised Distributor connected to the DNO's Distribution
2128		System .
2129		
2130	DOC2.4	Information Flow and Co-ordination
2131	DOC2.4.1	Embedded Generators
2132		Information relating to Embedded <u>Power Generating Module</u> where the DNO
2133		reasonably considers it appropriate whose Registered Capacity is greater than
2134		5MW, or 1MW in the case of <u>a renewable Power Generating Modulegenerating</u>
2135		plant in Scotland and Embedded Transmission System shall where reasonably
2136		required by the DNO be provided by the User directly to the DNO . This may
2137		include a Customer With Own Generation where the DNO considers it
2138		appropriate.
2139	DOC2.4.2	High Voltage Customers
2140		In the event that:
2141		a) a High Voltage Customer experiences the planned unavailability of its
2142		Apparatus resulting in the reduction of Demand of 100MW or more, or a
2143		change to the planned unavailability of its Apparatus resulting in a change in
2144		Demand of 100MW or more, for one settlement period or longer; or
2145		b) a High Voltage Customer experiences a change in the actual availability of
2146		its Apparatus resulting in a change in Demand of 100MW or greater, such a
2147		High Voltage Customer shall provide NGC with the information required
2148		from a Non-Embedded Customer specified in Grid Code OC2.4.2.3 and Grid
2149		Code DRC Schedule 6 in a format and timescales agreed with NGC .
2150		
2151	DOC 2.4.3	Other Plant and Apparatus
2152		Information relating to all Plant and Apparatus connected to the DNO's
2153		Distribution System , or that which may affect its Operation , shall be co-ordinated
2154		with the DNO .
2155	DOC2.5	Timescales and Data
2156	DOC2.5.1	Detailed implementation of data gathering and timescales will be agreed between
2157		the DNO and each User . Due recognition will be given by the DNO to voltage
2158		levels and capacities of Plant and Apparatus when assessing information
2159		requirements.
2160	DOC2.5.2	All information shall be provided in Decimal Weeks as a minimum, where Week
2161		1 commences in the first week of January as published from time to time.
2162	DOC2.5.3	The rolling timescales involved in Distribution Operating Code DOC2 are
2163		illustrated in Figure 1 of this Distribution Operating Code and are as follows:-
2164		
2165		(a) Operational Planning Phase

DISTRIBUTION OPERATING CODE (DOC)

2166		Long Term Planning Phase - Calendar year 3 ahead.
2167		Medium Term - Calendar years 1 and 2 ahead.
2168		Short Term - The current calendar year 52 weeks ahead down to 9 weeks
2169		ahead.
2170		(b) Programming Phase
2171		24 hours to 8 weeks ahead inclusive
2172		(c) Control Phase
2173		0 to 24 hours ahead
2174	DOC2.6	Operational Planning
2175	DOC2.6.1	Long Term Programme (Calendar Year 3 ahead - Appendix 1).
2176	DOC2.6.1.1	Each year, the DNO will prepare a Long Term Programme covering year 3 ahead
2177		which will include those Distribution System outages, Embedded Transmission
2178		System outages and Embedded <u>Power Generating Module</u> outages, where the
2179		DNO reasonably considers it appropriate, which may affect the performance of the
2180		Total System .
2181	DOC2.6.1.2	Users and Embedded Generators where the DNO reasonably considers it
2182		appropriate will provide the DNO with information in accordance with Appendix 1.
2183		This information will be requested by the DNO in order to satisfy the requirements
2184		of DOC2.6.1.1.
2185	DOC2.6.2	Medium Term Programme (Calendar years 1 - 2 ahead Appendix 2)
2186	DOC2.6.2.1	The previous Long Term Programme will be updated to form the basis of the
2187		Medium Term Programme. The availability of Embedded <u>Power Generating</u>
2188		Modules and any Embedded Transmission System will also be updated.
2189	DOC2.6.2.2	Users and Embedded Generators will provide the DNO with information in
2190		accordance with Appendix 2.
2191	DOC2.6.3	Short Term Programme (Current year 52 weeks ahead down to 9 weeks ahead -
2192		Appendix 3).
2193	DOC2.6.3.1	The previous Medium Term Programme will be updated to form the basis of the
2194		Short Term Programme. The DNO will continually review this programme as
2195		necessary and periodically discuss it with the relevant parties as appropriate.
2196	DOC2.6.3.2	It will take account of such review and discussions and any additional outages and
2197		the following further details of each outage proposed will be notified at this stage
2198		by the appropriate party:-
2199		(a) Return to service times of circuits (if different from programme).
2200		(b) Specific Plant and Apparatus to be worked upon.
2201		(c) Any other information that may be reasonably specified by the DNO from time
2202		to time.

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2203	DOC2.6.3.3	At any time and from time to time during the current calendar year up to the
2204		Programming Phase (8 weeks ahead), Users may notify reasonable changes and
2205		additions to the outages previously notified during the Medium Term planning
2206		process. The DNO will consider whether the changes will adversely affect System
2207		security, stability or other parties, and will discuss with the party in question.
2208		Where the change is so discussed the DNO will inform the other affected Users .
2209	DOC2.6.4	Programming Phase (24 hours to 8 weeks ahead inclusive)
2210	DOC2.6.4.1	The Short Term Programme will form the basis of the Programming Phase and a
2211		rolling suggested programme for the following week and subsequent 7 week period
2212		respectively will be prepared weekly by the DNO .
2213	DOC2.6.4.2	The DNO will update the programme each week and take account of any additional
2214		or varied outages.
2215	DOC2.6.4.3	Any decision to depart from the outages and actions determined during this phase
2216		will immediately be notified to the DNO , who will inform other affected parties.
2217	DOC2.6.5	Generation Scheduling Information (Programming Phase 24 hours to 8 weeks
2218		ahead inclusive).
2219	DOC2.6.5.1	The DNO will obtain Scheduling information from Embedded Generators for
2220		Embedded <u>Power Generating Modules</u> and any Embedded Transmission
2221		System which <u>do not</u> constitute or contain BM Units which are active (ie
2222		submitting bid-offer data) where it considers it appropriate.
2223	DOC2.6.5.2	The Scheduling information will specify the following on an individual <u>Power</u>
2224		<u>Generating Module</u> or Embedded Transmission System basis:
2225		(a) The period the set or system is required.
2226		(b) The planned half hourly output.
2227		(c) Any other information the DNO reasonably considers necessary.
2228	DOC2.6.6	Control Phase (0 to 24 hours ahead)
2229		During the real time Operation any changes to the outage programme for the day
2230		shall be at the discretion of the DNO .
2231	DOC2.7	Nuclear <u>s</u>
2232	DOC2.7.1	The DNO will endeavour to give as much notice as possible to a Generator with
2233		Nuclear <u>Power Generating Modules</u> Generating Plant which may be
2234		operationally affected by an outage which is to be included in a programme referred
2235		to in DOC2.6.4.1.

DISTRIBUTION OPERATING CODE (DOC)

2236 DOC2.7.2 Where a **Generator** with Nuclear which may be operationally affected by the
2237 **DNO's Distribution System** outage programme referred to in DOC2.6.4.1 (acting
2238 as a reasonable operator) is concerned on grounds relating to safety about the effect
2239 which an outage within such outage programme might have on one or more of its
2240 Nuclear s, it may contact the **DNO** to explain its concerns and discuss whether there
2241 is an alternative way of taking that outage (having regard to technical feasibility).
2242 If there is such an alternative way, but the **DNO** refuses to adopt that alternative
2243 way in taking that outage, the **Generator** may involve the **Electricity Supply**
2244 **Industry (ESI)** disputes resolution procedure to decide on the way the outage
2245 should be taken. If there is no such alternative way, then the **DNO** may take the
2246 outage despite that **Generator's** concerns.

2247

DISTRIBUTION OPERATING CODE (DOC)

2248 DISTRIBUTION OPERATING CODE 2

DOC 2 - APPENDIX 1

2249 OPERATIONAL PLANNING - LONG TERM PLANNING PHASE (YEAR 3 AHEAD)

2250 The requirements of the Long Term Programme apply to Embedded **Power Generating**
2251 **Module** and Embedded Transmission System connected to the DNO's Distribution System
2252 specified in DOC2.3.

2253 EACH CALENDAR YEAR BY:-

2254 WEEK 2 Embedded Generators provide the DNO with a provisional Embedded **Power**
2255 **Generating Module** or Embedded Transmission System outage programme for
2256 Year 3 ahead specifying the **Power Generating Module** and MW concerned, the
2257 preferred date for each proposed outage, and where there is a possibility of
2258 flexibility, the earliest start date and latest finishing date where applicable.

2259 WEEK 12 The DNO will provide the Embedded Generators with details of constraints on
2260 the DNO's Distribution System and potential DNO's Distribution System
2261 requirements during each week of Years 3 ahead for an outage together with their
2262 perceived Output Usable requirements for Year 3 ahead.

2263 WEEK 25 Embedded Generators will provide the DNO with updated provisional
2264 Embedded **Power Generating Module** or Embedded Transmission System
2265 outage programmes together with the Registered Capacity and neutral weekly
2266 Output Usable forecasts in both cases for Year 3 ahead.

2267 WEEK 28 The DNO after discussion with the Embedded Generator will notify each
2268 Embedded Generator with details of any suggested revisions the DNO proposes
2269 to the provisional Embedded **Power Generating Module** or Embedded
2270 Transmission System outage programme previously supplied and the reasons for
2271 such proposed revisions including such information as provided in week 12.

2272 Users will provide the DNO with details of proposed outages in Year 3 ahead which
2273 may affect the performance of the DNO's Distribution System. This information
2274 need not be limited to Plant Apparatus and System at the DNO interface. Details
2275 will comprise general outage requirements, start and end dates.

2276 WEEK 42 The DNO after discussions with the Embedded Generator will notify each
2277 Embedded Generator with details of any suggested revisions necessary to
2278 maintain DNO System security to the updated provisional Embedded **Power**
2279 **Generating Module** or Embedded Transmission System outage programme
2280 previously supplied.

2281 WEEK 43 Following consultation with Users, the DNO will include these outage proposals
2282 in the Long Term Programme.

2283

DISTRIBUTION OPERATING CODE (DOC)

2284 DISTRIBUTION OPERATING CODE 2

DOC 2 - APPENDIX 2

2285 OPERATIONAL PLANNING - MEDIUM TERM PROGRAMME (YEARS 1 & 2)

2286 The requirements of the Medium Term Programme apply to **Embedded Power Generating**
2287 **Module** and **Embedded Transmission System** connected to the **DNO's Distribution System** as
2288 specified in DOC2.3.

2289 EACH CALENDAR YEAR BY:-

2290 WEEK 2 **Embedded Generators** not included in the Long Term Programme shall
2291 provide the **DNO** with a provisional **Embedded Power Generating Module**
2292 or **Embedded Transmission System** outage programme for Years 1 and 2
2293 specifying the **Power Generating Module** and MW concerned, the preferred
2294 date for each proposed outage, where applicable earliest start date and latest
2295 finishing date.

2296 WEEK 10 **Embedded Generators** provide the **DNO** with estimates of **Output Usable**
2297 for each **Embedded Power Generating Module** or **Embedded Transmission**
2298 **System** for Year 1 and 2 (weeks 1 to 52) and its proposed **Power Generating**
2299 **Module** and/or **System** outage programme for Years 1 and 2.

2300 WEEK 12 The **DNO** will after discussion with the **Embedded Generator** provide the
2301 appropriate **Embedded Generator** with details of **DNO's Distribution**
2302 **System** constraints and potential **DNO's Distribution System** requirements
2303 during each week of Years 1 and 2 for an outage together with any suggested
2304 changes to its proposed **Power Generating Module** or **Embedded**
2305 **Transmission System** outage programme.

2306 The **DNO** will notify each **Embedded Generator** of **Output Usable**
2307 requirements for Years 1 and 2 (weeks 1 to 52).

2308 WEEK 28 **Users** within the **DNO's** distribution services area will provide the **DNO** with
2309 details of outages due to take place during the Years 1 and 2 which may affect
2310 the performance of the **DNO's Distribution System**. This will comprise
2311 updating the programme for Years 3 ahead where appropriate and including
2312 any subsequent requests.

2313 In addition to outage proposals, the programme shall include Trip Testing,
2314 Risks of Trip, and other information where known which may affect the
2315 security and stability of the **DNO's Distribution System**.

2316 WEEK 41 Each **Embedded Generator** will provide the **DNO** with revised estimates of
2317 the **Output Usable** of each **Embedded Power Generating Module** or
2318 **Embedded Transmission System** for Year 1 and 2 (weeks 1 to 52).

2319 WEEK 48 Following consultation with **Users**, the **DNO** will include their proposals in the
2320 Medium Term Plan.

2321

DISTRIBUTION OPERATING CODE (DOC)

2322 DISTRIBUTION OPERATING CODE 2

DOC 2 - APPENDIX 3

2323 OPERATIONAL PLANNING - SHORT TERM (CURRENT YEAR 52 WEEKS 2324 AHEAD DOWN TO 9 WEEKS AHEAD)

2325 The Short Term Plan will be an update of the Medium Term Plan and comprise a receding period
2326 as the **Programming Phase** (24 hours to 8 weeks ahead inclusive) evolves through the current
2327 year.

2328 EACH CALENDAR YEAR

2329 WEEK 2 **Embedded Generators** not included in the Medium Term Plan will provide the
2330 **DNO** with a provisional **Embedded Power Generating Module** or- **Embedded**
2331 **Transmission System** outage programme for the current calendar year specifying
2332 the **Embedded Power Generating Module** or **Embedded Transmission System**
2333 and MW concerned, duration of the outage, earliest start date and latest finishing
2334 date where applicable. **Embedded Generators** will also provide the **DNO** with
2335 revised estimates of **Embedded Power Generating Module** or **Embedded**
2336 **Transmission System Output Usable** for weeks 9 - 52.

2337 WEEK 4 **DNO** will inform **Embedded Generators** of **Output Usable** requirements for
2338 weeks 9 - 52.

2339 WEEK 10 **Embedded Generators** will provide the **DNO** with estimates of each **Embedded**
2340 **Power Generating Module**- or **Embedded Transmission System Output Usable**
2341 for weeks 18 - 52.

2342 WEEK 12 The **DNO** will inform **Embedded Generators** of their desired changes **Embedded**
2343 **Generator to Output Usable** requirements for weeks 18 - 52 and will provide
2344 details of **DNO's Distribution System** constraints and **DNO's Distribution**
2345 **System** requirements.

2346 WEEK 25 **Embedded Generators** will provide the **DNO** with estimates of each **Embedded**
2347 **Power Generating Module** or **Embedded Transmission System Output Usable**
2348 for weeks 28 - 52.

2349 WEEK 27 The **DNO** will inform **Embedded Generators** of changes to **Output Usable**
2350 requirements for weeks 31 - 52.

2351 WEEK 41 **Embedded Generators** will provide the **DNO** with estimates of each **Embedded**
2352 **Power Generating Module** or-**Embedded Transmission System Output Usable**
2353 for weeks 44 - 52.

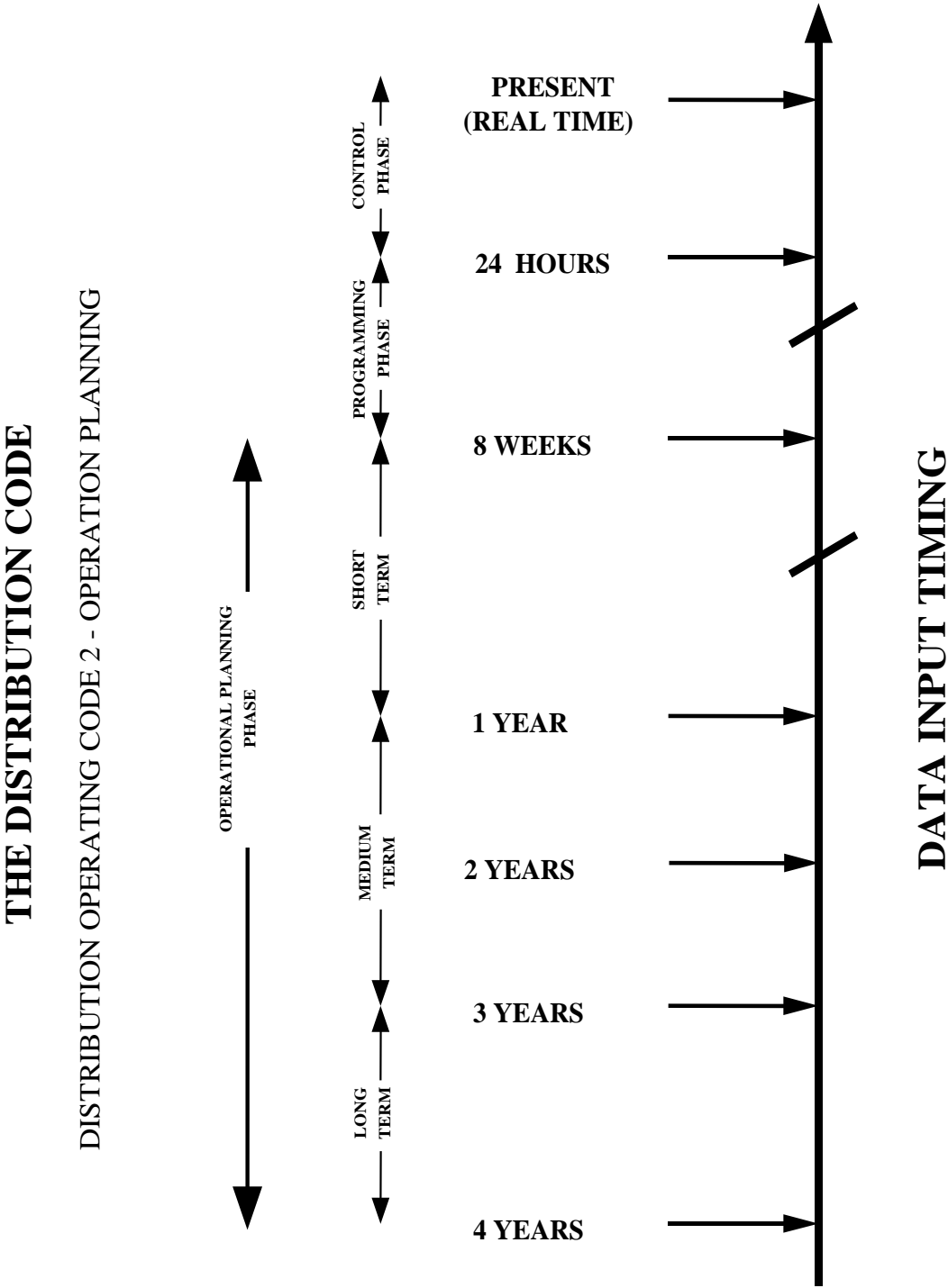
2354 WEEK 43 The **DNO** will inform **Embedded Generators** of changes to **Output Usable**
2355 requirements for weeks 44 - 52.

2356 An update of **Users** proposals agreed in the Medium Term Plan will be included in
2357 the Short Term Programming Phase.

2358

2359

Figure 1



2360

DISTRIBUTION OPERATING CODE (DOC)

2361 DISTRIBUTION OPERATING CODE 5

DOC5 TESTING AND MONITORING

2362 DOC5.1 Introduction

2363 DOC5.1.1 To ensure that the **DNO's Distribution System** is operated efficiently and within
2364 its licence standards and to meet statutory actions the **DNO** will organise and carry
2365 out testing and/or monitoring of the effect of **Users'** electrical apparatus on the
2366 **DNO's Distribution System**.

2367 DOC5.1.2 The testing and/or monitoring procedures will be specifically related to the
2368 technical criteria detailed in the **Distribution Planning and Connection Code**.
2369 They will also relate to the parameters submitted by **Users** in the **Distribution Data**
2370 **Registration Code**. Such testing can also be initiated on request from the **User** for
2371 the purpose of the **User** ensuring compliance with the above technical criteria.

2372 DOC5.1.3 This DOC5 also covers the testing requirements that might be imposed from time
2373 to time on **Embedded Medium Power Stations** owned by a **Generator_s** who **is**
2374 **are** not party to the **CUSC**
2375

2376 DOC5.1.4 The testing carried out under this **Distribution Operating Code (DOC5)** should
2377 not be confused with the more extensive **System Test** outlined in DOC12.

2378 DOC5.2 Objective

2379 DOC5.2.1 The objective of this **Distribution Operating Code** is to specify the **DNO's**
2380 requirement to test and/or monitor its **DNO's Distribution System** to ensure that
2381 **Users** are not operating outside the technical parameters required by the
2382 **Distribution Planning and Connection Code** and/or the **Distribution Operating**
2383 **Codes**.

2384 DOC5.3 Scope

2385 DOC5.3.1 This Distribution Operating Code applies to the following **Users** of the **DNO's**
2386 **Distribution System**:-

2387 (a) **Customers** (it is not intended that the **Distribution Code** will necessarily
2388 apply to small **Customers** individually - their obligations will generally be
2389 dealt with on their behalf by their **Supplier**).

2390 (b) **Embedded Generators**.

2391 (c) **Other Authorised Distributor** connected to the **DNO's Distribution System**.

2392 (d) **Suppliers**.

2393 (e) **Meter Operators**.

2394 DOC5.4 Procedure Related to **Compliance and** Quality of Supply

2395 DOC5.4.1 The **DNO** will from time to time determine the need to test and/or monitor
2396 **compliance and/or** the quality of supply at various points on its **DNO's**
2397 **Distribution System**.

DISTRIBUTION OPERATING CODE (DOC)

2398	DOC5.4.2	The requirement for specific testing and/or monitoring may be initiated by <u>reasonable concerns relating to compliance with the Distribution Code and/or associated Annex 1 Standards. It may also be initiated by</u> the receipt of complaints as to the quality of supply on the DNO's Distribution System .
2399		
2400		
2401		
2402	<u>DOC5.4.3</u>	<u>Where required by the DNO the User will undertake compliance tests as agreed with the DNO and relevant and necessary for proving compliance with the Distribution Code and/or associated Annex 1 Standards.</u>
2403		
2404		
2405	DOC5.4. <u>34</u>	In certain situations the DNO may require the testing and/or monitoring to take place at the point of connection of a User with the DNO's Distribution System .
2406		
2407	DOC5.4. <u>54</u>	Where testing and/or monitoring is required at the Connection Point , the DNO will advise the User involved and will make available the results of such tests to the User .
2408		
2409		
2410	DOC5.4. <u>65</u>	Where the results of such tests show that the User is operating outside the technical parameters specified in the Distribution Planning and Connection Code , the User will be informed accordingly.
2411		
2412		
2413	DOC5.4. <u>76</u>	Where the User requests, a retest will be carried out and the test witnessed by a User representative.
2414		
2415	DOC5.4. <u>78</u>	A User shown to be operating outside the limits specified in Distribution Planning and Connection Code will rectify the situation or disconnect the Apparatus causing the problem from its electrical System connected to the DNO's Distribution System immediately or within such time as is agreed with the DNO .
2416		
2417		
2418		
2419	DOC5.4. <u>98</u>	Continued failure to rectify the situation will result in the User being disconnected or de-energised in accordance with the Connection Agreement from the DNO's Distribution System either as a breach of the Distribution Code or through the authority of the ESQCR , where appropriate.
2420		
2421		
2422		
2423	DOC5.5	Procedure Related to Connection Point Parameters
2424	DOC5.5.1	The DNO from time to time will monitor the effect of the User on the DNO's Distribution System .
2425		
2426	DOC5.5.2	The monitoring will normally be related to amount of Active Power and Reactive Power transferred across the Connection Point .
2427		
2428	DOC5.5.3	Where the User is exporting to or importing from the DNO's Distribution System Active Power and Reactive Power in excess of the parameters in the Connection Agreement the DNO will inform the User and where appropriate demonstrate the results of such monitoring.
2429		
2430		
2431		
2432	DOC5.5.4	The User may request technical information on the method of monitoring and, if necessary, request another method reasonably acceptable to the DNO .
2433		
2434	DOC5.5.5	Where the User is operating outside the specified parameters, the User will immediately restrict the Active Power and Reactive Power transfers to within the specified parameters.
2435		
2436		

DISTRIBUTION OPERATING CODE (DOC)

- 2437 DOC5.5.6 Where the **User** requires increased **Active Power** and **Reactive Power** in excess of
2438 the physical capacity of the **Connection Point** the **User** will restrict power transfers
2439 to those specified in the **Connection Agreement** until a modified **Connection**
2440 **Agreement** has been applied for from the **DNO** and physically established.
- 2441 **DOC5.6 Grid Code Compliance for Medium Power Stations not subject to an embedded**
2442 **generation agreement**
- 2443 **DOC5.6.1 Procedure For Compliance**
- 2444 DOC5.6.1.1 **NGC** may, from time to time, but generally not more than twice in any calendar
2445 year, request that the **DNO** procure from the **Generator** a statement confirming
2446 compliance with the relevant **Grid Code** Connection Conditions at the **Embedded**
2447 **Medium Power Station** not subject to an embedded generation agreement in
2448 question. Such requests will generally, but not necessarily, be contingent on the
2449 issues raised in DOC6.5.3.3 below.
- 2450 DOC5.6.1.2 On request from the **DNO**, in furtherance of DOC5.6.1.1 above or at other times
2451 not generally more than twice per calendar year, the **Generator** will provide to the
2452 **DNO** a statement with appropriate supporting evidence of compliance with the
2453 relevant **Grid Code** requirements. The **DNO** will immediately submit this
2454 information to **NGC**. The **Generator** is at liberty to submit the data directly to
2455 **NGC**, but a copy must be submitted in parallel to the **DNO**.
- 2456 DOC5.6.1.3 In the event that in **NGC**'s view an **Embedded Medium Power Station** fails
2457 persistently to comply with the **Grid Code** Connection Conditions **NGC** shall
2458 notify the **DNO** giving details of the failure and of the monitoring that **NGC** has
2459 carried out.
- 2460 DOC5.6.1.4 The **DNO** will notify the **Generator** responsible for the **Embedded Medium**
2461 **Power Station** in question as soon as possible, and in any case within 2 working
2462 days of all the facts contained in the **NGC** notice.
- 2463 DOC5.6.1.5 The **Generator** responsible for the **Embedded Medium Power Station** in question
2464 will, as soon as possible, provide the **DNO** with an explanation of the reasons for
2465 the failure and details of the action that it proposes to take to comply with the **Grid**
2466 **Code** Connections Conditions within a reasonable period.
- 2467 DOC 5.6.1.6 **NGC**, the **DNO** and the **Generator** will then discuss the action the **Generator**
2468 proposes to take and will endeavour to reach agreement as to:
- 2469 (a) any short term operational measures necessary to protect other **Users**; and
- 2470 (b) the parameters which are to be submitted for the **Power Generating**
2471 **Module** and the effective date(s) for the application of the agreed
2472 parameters.

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2473 DOC5.6.2 Procedure for Testing

2474 DOC5.6.2.1 Subject to the provisions of DOC5.6.1 should the **DNO** fail to procure a notice of
2475 compliance to **NGC's** reasonable satisfaction, **NGC** may at any time (although not
2476 normally more than twice in any calendar year in respect of any particular
2477 **Embedded Medium Power Station** not subject to an embedded generation
2478 agreement issue an instruction requiring the **DNO** to facilitate a test, provided **NGC**
2479 has reasonable grounds of justification based upon:

- 2480 (a) a submission of data in respect of the relevant **Embedded Medium Power**
2481 **Station** indicating a change in performance; or
- 2482 (b) a statement from the **DNO** or **Generator** indicating a change in
2483 performance; or
- 2484 (c) monitoring by **NGC**, whether or not carried out in accordance with
2485 DOC5.6.1.3 above; or
- 2486 (d) notification from the **DNO** of completion of an agreed action from
2487 DOC5.6.1 above.

2488 DOC5.6.2.2 The test referred to in DOC5.6.2.1 on any one or more of the **Power Generating**
2489 **Modules** comprising part of the relevant **Embedded Medium Power Station**
2490 should only be to demonstrate that:

- 2491 (a) the relevant **Power Generating Module** meets the requirements of the
2492 paragraphs in the **Grid Code** Connection Conditions or European
2493 Connection Conditions (as applicable) which are applicable to such **Power**
2494 **Generating Modules** or **Power Station**; or
- 2495 (b) the relevant **Power Generating Module** meets the requirements for
2496 operation in ~~Limited Frequency Sensitive Mode~~ limited frequency
2497 sensitive mode as describe in the **Grid Code** in accordance with CC.6.3.3
2498 (or ECC6.3.3), BC3.5.2 and BC3.7.2,

2499 DOC5.6.2.3 The instruction referred to in DOC5.6.2.1 may only be issued where, following
2500 consultation and the preparation of a mutually agreed testing plan (to include
2501 prevailing economic conditions etc) and timetable between the **DNO**, **Generator**
2502 and **NGC**, **NGC** has:

- 2503 (a) confirmed to the **DNO** and **Generator** the manner in which the test will be
2504 conducted, which shall be consistent with the principles established in
2505 DOC5.6.3; and
- 2506 (b) received confirmation from the **DNO** that the relevant **Power Generating**
2507 **Module** would not then be unavailable by reason of forced outage or
2508 **Planned Outage** expected prior to the instruction.

2509 DOC5.6.3 Conduct of Test

2510 DOC5.6.3.1 The **Generator** is responsible for carrying out the test when requested by the **DNO**
2511 following a valid request from **NGC** in accordance with DOC5.6.2.1 and the
2512 **Generator** retains the responsibility for the safety of personnel and plant during the
2513 test.

2514 DOC5.6.3.2 The performance of the **Power Generating Module** concerned will be recorded at
2515 **NGC** and/or **DNO Control Centres** with monitoring at site as and when necessary
2516 during the test.

DISTRIBUTION OPERATING CODE (DOC)

- 2517 DOC5.6.3.3 If monitoring at site is undertaken, the performance of the **Power Generating**
2518 **Module** will be recorded on a suitable recorder (with measurements taken as
2519 appropriate on the **Power Generating Module** Stator Terminals / on the LV side
2520 of the generator transformer) or at the Connection Point if this has been agreed
2521 between the DNO and the Generator in the relevant **User's Control Centre**, in
2522 the presence of a reasonable number of representatives appointed and authorised by
2523 **NGC**. If **NGC** or the **DNO** or the **Generator** requests, monitoring at site will
2524 include measurement of the following parameters during the test.:
- 2525 (a) for Steam Turbines: governor pilot oil pressure, valve position and steam
2526 pressure; or
 - 2527 (b) for Gas Turbines: Inlet Guide Vane position, Fuel Valve positions, Fuel
2528 Demand signal and Exhaust Gas temperature; or
 - 2529 (c) for Hydro Turbines: Governor Demand signal, Actuator Output signal,
2530 Guide Vane position; and/or
 - 2531 (d) for Excitation Systems: Generator Field Voltage and Power System
2532 Stabiliser signal where appropriate.
- 2533 DOC5.6.3.4 The relevant test parameters and the pass/fail criteria shall be drawn from Section
2534 OC5.5.3 of the **Grid Code**.
- 2535 **DOC5.6.4 Test Failure/Re-test**
- 2536 DOC5.6.4.1 If the **Power Generating Module** concerned fails to pass the test the **Generator**
2537 must provide the **DNO** and **NGC** with a written report specifying in reasonable
2538 detail the reasons for any failure of the test so far as they are then known to the
2539 **Generator** after due and careful enquiry.
- 2540 DOC5.6.4.2 The **DNO** has the responsibility under the **Grid Code** to forward the report of
2541 DOC5.6.4.1 above to **NGC**. This report must be provided within five Business
2542 Days of the test. If a dispute arises relating to the failure, **NGC**, the **DNO** and the
2543 **Generator** shall seek to resolve the dispute by discussion, and, if they fail to reach
2544 agreement, either of the **DNO** or **Generator** may by notice respectively:
- 2545 (a) require **NGC** to initiate a re-test on 48 hours' notice which shall be carried
2546 out following the procedure set out in OC5.5.2 and OC5.5.3 and subject as
2547 provided in OC5.5.1.3, as if **NGC** had issued an instruction at the time of
2548 notice from the relevant **User**; or
 - 2549 (b) confirm that it (or they) will exercise its right to carry out a re-test on 48
2550 hours' notice which shall be carried out following the procedure set out in
2551 **Grid Code** Sections OC5.5.2 and OC5.5.3 and subject as provided in **Grid**
2552 **Code** Sections OC5.5.1.6, as if **NGC** had issued an instruction at the time
2553 of notice from the **DNO**.
- 2554 **DOC5.6.5 Dispute following Re-test**
- 2555 DOC5.6.5.1 If the **Power Generating Module** in **NGC's** view fails to pass the re-test and a
2556 dispute arises on that re-test, **NGC**, the **DNO** and the **Generator** may use the **CUSC**
2557 **Disputes Resolution Procedure**, (which embodies the ESI disputes resolution
2558 procedure) for a ruling in relation to the dispute, which ruling shall be binding.

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2559 DOC5.6.6 Dispute Resolution

2560 DOC5.6.6.1 If following the procedure set out in DOC5.6.5 it is accepted that the **Power**
2561 **Generating Module** has failed the test or re-test (as applicable), the **Generator**
2562 shall within 14 days, or such longer period as **NGC** may reasonably agree,
2563 following such failure, submit in writing to the **DNO** for submission to **NGC** for
2564 approval the date and time by which the **Generator** shall have brought the **Power**
2565 **Generating Module** concerned to a condition where it complies with the relevant
2566 requirement.

2567 DOC5.6.6.2 Should **NGC** not approve the **Generator's**, proposed date or time (or any revised
2568 proposal), the **Generator** shall amend such proposal having regard to any
2569 comments **NGC** and/or the **DNO** may have made and re-submit it for approval.

2570 DOC5.6.6.3 If the **Power Generating Module** fails the test the **Generator** shall resubmit to the
2571 **DNO** the relevant registered parameters of that **Power Generating Module** for the
2572 period of time until the **Power Generating Module** can achieve the parameters
2573 previously registered, as demonstrated (if required by **NGC** in accordance with
2574 DOC5.6.6.4) in a re-test. The **DNO** will submit these parameters to **NGC** as
2575 required by the **Grid Code**.

2576 DOC5.6.6.4 Once the **Generator**, has indicated to **NGC** via the **DNO** the date and time that the
2577 **Power Generating Module** can achieve the parameters previously registered or
2578 submitted, **NGC** shall either accept this information or require the **Generator** to
2579 demonstrate the restoration of the capability by means of a repetition of the test
2580 referred to in DOC5.6.7 by an instruction requiring the **DNO** to ensure on 48 hours'
2581 notice that such a test is carried out by the **Generator**.

2582 DOC5.6.6.5 The provisions of this DOC5.6.6 will apply to such further test.

2583

DISTRIBUTION OPERATING CODE (DOC)

2584 DISTRIBUTION OPERATING CODE 6

DOC6 DEMAND CONTROL

2585 DOC6.1 Introduction

2586 DOC6.1.1 This **Distribution Operating Code** DOC6 is concerned with the provisions to be
2587 made by the **DNO** and **Users** with **Systems** connected to the **DNO's Distribution**
2588 **System** in certain circumstances, to permit reductions in **Demand** in the event of
2589 insufficient output from Power Generating Modules, and transfers from **External**
2590 **Interconnections** being available to meet **Demand** or to avoid disconnection of
2591 **Customers** or in the event of breakdown and/or operating problems (such as in
2592 respect of **System Frequency**, **System** voltage levels or **System** thermal overloads)
2593 on any part of the **National Electricity Transmission System** and/or the **DNO's**
2594 **Distribution System**.

2595 DOC6.1.2 This **Distribution Operating Code** deals with the following methods of **Demand**
2596 **Control**:-

2597 (a) **Customer Demand** reduction, including **Voltage Reduction**, initiated by the
2598 **DNO**.

2599 (b) **Customer Demand** reduction instructed by **NGC**.

2600 (c) Automatic low frequency **Demand** disconnection.

2601 (d) Emergency manual **Demand** disconnection.

2602 **The term "Demand Control" is used to describe any or all of these methods of**
2603 **achieving a Demand reduction.**

2604 **Data relating to Demand Control should be expressed in MW.**

2605 DOC6.1.3 The situation where it is necessary to reduce **Demand** due to Civil Emergencies is
2606 dealt with in **Distribution Operating Code**, DOC9.

2607 The Electricity Supply Emergency Code issued by the lead government department
2608 for energy emergencies (as amended from time to time) provides that in certain
2609 circumstances consumers are given a certain degree of "protection" when rota
2610 disconnections are implemented pursuant to a direction under the Energy Act 1976.
2611 No such protection can be given under the **Grid Code** or this section of the
2612 **Distribution Code**.

2613 DOC6.1.4 Connections between any Power Stations comprising Power Generating
2614 Module(s) which comprise or contain **BM Units** which are active (ie. submitting
2615 bid-offer data) in the **Balancing Mechanism** and a **DNO's Distribution System**
2616 will not, as far as is possible, be disconnected by a **DNO** pursuant to the provisions
2617 of DOC6 insofar as that would interrupt supplies.

2618 (a) For the purpose of operation of the **Power Station** (including start-up and
2619 shutting down).

2620 (b) For the purposes of keeping the **Power Station** in a state that it could be started-
2621 up when it is off-load for ordinary operational reasons.

2622 (c) For the purpose of compliance with the requirements of a Nuclear Site Licence.

2623 **Demand Control** pursuant to this **DOC6** therefore applies subject to this exception.

DISTRIBUTION OPERATING CODE (DOC)

2624	DOC6.1.5	The control of Demand Control between the DNO's Distribution System and the
2625		National Electricity Transmission System will be carried out in accordance with
2626		Operating Code of the Grid Code and is outwith the scope of this Distribution
2627		Operating Code .
2628	DOC6.2	Objective
2629		To establish procedures to enable the DNO , following an instruction of NGC or
2630		otherwise, to achieve reduction in Demand that will either avoid or relieve
2631		operating problems on the National Electricity Transmission System and/or the
2632		DNO's Distribution System , in whole or in part in a manner that does not
2633		discriminate against or unduly prefer any one or any group of Suppliers or their
2634		Customers or Other Authorised Distributors in accordance with the
2635		Distribution Licence .
2636	DOC6.3	Scope
2637		This Distribution Operating Code will apply to the DNO and to Users which in
2638		this Distribution Operating Code means:
2639		(a) Customers (it is not intended that the Distribution Code shall apply to small
2640		Customers individually).
2641		(b) Embedded Generators .
2642		(c) Other Authorised Distributor connected to the DNO's Distribution System .
2643	DOC6.3.2	Implementation of Demand Control by the DNO may affect all Suppliers'
2644		Customers and where applicable, contractual arrangements between Suppliers and
2645		their Customers may need to reflect this.
2646	DOC6.4	Operational System Load Reduction Arrangements
2647	DOC6.4.1	The DNO will arrange within its DNO's Distribution System a scheme to reduce
2648		load in a controlled manner by reducing voltage and/or by disconnecting
2649		Customers and/or Users .
2650	DOC6.4.2	A System of warnings will be contained within the load reduction arrangements to
2651		give notice, wherever practical, of impending implementation.
2652	DOC6.4.3	The DNO will arrange to have available within the DNO's Distribution System ,
2653		four stages of Demand Control in integral multiples of between four and six per
2654		cent. These stages may include the use of Voltage Reduction and/or other forms
2655		of Demand Control determined by the DNO .
2656	DOC6.4.4	The groups will be arranged so that disconnection can take place uniformly across
2657		the DNO's Distribution System , and as far as practicable uniformly between Grid
2658		Supply Points .
2659	DOC6.4.5	The DNO will arrange to have available a scheme to implement a further four 5%
2660		stages of Demand Control upon receipt of a suitable warning from NGC which
2661		will be issued by 1600 hrs on the previous day.
2662		The DNO will arrange to have available a scheme to implement further twelve 5%
2663		stages of Demand Control .

DISTRIBUTION OPERATING CODE (DOC)

2664	DOC6.4.6	Embedded Generators, Suppliers, Customers and Other Authorised Distributors connected to the DNO's Distribution System will need to be considered in the preparation of DNO's Demand Control schemes.
2665		
2666		
2667	DOC6.4.7	The DNO shall issue instructions to such Users of the DNO's Distribution System who are required to disconnect or reconnect and the User shall carry out the instructions without delay.
2668		
2669		
2670	DOC6.4.8	Once a disconnection has been applied at the instruction of the DNO , the User shall not reconnect until the DNO instructs the User to do so in accordance with this Distribution Operating Code .
2671		
2672		
2673	DOC6.4.9	The Users shall abide by the instructions of the DNO with regard to reconnection under this Distribution Operating Code without delay.
2674		
2675	DOC6.4.10	Where disconnection is envisaged by the DNO to be prolonged, the DNO may utilise disconnection rotas where 5 per cent groups are interchanged to ensure (so far as practicable) equitable treatment of Customers , provided that the proportion of total Demand disconnected at all times does not change.
2676		
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2679	DOC6.5	Automatic Low Frequency Demand Disconnection
2680	DOC6.5.1	The DNO shall provide automatic low frequency disconnection in stages by tripping relays to disconnect at least 40% of the DNO's Distribution System Peak Demand in Scotland and 60% of the DNO's Distribution System Peak Demand in England and Wales (based on the winter peak value), in order to seek to limit the consequences of the loss of a major source of generation or an Event on the National Electricity Transmission System which leaves part of the Total System with a generation deficit.
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2687	DOC6.5.2	The Demand subject to automatic low frequency disconnection shall be split into discrete blocks. The number, location and size of the blocks and the associated low frequency settings will be as specified by the DNO . The intention is that the distribution of the blocks will be such as to give a reasonably uniform application throughout the DNO's Distribution System , but may take into account any operational requirements and the essential nature of certain Demand .
2688		
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2693	DOC6.5.3	Where conditions are such that, following automatic low frequency disconnection, it is not possible to restore all or a great proportion of those Customers so disconnected within a reasonable period of time, the DNO may instruct, at any time, further manual load disconnection and instruct a portion of the Customers which were disconnected by automatic low frequency disconnection to be restored in order that any further fall in Frequency will be contained by operation of automatic low frequency disconnection.
2694		
2695		
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2700	DOC6.5.4	Once an automatic low frequency disconnection has taken place, it shall not be reconnected until the DNO instructs to do so in accordance with this Distribution Operating Code .
2701		
2702		
2703	DOC6.5.5	Each Supplier and Other Authorised Distributor shall abide by the instructions of the DNO with regard to reconnection under this Distribution Operating Code without delay.
2704		
2705		

DISTRIBUTION OPERATING CODE (DOC)

2706	DOC6.5.6	In addition, Embedded Generators may wish to disconnect, automatically or
2707		manually, their plant from the System to which it is connected at certain frequency
2708		levels. Any such disconnection will be agreed with the DNO on connection to the
2709		DNO's Distribution System in accordance with the Distribution Planning and
2710		Connection Code .
2711	DOC6.6	Emergency Manual Disconnection of Demand
2712	DOC6.6.1	The DNO shall make such arrangements as are necessary to enable it to disconnect
2713		Customers under emergency conditions irrespective of frequency.
2714	DOC6.6.2	The DNO shall annually, by the end of September, prepare schedules with details,
2715		on a Grid Supply Point basis and including arrangements with Users , of the
2716		percentage block of Demand at that Grid Supply Point available for manual
2717		disconnection, the method of disconnection to be used and the timescale of the
2718		implementation of disconnection of each block.
2719	DOC6.6.3	The scheme will be designed to be called into operation irrespective of System
2720		Frequency , and to be implemented in predetermined timescales to disconnect
2721		Demand progressively.
2722	DOC6.6.4	Customers and Other Authorised Distributors may be required to provide
2723		manual disconnection facilities. Where required by the DNO to disconnect load,
2724		each Customer or Other Authorised Distributor shall abide by the instructions
2725		of the DNO with regard to disconnection under this Distribution Operating Code
2726		without delay and the instructed disconnection must be completed without undue
2727		delay.
2728	DOC6.6.5	Once a disconnection has been applied at the instruction of the DNO reconnection
2729		shall not be applied until the DNO instructs it to be done in accordance with this
2730		Distribution Operating Code .
2731	DOC6.6.6	Each Customer and Other Authorised Distributor shall abide by the instructions
2732		of the DNO with regard to reconnection under this Distribution Operating Code
2733		without delay.
2734	DOC6.7	Co-ordination of Actions
2735	DOC6.7.1	Where Demand Control is exercised by the DNO in order to safeguard the DNO's
2736		Distribution System the DNO will liaise with and inform Users accordingly so far
2737		as is practical.
2738	DOC6.7.2	Where Demand Control is exercised by the DNO on instruction or request from
2739		NGC in order to safeguard the Total System then the DNO is required to respond
2740		to these requests promptly but will liaise with and inform other Users so far as is
2741		practical.
2742		

DISTRIBUTION OPERATING CODE (DOC)

2743 DISTRIBUTION OPERATING CODE 7

DOC7 OPERATIONAL LIAISON

2744 DOC7.1 Introduction

2745 DOC7.1.1 This **Distribution Operating Code** DOC7 sets out the requirements for the
2746 exchange of information in relation to **Operations** and/or **Events** on the **DNO's**
2747 **Distribution System** and on the immediately adjacent parts of adjoining **Systems**
2748 which have had (or may have had), or will have (or may have) an **Operational**
2749 **Effect**.

2750 (a) on the **DNO's Distribution System** or on the **System** of any other **User** in the
2751 case of an **Operation** and/or **Event** occurring on the **System** of a **User**, and
2752 (b) on the **System** of a **User** in the case of an **Operation** and/or **Event** occurring
2753 on the **DNO's Distribution System** or the **National Electricity Transmission**
2754 **System**,
2755 where no requirement for liaison is specified in any other section of the
2756 **Distribution Code**.

2757 DOC7.1.2 The requirement to notify in DOC7 relates generally to communicating what has
2758 happened or what is to happen and not the reasons why. However, DOC7 provides,
2759 when an **Event** has occurred on the **DNO's Distribution System** which itself has
2760 been caused by (or exacerbated by) an **Operation** or **Event** on a **User's System**,
2761 the **DNO** in reporting the **Event** on the **DNO's Distribution System** to a **User** can
2762 pass on what it has been told by the **User** in relation to the **Operation** on that **User's**
2763 **System**.

2764 DOC7.2 Objective

2765 To provide for the exchange of information so that the implications of the
2766 **Operation** and/or **Event** can be considered and the possible risks arising from it
2767 can be assessed and appropriate action taken by the relevant party in order to
2768 maintain the integrity of the **Total System** and the **User's System**. This
2769 **Distribution Operating Code** does not seek to deal with any actions arising from
2770 the exchange of information, but merely with that exchange.

2771 DOC7.3 Scope

2772 This Distribution Operating Code applies to the **DNO** and to Users, which in this
2773 Distribution Operating Code means:-

- 2774 (a) **High Voltage Customers**.
2775 (b) **Embedded Generators** connected to the **DNO's Distribution System**.
2776 (c) **Other Authorised Distributors** connected to the **DNO's Distribution**
2777 **System**.
2778 (d) **Suppliers** on behalf of their **Customers** where appropriate.

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2779	DOC7.4	Communications
2780	DOC7.4.1	The DNO and each User connected to the DNO's Distribution System will
2781		establish communication channels to make effective the exchange of information
2782		required by DOC7.
2783	DOC7.4.2	Communication should, as far as possible, be direct between the User and the
2784		operator of the network to which that User is connected.
2785	DOC7.4.3	Information between a DNO and Users will be exchanged on the reasonable request
2786		of either party. The request may follow a specific Operation or Event , or be in
2787		accordance with a prior agreement to exchange information on particular types of
2788		Operation or Event .
2789		This does not preclude the voluntary exchange of information which may be
2790		perceived as being relevant to the operation of the DNO or User System , in
2791		accordance with good operating practice.
2792	DOC7.5	Requirement to notify Operations
2793	DOC7.5.1	Notification Requirements
2794	DOC7.5.1.1	In the case of an Operation on the DNO's Distribution System or on receipt of
2795		notification of an Operation on the National Electricity Transmission System ,
2796		which will have or may, in the opinion of the DNO , have an Operational Effect
2797		on the System of a User connected to the DNO's Distribution System , the DNO
2798		will notify the User in accordance with DOC7.
2799	DOC7.5.1.2	In the case of an Operation on the System of a User connected to the DNO's
2800		Distribution System , which, in the opinion of the User , will have or may have an
2801		Operational Effect on the DNO's Distribution System , the User will notify the
2802		DNO in accordance with DOC7.
2803	DOC7.5.1.3	An Operation may be caused by another Operation or an Event on another's
2804		System and in such situations the information to be notified is different from that
2805		where the Operation arose independently of any other Operation or Event .
2806	DOC7.5.1.4	Whilst in no way limiting the general requirement to notify in advance as set out in
2807		this part of this Distribution Operating Code , DOC7.5, the following are
2808		examples of circumstances where notification may be required in accordance with
2809		this Distribution Operating Code :-
2810		(a) The implementation of a scheduled outage of Plant and/or Apparatus which
2811		has been arranged pursuant to Distribution Operating Code DOC2.
2812		(b) The Operation (other than, in the case of a User , at the instruction of the DNO)
2813		of a circuit breaker or isolator or any sequence or combination of the two,
2814		including any temporary over-stressing, System parallels, or Power
2815		Generating Module synchronising.
2816		(c) Voltage control.

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2817 DOC7.5.2 **Form of Notification**

2818 DOC7.5.2.1 A notification under DOC7.5.1 will be of sufficient detail to describe the
2819 **Operation**, although it need not state the cause, and to enable the recipient of the
2820 notification reasonably to consider and assess the implications and risks arising and
2821 will include the name of the individual reporting the **Operation** on behalf of the
2822 **DNO** or the **User**, as the case may be. The recipient may seek clarification of the
2823 notification.

2824 DOC7.5.2.2 The notification may be written or oral. Written notification must be of an
2825 immediate form such as electronic mail. Where the notification is oral, it shall be
2826 written down by the sender and be dictated to the recipient who shall write it down
2827 and repeat each phrase as received and on completion shall repeat the notification
2828 in full to the sender and check that it has been accurately recorded.

2829 DOC7.5.3 **Timing**

2830 A notification under DOC7.5.12 shall be given in sufficient time as will reasonably
2831 allow the recipient to consider and assess the implications and risks arising, and to
2832 undertake mitigating actions.

2833 DOC7.6 **Requirement to Notify Events**

2834 DOC7.6.1 **Notification Requirements**

2835 DOC7.6.1.1 In the case of an **Event** on the **DNO's Distribution System** or on receipt of
2836 notification of an **Event** on the **National Electricity Transmission System**, which,
2837 in the opinion of the **DNO**, might have had or will have an **Operational Effect** on
2838 the **System** of a **User** connected to the **DNO's Distribution System**, the **DNO** will
2839 notify the **User** in accordance with this DOC7. This does not preclude any **User**
2840 asking the **DNO**, to whose **System** he is connected, for information regarding the
2841 **Event** which has affected the **User's System**.

2842 DOC7.6.1.2 In the case of an **Event** on the **System** of a **User** connected to the **DNO's**
2843 **Distribution System**, which has had or may have had an **Operational Effect** on
2844 the **DNO's Distribution System** or on the **National Electricity Transmission**
2845 **System**, the **User** will notify the **DNO** in accordance with this DOC7.

2846 DOC7.6.1.3 An **Event** may be caused by (or exacerbated by) another **Event** or by an **Operation**
2847 on another's **System** and in that situation the information to be notified is different
2848 from that where the **Event** arose independently or any other **Event** or **Operation**.

2849 DOC7.6.1.4 Whilst in no way limiting the general requirement to notify set out in this part of
2850 this **Distribution Operating Code**, DOC7.6, the following are examples of
2851 circumstances where notification may be required in accordance with this
2852 **Distribution Operating Code**:-

- 2853 (a) Where **Plant** and/or **Apparatus** is being operated in excess of its capability or
2854 may present a hazard to personnel.
- 2855 (b) The actuation of an alarm or indication of an abnormal operating condition.
- 2856 (c) Adverse weather conditions being experienced or forecast.

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2857		(d) Breakdown of, or faults on, or temporary changes in the capabilities of, Plant
2858		and/or Apparatus including Protection control, communications and
2859		metering equipment.
2860		(e) Increased risk of inadvertent Protection operation.
2861	DOC7.6.2	Form of Notification
2862	DOC7.6.2.1	A notification under DOC7.6.1 of an Event , although it need not state the cause,
2863		shall be of sufficient detail to enable the recipient of the notification to reasonably
2864		consider and assess the implications and risks arising. Details of the Event should
2865		include the timescale and the probability of repeat occurrences within a period. The
2866		recipient may seek clarification of the notification.
2867	DOC7.6.2.2	The notification may be written or oral. Written notification must be of an
2868		immediate form such as electronic mail. Except in an emergency situation any oral
2869		notification shall, be written down by the sender and dictated to the recipient who
2870		shall write it down and repeat each phrase as received and on completion shall
2871		repeat the notification in full to the sender and check that it has been accurately
2872		recorded.
2873	DOC7.6.3	Timing
2874		A notification under DOC7.6.1 shall be given as soon as practicable after the
2875		occurrence of the Event , or time that the Event is known of or anticipated by the
2876		giver of the notification under this Distribution Operating Code DOC7 .
2877	DOC7.7	System Control
2878	DOC7.7.1	Where a part of a DNO's Distribution System is, by agreement, under the System
2879		Control of the National Electricity Transmission System Control Centre then
2880		the requirements and provisions of the Grid Code shall apply to that situation as
2881		if that DNO's Distribution System was the National Electricity Transmission
2882		System
2883	DOC7.7.2	Where a part of a User's System is, by agreement, under the System Control of a
2884		Distribution Control Centre the DNO , then the requirements and provisions of this
2885		Distribution Operating Code shall apply to that situation as if that System was
2886		part of the DNO's Distribution System .
2887	DOC7.8.	Significant Incidents
2888	DOC7.8.1	Where an Event on the DNO's Distribution System or the National Electricity
2889		Transmission System or the System of a User , in the opinion of the DNO , has had
2890		or may have had a significant effect on the System of any of the others, the Event
2891		shall be reported in writing to the owner of the System affected in accordance with
2892		the provisions of Distribution Operating Code DOC10 . Such an Event will be
2893		termed a " Significant Incident ".
2894	DOC7.8.2	Where the DNO notifies a User of an Event under DOC7, which the User considers
2895		has had or may have a significant effect on that User's System , that User will
2896		require the DNO to report that Event in writing and will notify the DNO
2897		accordingly. Such an Event will also be termed a " Significant Incident ".

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2898	DOC7.8.3	Without limiting the general description set out in DOC7.8.1 or DOC7.4.10.2 a
2899		Significant Incident will include Events which result in, or may result in, the
2900		following:
2901		(a) Voltage outside statutory limits.
2902		(b) System Frequency outside statutory limits.
2903		(c) System instability.
2904		
2905		

DISTRIBUTION OPERATING CODE (DOC)

2906 DISTRIBUTION OPERATING CODE 8

DOC8 SAFETY CO-ORDINATION

2907 DOC8.1 Introduction

2908 DOC8.1.1 This **Distribution Operating Code** DOC8 specifies the **Safety Management**
2909 **System** criteria to be applied by the **DNO** and **Users** for the co-ordination,
2910 establishment and maintenance of necessary **Safety Precautions** when work or
2911 testing is to be carried out on **Plant** and/or **Apparatus** of the **DNO** or a **User** and
2912 where for this to be done safely, isolation on and/or earthing of the other's **System**
2913 is needed. This **Distribution Operating Code** does not apply to the situation where
2914 **Safety Precautions** need to be agreed solely between **Users**.

2915 DOC8.1.2 This **Distribution Operating Code** does not seek to impose a particular set of
2916 **Safety Rules** on the **DNO** and **Users**. The **Safety Rules** to be adopted and used by
2917 the **DNO** and each **User** shall be those chosen by each.

2918 DOC8.2 Objectives

2919 To lay down requirements with a view to ensuring safety of persons working at or
2920 across Operational and Ownership Boundaries between the **DNO's Distribution**
2921 **System** and **Users' Systems**.

2922 DOC8.3 Scope

2923 This **Distribution Operating Code** **DOC8** specifies the **Safety Management**
2924 **System** criteria to be applied by the **DNO** and all **Users** of the **DNO's Distribution**
2925 **System** at or across an **Operational Boundary**, **Users** for the purposes of this
2926 **Distribution Operating Code** being:-

- 2927 (a) **High Voltage Customers**.
- 2928 (b) **Embedded Generators**, but excluding the **OTSO**.
- 2929 (c) **Other Authorised Distributors** connected to the **DNO's Distribution**
2930 **System**.
- 2931 (d) **Meter Operators**.
- 2932 (e) Any other party reasonably specified by the **DNO** including **Users** with
2933 **Unmetered Supply** and those connected at **Low Voltage** for appropriate
2934 sections of DOC8 where necessary.

2935 DOC8.4 Operational Safety

2936 DOC8.4.1 Approved Safety Management Systems

2937 DOC8.4.1.1 At each site or location where an **Operational Boundary** exists, a **Safety**
2938 **Management System** specifying the principles and procedures to be applied so as
2939 to ensure the health and safety of all who are liable to be working or testing on the
2940 **DNO's Distribution System**, or on **Plant** and **Apparatus** connected to it, will be
2941 established by the **DNO** and **Users**. For interfaces involving **HV Systems** this shall
2942 include the provision for **Control Person(s)**, a system of documentation and the
2943 establishment of **Safety Precautions**.

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2944	DOC8.4.2	Authorised Persons
2945	DOC8.4.2.1	The DNO and every User shall at all times have nominated a person or persons to
2946		be responsible for the co-ordination of safety pursuant to this Distribution
2947		Operating Code , those persons being referred to in this Distribution Operating
2948		Code as Control Persons . (Under the conditions of the DNO's Safety Rules a
2949		Control Person may either be at the DNO's Distribution Control Centre or be a
2950		person authorised in accordance with DOC8.4.2.2, who is at the site or location of
2951		the Operational Boundary).
2952	DOC8.4.2.2	Control Persons and persons concerned with the carrying out of Safety
2953		Precautions and work on or testing of Plant and Apparatus forming part of, or
2954		connected to, the DNO's Distribution System shall have a written authorisation
2955		designating their role in implementing the Safety Management System .
2956	DOC8.4.2.3	The written authorisation shall indicate the class of Operation and/or the class of
2957		work permitted and the parts of the System , the DNO and/or Users , to which the
2958		written authorisation shall apply.
2959	DOC8.4.3	System of Documentation
2960	DOC8.4.3.1	A system of documentation shall be maintained by the DNO and the appropriate
2961		Users which will record the inter-system Safety Precautions taken when:-
2962		(a) Work and/or testing is to be carried out on HV Plant and/or Apparatus across
2963		the Operational Boundary .
2964		(b) Isolation and/or earthing of the other's System is required.
2965	DOC8.4.3.2	Where relevant, copies of the Safety Management Systems and related
2966		documentation shall be exchanged between the DNO and Users for each
2967		Operational Boundary .
2968	DOC8.4.3.3	The DNO and Users shall maintain a suitable system of documentation which
2969		records all relevant operational events that have taken place on the DNO's
2970		Distribution System or any other System connected to it and the co-ordination of
2971		relevant Safety Precautions for work.
2972	DOC8.4.3.4	All documentation relevant to the Operation of the Distribution System , and
2973		Safety Precautions taken for work or tests, shall be held by the DNO and the
2974		appropriate User for a period of not less than six months.
2975	DOC8.4.4	Safety Precautions
2976		The establishment of Safety Precautions involves:-
2977		(a) the isolation from the remainder of the System of Plant and/or Apparatus ,
2978		including from Low Voltage infeeds, either by an Isolating Device in the
2979		isolating position and immobilised and locked or by other means of rendering
2980		the Plant or Apparatus Isolated , and/or
2981		(b) the earthing by way of providing a connection between a conductor and earth
2982		by using an Earthing Device which is applied and where reasonably
2983		practicable, immobilised and locked, the extent of the Safety Precautions
2984		required being determined pursuant to this Distribution Operating Code .

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2985	DOC8.5	Environmental Safety
2986	DOC8.5.1	Site Safety and Security
2987 2988	DOC8.5.1.1	Arrangements shall be made by the DNO and Users to ensure site safety and security as required by statutory requirements.
2989 2990 2991 2992	DOC8.5.1.2	Suitable arrangements shall be agreed between the DNO and the relevant Users to provide free and unrestricted access to the DNO's Plant and Apparatus at substations or similar by the DNO's personnel or their designated representatives at all times.
2993	DOC8.5.2	Site Specific Hazards
2994 2995 2996 2997 2998		Suitable arrangements shall be made by the DNO and/or the relevant Users to ensure that personnel are warned by an appropriate means of hazards specific to any site, before entering any area of the site. This shall include hazards that may be temporary or permanent. Where these risks include contamination or similar, suitable decontamination facilities and procedures shall be provided.
2999	DOC8.6	Information Flow and Co-ordination
3000	DOC8.6.1	Schedules of Responsibility
3001 3002 3003 3004	DOC8.6.1.1	The DNO and Users shall jointly agree and set down in writing schedules specifying the responsibilities for System Control of Equipment . These shall ensure that only one party is responsible for any item of Plant or Apparatus at any one time.
3005 3006 3007 3008 3009 3010 3011	DOC8.6.1.2	Pursuant to the Distribution Planning and Connection Code , Site Responsibility Schedules specifying the responsibilities for ownership, operation and maintenance shall be jointly agreed by the DNO and the appropriate User(s) for each site or location where an Operational Boundary or joint responsibility exists. This will include Operation Diagrams illustrating sufficient information for Control Persons to carry out their duties which shall be exchanged by the DNO and the appropriate User .
3012 3013 3014 3015 3016	DOC8.6.1.3	A copy of the Site Responsibility Schedules and Operation Diagrams shall be retained by the DNO and the appropriate User(s) . Site Responsibility Schedules and Operation Diagrams shall be maintained by the DNO and the appropriate User(s) and exchanged as necessary to ensure that they reflect the current agreements.
3017	DOC8.6.2	Outage Co-ordination
3018 3019 3020 3021 3022 3023 3024 3025	DOC8.6.2.1	For those Users connected at HV and having firm supply connections (provided by more than one circuit) and where the User so requests the DNO , these schedules shall identify those specified DNO circuits on which Planned Outages by the DNO shall be notified to the User . These specified circuits will be those where the DNO and the User have agreed that during outages of the specified circuits the User can introduce measures to manage critical processes or safety aspects. These specified circuits will usually operate at the voltage level at which the supply is provided and will have a significant effect on the security level of the User's supply.

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- 3026 DOC8.6.2.2 Those **Users** connected at **HV** and not having firm supply connections (provided
3027 by more than one circuit) may seek to obtain outage planning information through
3028 arrangements with the **DNO**.
- 3029 DOC8.6.3 **Nomination of Control Persons**
- 3030 The **DNO** and each **User** shall at all times have nominated a **Control Person** or
3031 **Control Persons** responsible for co-ordination of **Safety From The System**
3032 pursuant to this **Distribution Operating Code**.
- 3033 DOC8.6.4 **Communications**
- 3034 DOC8.6.4.1 Where the **DNO** reasonably specifies the need, suitable communication systems
3035 shall be established between the **DNO** and other **Users** to ensure the control
3036 function is carried out in a safe and secure manner.
- 3037 DOC8.6.4.2 Where the **DNO** reasonably decides a back up or alternative routing of
3038 communication is necessary to provide for the safe and secure **Operation** of the
3039 **DNO's Distribution System** the means shall be agreed with the appropriate **Users**.
- 3040 DOC8.6.4.3 Schedules of telephone numbers/call signs shall be exchanged by the **DNO** and
3041 appropriate **User** to enable control activities to be efficiently co-ordinated.
- 3042 DOC8.6.4.4 The **DNO** and appropriate **Users** will establish 24-hour availability of personnel
3043 with suitable authorisation where the joint operational requirements demand it.
- 3044 DOC8.7 **Procedures**
- 3045 DOC8.7.1 Pursuant to this **Distribution Operating Code** the **Control Person** and/or
3046 Authorised Persons for each of the **DNO** and a **User** relating to the place where
3047 **Safety Precautions** are required will contact each other to coordinate the **Safety**
3048 **Precautions**, and the **Control Person** requesting **Safety Precautions** shall be
3049 referred to as the "**Requesting Control Person**" and the **Control Person** being
3050 requested and implementing the **Safety Precautions** shall be referred to as the
3051 "**Implementing Control Person**".
- 3052 DOC8.7.2 Procedures shall be maintained by the **DNO** and the appropriate **Users** which
3053 clearly specify the responsibility for **System Control** of **Plant** and **Apparatus** and
3054 these shall ensure that only one **Control Person** is responsible for any item of **Plant**
3055 and **Apparatus** at any one time.
- 3056 DOC8.7.3 The operational procedures shall be in accordance with the **Safety Management**
3057 **System** agreed between the **DNO** and the **User(s)**.
- 3058

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3059 DISTRIBUTION OPERATING CODE 9

DOC9 CONTINGENCY PLANNING

3060 DOC9.1 Introduction

3061 This **Distribution Operating Code** DOC9 sets out requirements and
3062 procedures relating to the following planning procedures for abnormal
3063 situations:

3064 DOC9.1.1 Black Start

3065 This **Distribution Operating Code** DOC9 covers the requirements for the
3066 implementation of **Black Start** recovery procedures following a **Total Shutdown**
3067 or **Partial Shutdown** of the **Total System** as recognised by **NGC**. The **Black Start**
3068 procedure provides for the recovery of the **Total System** in the shortest possible
3069 time taking into account **Power Station** capabilities and the operational constraints
3070 of the **Total System**, in accordance with the **Grid Code** and the requirements of
3071 **NGC**.

3072 DOC9.1.2 Re-synchronising Islands

3073 The requirements for re-synchronising parts of the **Total System** where there is no
3074 **Total Shutdown** or **Partial Shutdown** but parts of the **Total System** are out of
3075 synchronism with each other.

3076 DOC9.1.3 Joint System Incident Procedure

3077 The requirements for the establishment of a communication route and arrangements
3078 between responsible representatives of the **DNO** and **Users** involved in, or who
3079 may be involved in, an actual or potential serious or widespread **Total System**
3080 disruption which requires or may require urgent managerial response, day or night.

3081 DOC9.1.4 Civil Emergencies

3082 The requirements for dealing with a Civil Emergency which under the **Act** is any
3083 natural disaster or other emergency which, in the opinion of the **Secretary of State**,
3084 is or may be likely to disrupt electricity supplies. The procedures may be similar
3085 to, or separate from, the **Demand** reduction schemes in **Distribution Operating**
3086 **Code** DOC6.

3087 DOC9.2 Objectives

3088 This **Distribution Operating Code** sets out Contingency Planning procedures to
3089 enable co-ordination between all **Users** with a common approach to give uniformity
3090 of priorities to restart or to operate the **Total System** in abnormal situations. It also
3091 specifies requirements to be met during periods of declared civil emergencies.

3092 DOC9.3 Scope

3093 This **Distribution Operating Code** applies to the **DNO** and to **Users** which in this
3094 **Distribution Operating Code** means, the **Users** specified below with a High Voltage
3095 connection to the **DNO's Distribution System**:

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3096		(a) Customers (it is not intended that the Distribution Code shall apply to small
3097		Customers individually).
3098		(b) Embedded Generators , but excluding the OTSO .
3099		(c) Other Authorised Distributors connected to the DNO's Distribution
3100		System .
3101		Any actions required of Users connected at HV will be identified by the DNO and
3102		discussed with Users .
3103	DOC9.4	Black Start
3104	DOC9.4.1	Shutdown
3105	DOC9.4.1.1	During a Total Shutdown or Partial Shutdown and during the subsequent
3106		recovery the Security Standards set out in, or deriving authority pursuant to, the
3107		Transmission Licence and the Distribution Licence may not apply and the Total
3108		System may be operated outside normal voltage and Frequency standards.
3109	DOC9.4.1.2	In a Total Shutdown or Partial Shutdown , it may be necessary for NGC to
3110		issue Emergency Instructions and it may be necessary to depart from the normal
3111		Balancing Mechanism operation in issuing Bid-Offer Acceptances.
3112	DOC9.4.1.3	Certain Embedded Power Station(s) are registered by NGC , as having the ability
3113		of at least one of its Power Generating Modules to start up from shutdown without
3114		connections to external power supplies. Such Power Station(s) are to be referred
3115		to as Black Start Stations .
3116	DOC9.4.1.4	For each Black Start Station plans will be put in place, in accordance with the
3117		Grid Code , which in the event of a Partial Shutdown or Total Shutdown , will
3118		provide for the establishment of a Power Island . These plans are known as Local
3119		Joint Restoration Plans produced jointly by NGC the DNO and Generators and
3120		may include Embedded Generators . DNOs will be party to these Plans
3121		irrespective of whether the Black Start Station is Embedded .
3122	DOC9.4.1.5	In Scotland a Local Joint Restoration Plan may include more than one Black Start
3123		Station and may be produced with and include obligations on the relevant
3124		Transmission Licensee , Generators responsible for Power Generating Modules
3125		not at a Black Start Station and other Users .
3126	DOC9.4.2	Black Start Situation
3127		In the event of a Total Shutdown or Partial Shutdown , the DNO will, as soon as
3128		reasonably practicable, inform Users which, in the DNO's opinion, need to be
3129		informed that a Total Shutdown or, as the case may be, a Partial Shutdown , exists
3130		and that NGC intends to implement the Black Start procedure.
3131		In Scotland, in exceptional circumstances, as specified in the Local Joint
3132		Restoration Plan, the relevant Transmission Licensee may invoke such Local Joint
3133		Restoration Plan for its own Transmission System and operate within its
3134		provisions.DOC9.4.3 Black Start Recovery Procedure

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- 3135 DOC9.4.3.1 The procedure necessary for a recovery from a **Total Shutdown** or **Partial**
3136 **Shutdown** is known as **Black Start**, the main objective of which is the restoration
3137 of the **Total System** as an integrated whole as soon as possible bearing in mind the
3138 restoration of **Customers**. The procedure for a **Partial Shutdown** is the same as
3139 that for a **Total Shutdown** except that it applies only to a part of the **Total System**.
3140 It should be remembered that a **Partial Shutdown** may affect parts of the **Total**
3141 **System** which are not themselves shut down.
- 3142 DOC9.4.3.2 The complexities and uncertainties of recovery from a **Total Shutdown** or **Partial**
3143 **Shutdown** require that **Black Start** is sufficiently flexible in order to accommodate
3144 the full range of **Power Generating Module** and **Total System** characteristics and
3145 operational possibilities and this precludes the setting out of concise chronological
3146 sequences. The overall strategy will in general include the overlapping phases of
3147 establishment of isolated groups of **Power Generating Facilit(Power Stations)ies**
3148 together with complementary local **Demand** termed “**Power Islands**”, step by step
3149 integration of these groups into larger sub-systems and eventually re-establishment
3150 of a complete **Total System**.
- 3151 DOC9.4.3.3 Where there are no **Power Generating FacilitiesPower Station(s)** with a
3152 contracted **Black Start** capability within the **DNO’s Distribution System**, then
3153 restoration of supply may be substantially delayed while the relevant **Transmission**
3154 **Licensee** re-establishes the **National Electricity Transmission System** or part of
3155 the **National Electricity Transmission System** from a restored **Power Island** .
3156 The **DNO** shall re-appraise the priorities in these situations and restore supplies in
3157 accordance with such priorities.
- 3158 DOC9.4.3.4 The procedure for a **Black Start** shall, therefore, be that specified by the **relevant**
3159 **Transmission Licensee** at the time. **Users** shall abide by the **DNO’s** instructions
3160 during a **Black Start** situation, even if they conflict with the general overall strategy
3161 outlined in DOC9.4.3.2.
- 3162 DOC9.4.3.5 The **DNO** may, in accordance with the relevant **Transmission Licensee’s**
3163 requirements, be required to issue instructions (although this list should not be
3164 regarded as exhaustive) to a **Black Start Station** relating to the commencement of
3165 generation, to a **User** connected to the **DNO’s Distribution System** or **Customers**
3166 in the **DNO’s** authorised operating area, as appropriate, relating to the restoration
3167 of **Demand** and to an **Embedded Power Generating Facilities Power Station**
3168 relating to their preparation for commencement of generation when an external
3169 power supply is made available to them, and in each case may include switching
3170 instructions.
- 3171 DOC9.4.3.6 Where the **DNO**, as part of the **Black Start** procedure, has given an instruction to
3172 a **Black Start Station** to initiate startup the **Black Start Station** -shall confirm to
3173 the **DNO** when the startup of a **Power Generating Module** has been completed.
3174 Following confirmation of startup, the **DNO** will endeavour to stabilise that **Power**
3175 **Generating Module** by the establishment of appropriate **Demand** following which
3176 the **DNO** may instruct the **Black Start Station** to start up the remaining available
3177 **Power Generating Modules** and auxiliary gas turbines if any at that **Black Start**
3178 **Station** and synchronise them to create a **Power Island**.

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- 3179 DOC9.4.3.7 **Interconnection of Power Islands**
- 3180 In accordance with the requirements of the relevant **Transmission Licensee**, the
3181 **DNO** may be required to issue instructions to **Users** so as to establish, maintain and
3182 expand **Power Islands** and to interconnect **Power Islands** to achieve larger sub-
3183 systems and subsequently to form an integrated **System** and re-establishment of the
3184 **Total System**. **Users** shall at all times abide by the **DNO's** instructions in relation
3185 to interconnection of **Power Islands**.
- 3186 DOC9.4.3.8 The conclusion of the **Black Start** situation and the time of the normal operation of
3187 the **Total System** will be determined by the relevant **Transmission Licensee** who
3188 shall inform the **DNO**. The **DNO** will inform **Users** of the **DNO's Distribution**
3189 **System** which in the **DNO's** opinion need to be informed that the **Black Start**
3190 situation no longer exists and that normal operation of the **Total System** has begun.
- 3191 DOC9.5 **Re-synchronisation of De-synchronised Islands**
- 3192 DOC9.5.1 Where parts of the **Total System** are out of synchronism with each other but there
3193 is no **Total Shutdown** or **Partial Shutdown** **NGC** will instruct **Users** to regulate
3194 generation or **Demand**, as the case may be, to enable the de-synchronised islands
3195 to be re-synchronised.
- 3196 DOC9.5.2 **DNOs** may be involved in re-synchronising by issuing instructions to **Users** in
3197 accordance with the requirements of **NGC**. **Users** shall at all times abide by the
3198 **DNO's** instructions in relation to re-synchronising de-synchronised islands.
- 3199 DOC9.5.3 The re-synchronising of de-synchronised islands are covered by De-synchronised
3200 Island Procedures agreed between **NGC** and the relevant **Transmission Licensee**,
3201 **DNO** and **Generators**.
- 3202 DOC9.6 **Joint System Incident Procedure**
- 3203 DOC9.6.1 A **Joint System Incident** is an **Event** (as referred to in **Distribution Operating**
3204 **Code DOC7**) wherever occurring which in the opinion of the **DNO** has or may have
3205 a serious and/or widespread effect on, in the case of an incident on a **User's System**,
3206 the **DNO's Distribution System** or the **National Electricity Transmission**
3207 **System** or, in the case of an incident on the **DNO's Distribution System** or the
3208 **National Electricity Transmission System**, on a **User's**, or **Users', System(s)**.
3209 Where an incident on a **User's System** has or may have no effect on the **DNO's**
3210 **Distribution System** or the **National Electricity Transmission System**, then such
3211 an incident does not fall within this **Distribution Operating Code** and accordingly
3212 **DOC9** shall not apply to it.
- 3213 DOC9.6.2 Each **User** requested by the **DNO** in accordance with the **Distribution Planning**
3214 **and Connection Code**, shall provide in writing to the **DNO** and the **DNO** shall
3215 provide in writing to each such **User** a telephone number or numbers at which or
3216 through which responsible management representatives, who are fully authorised
3217 to take binding decisions on behalf of their appointers, can be contacted day or night
3218 when there is a **Joint System Incident**. The lists of telephone numbers shall be
3219 provided at the time that a **User** connects to the **DNO's Distribution System** and
3220 must be updated (in writing) as often as the information contained in them changes.
- 3221 DOC9.6.3 On the occurrence of an **Event**, then pursuant to **Distribution Operating Code**
3222 **DOC7**:

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- 3223 (a) If it is on the **System** of a **User**, the **User** shall notify the **DNO** accordingly
3224 together with any other **User** who is or may be affected and will inform the
3225 **DNO** of which **Users** it has informed.
- 3226 (b) If it is on the **DNO's Distribution System**, the **DNO** shall notify all **Users** who
3227 are or may be affected.
- 3228 DOC9.6.4 Following notification by a **User** of an **Event**, the **DNO** will if it considers
3229 necessary, telephone the **User** on the telephone number referred to in DOC9.6.2 to
3230 obtain such additional information as it requires.
- 3231 DOC9.6.5 Following notification of an **Event** in accordance with DOC9.6.3(a) or (b), and/or
3232 the receipt of any additional information requested pursuant to DOC9.6.4, the **DNO**
3233 will determine whether or not the **Event** is a **Joint System Incident**, and, if so, the
3234 **DNO** may set up a **System Incident Centre** in order to avoid overloading existing
3235 operational arrangements of the **DNO**.
- 3236 DOC9.6.6 The **DNO** shall as soon as possible notify all relevant **Users** that a **System Incident**
3237 **Centre** has been established and the telephone number(s) of the **DNO's System**
3238 **Incident Centre** if different from those already supplied pursuant to DOC9.6.2.
- 3239 DOC9.6.7 All communications between the responsible management representatives of the
3240 relevant parties with regard to the **DNO's** role in the **Joint System Incident** shall
3241 be made via the **System Incident Centre**, if it has been established.
- 3242 DOC9.7 **Civil Emergencies**
- 3243 DOC9.7.1 Directions under Section 96 of the **Act** place an obligation on the **DNO** to prepare
3244 and maintain plans for mitigating the effects of any civil emergency which may
3245 occur in accordance with the Electricity Supply Emergency Code. That Code
3246 describes the steps which Government might take to deal with an electricity supply
3247 emergency envisaged under Section 96(7) of the **Act** or Section 3(i)(b) of the
3248 Energy Act 1976 and sets down the actions which Companies in the Electricity
3249 Supply Industry should plan to take and which may be needed or required in order
3250 to deal with such an emergency.
- 3251 DOC9.7.2 In an electricity emergency it may become necessary to restrict **Users' Demand** for
3252 and consumption of electricity and may be achieved by one or more of the following
3253 methods:
- 3254 (a) Appeals by the Government to the public for voluntary restraint.
- 3255 (b) The issue of Orders under the Energy Act 1976 requiring restrictions on
3256 consumption by industry and commerce.
- 3257 (c) The issue of directions under the Energy Act 1976 requiring rota
3258 disconnections and associated restrictions.
- 3259 DOC9.7.3 In the event that the **Secretary of State** issues directions to the **DNO** to implement
3260 rota disconnections, the **DNO** will establish an Emergency Co-ordinating Centre
3261 and as soon as possible establish communications with such relevant **Users** as is
3262 necessary to ensure operational liaison. The plans to be implemented will be similar
3263 or separate from the schemes outlined in **Distribution Operating Code**, DOC6.

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3264 DOC9.7.4 The plans make provision for the need to maintain supply, so far as practicable, to
3265 consumers in protected categories. For the purpose of the **Distribution Code** a
3266 Nuclear shall be deemed to be a protected category in accordance with the
3267 provisions of DOC6.1.4.

3268

DISTRIBUTION OPERATING CODE (DOC)

3269 DISTRIBUTION OPERATING CODE 10

DOC10 OPERATIONAL EVENT REPORTING AND INFORMATION SUPPLY

3270 DOC10.1 Introduction

3271 DOC10.1.1 This **Distribution Operating Code** DOC10 sets out the requirements for reporting
3272 in writing and, where appropriate, more fully those **Events** termed **Significant**
3273 **Incidents** which were initially reported under **Distribution Operating Code**
3274 DOC7 and those statutory specified events to be reported under the **ESQCR**.

3275 Information between a **DNO** and **Users** will be exchanged on the reasonable request
3276 of either party.

3277 DOC10.1.2 DOC10 also provides for the joint investigation of **Significant Incidents** by the
3278 **Users** involved.

3279 DOC10.2 Objectives

3280 The objective of this **Distribution Operating Code** is to facilitate the provision of
3281 more detailed information in writing and, where agreed between the **DNO** and the
3282 **Users** involved, joint investigation of those **Significant Incidents** initially reported
3283 under DOC7.

3284 DOC10.3 Scope

3285 This Distribution Operating Code DOC10 applies to the **DNO** and to **Users**, which
3286 in this Distribution Operating Code means:-

3287 (a) **High Voltage Customers**.

3288 (b) **Embedded Generators** connected to the **DNO's Distribution System** at **HV**.

3289 (c) **Other Authorised Distributors** connected to the **DNO's Distribution**
3290 **System** at **HV**.

3291 (d) **Suppliers** on behalf of their **Customers** where appropriate.

3292 DOC10.4 Communications

3293 DOC10.4.1. The **DNO** and **Users** connected to the **DNO's Distribution System** shall establish
3294 communication channels to ensure the effectiveness of this **Distribution**
3295 **Operating Code**. Communication should, as far as possible, be direct between the
3296 **User** and the operator of the network to which that **User** is connected. However,
3297 this does not preclude communication with the **User's** nominated representative.

3298 DOC10.4.2 Operational Event Reporting

3299 DOC10.4.2.1 Written Reports of Events by Users to the DNO

3300 In the case of an **Event** which has been reported initially to the **DNO** under DOC7.6
3301 and subsequently has been determined by the **DNO** to be a **Significant Incident**, a
3302 written report will be given to the **DNO** by the **User** in accordance with DOC10.
3303 The **DNO** will not pass this report on to other affected **Users** but may use the
3304 information contained therein in preparing a report under DOC10 to a **User** in
3305 relation to a **Significant Incident** on the **DNO's Distribution System** which has
3306 been caused by (or exacerbated by) the **Significant Incident** on the **User's System**.

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3307 DOC10.4.2.2 **Written Reports of Events by the DNO to Users**

3308 In the case of an **Event** which has been reported initially to the **User** under DOC7.6
3309 and subsequently has been determined by the **User** to be a **Significant Incident**, a
3310 written report will be given to the **User** by the **DNO** in accordance with DOC10.
3311 The **User** will not pass this report on to other affected **Users** but may use the
3312 information contained therein in preparing a report for another **Authorised**
3313 **Electricity Operator** connected to its **System** in relation to a **Significant Incident**
3314 which has been caused by (or exacerbated) the **Significant Incident** on the **DNO's**
3315 **Distribution System**.

3316 DOC10.4.3 **Form of Report in Writing**

3317 DOC10.4.3.1 A report under DOC10.4.2 will be in writing and shall be sent to the **DNO** or **User**,
3318 as the case may be, containing written confirmation of the initial notification given
3319 under DOC7 together with more details relating to the **Significant Incident**,
3320 although it need not state the cause of the **Event** save to the extent required under
3321 DOC7.6.2 and such further information which has become known relating to the
3322 **Significant Incident** since the initial notification under DOC7. The report should,
3323 as a minimum, contain those matters specified in the Appendix 1 of this DOC10
3324 which is not intended to be exhaustive to this DOC10. The recipient may raise
3325 questions to clarify the notification, and the giver of the notification will, in so far
3326 as it is able, answer any questions raised.

3327 DOC10.4.4 **Timing of the Report in Writing**

3328 DOC10.4.4.1 A written report under DOC10.4.2 shall be given as soon as reasonably practicable
3329 after the initial notification under DOC7 and in any event a preliminary report shall
3330 normally be given within 24 hours of such time.

3331 DOC10.4.5 **Statutory Reports of Specified Events**

3332 DOC10.4.5.1 Nothing in this **Distribution Operating Code** shall be construed as relieving
3333 **DNOs** or **Users** from their duty to report events specified in the **ESQCR** in
3334 accordance with those **Regulations** in so far as they apply to **Users**.

3335 DOC10.4.6 **Joint Investigation into Significant Incidents**

3336 DOC10.4.6.1 Where a **Significant Incident** has been declared and a report submitted under
3337 DOC10 either party or parties may request in writing that a joint investigation
3338 be carried out.

3339 DOC10.4.6.2 The composition of such an investigation panel will be appropriate to the
3340 incident to be investigated, and agreed by all parties involved.

3341 DOC10.4.6.3 Where there has been a series of **Significant Incidents** (that is to say, where a
3342 **Significant Incident** has caused or exacerbated another **Significant Incident**)
3343 the parties involved may agree that the joint investigation should include some
3344 or all of those **Significant Incidents**.

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3345 DOC10.4.6.4 A joint investigation will only take place where all affected parties agree to it.
3346 The form and rules of, the procedure for, and all matters (including, if thought
3347 appropriate, provisions for costs and for a party to withdraw from the joint
3348 investigations once it has begun) relating to the joint investigation will be
3349 agreed at the time of a joint investigation and in the absence of agreement the
3350 joint investigation will not take place.

3351 DOC10.4.6.5 Any joint investigation under **DOC10** is separate from any inquiry which may
3352 be carried out under the **Electricity Supply Industry (ESI)** disputes resolution
3353 procedure.

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3359 DISTRIBUTION OPERATING CODE 10

DOC 10 - APPENDIX 1

3360 **MATTERS, IF APPLICABLE TO THE SIGNIFICANT INCIDENT, TO BE INCLUDED**
3361 **IN A WRITTEN REPORT GIVEN IN ACCORDANCE WITH DOC10.4.2.**

3362

- 3363 1. Time and date of **Significant Incident**.
- 3364 2. Location.
- 3365 3. **Plant** and/or **Apparatus** involved.
- 3366 4. Brief description of **Significant Incident**.
- 3367 5. Estimated time and date of return to service.
- 3368 6. Supplies/generation interrupted and duration of interruption.
- 3369 7. Set/Station frequency response achieved.
- 3370 8. Set/Station MVAr performance achieved.
- 3371 9. Ownership of the faulted **Plant** and/or **Apparatus**.
- 3372 10. Estimated **Demand Control** relief undertaken.
- 3373 11. Estimated **Demand** shed Automatic/Manual.
- 3374 12. Time and date of **Demand** restoration.

DISTRIBUTION OPERATING CODE (DOC)

3375 DISTRIBUTION OPERATING CODE 11

DOC11 NUMBERING AND NOMENCLATURE OF ELECTRICAL APPARATUS AT OWNERSHIP BOUNDARIES

3376 DOC11.1 Introduction

3377 DOC11.1.1 This **Distribution Operating Code DOC11** sets out the responsibilities and
3378 procedures for notifying the relevant owners of the numbering and nomenclature of
3379 **Apparatus** at **Ownership Boundaries**.

3380 DOC11.1.2 The numbering and nomenclature of **Apparatus** shall be included in the **Operation**
3381 **Diagram** prepared for each site having an **Ownership Boundary**.

3382 DOC11.2 Objectives

3383 The prime objective embodied in this **Distribution Operating Code** is to ensure
3384 that at any site where there is an **Ownership Boundary** every item of **Apparatus**
3385 has numbering and/or nomenclature that has been mutually agreed and notified
3386 between the owners concerned to ensure, so far as is reasonably practicable the safe
3387 and effective **Operation** of the **Systems** involved and to reduce the risk of error.

3388 DOC11.3 Scope

3389 This **Distribution Operating Code DOC11** applies to the **DNO** and to **Users**,
3390 which in this **Distribution Operating Code** excludes **Users** connected at **Low**
3391 **Voltage** without **Generation** and protected by a fuse(s) or other device(s) rated at
3392 100 amps or less, (except it may apply to such **Users** who are the sole **User**
3393 connected to an **HV/LV** transformer.), and otherwise includes:

3394 (a) **Customers**.

3395 (b) **Embedded Generators**, but excluding the **OTSO**.

3396 (c) **Other Authorised Distributors** connected to the **DNO's Distribution**
3397 **System**.

3398 (d) **Meter Operators**.

3399 DOC11.4 Procedure

3400 DOC11.4.1 New Apparatus

3401 DOC11.4.1.1 When the **DNO** or a **User** intends to install **Apparatus** having an interface at an
3402 **Ownership Boundary** the proposed numbering and/or nomenclature to be adopted
3403 for the **Apparatus** must be notified to the other owner(s).

3404 DOC11.4.1.2 The notification shall be made in writing to the relevant owner(s) and will consist
3405 of **Operation Diagrams** incorporating the proposed new **Apparatus** to be installed
3406 and its proposed numbering and/or nomenclature.

3407 DOC11.4.1.3 The notification shall be made to the relevant owner(s) at least eight months prior
3408 to the proposed installation of the **Apparatus**.

DISTRIBUTION OPERATING CODE (DOC)

- 3409 DOC11.4.1.4 The relevant owners shall respond in writing within one month of the receipt
3410 of the notification confirming both receipt and whether the proposed numbering
3411 and/or nomenclature is acceptable or, if not, what would be acceptable.
- 3412 DOC11.4.1.5 In the event that agreement cannot be reached between the **DNO**, and the other
3413 owner(s), the **DNO**, acting reasonably, shall have the right to determine the
3414 numbering and nomenclature to be applied at that site.
- 3415 DOC11.4.2 **Existing Apparatus**
- 3416 DOC11.4.2.1 The **DNO** and/or every **User** shall supply the **DNO** and/or every other **User** on
3417 request with details of the numbering and nomenclature of **Apparatus** on sites
3418 having an **Ownership Boundary**.
- 3419 DOC11.4.2.2 The **DNO** and every **User** shall be responsible for the provision and erection of
3420 clear and unambiguous labelling showing the numbering and nomenclature of
3421 its **Apparatus** on sites having an **Ownership Boundary**.
- 3422 DOC11.4.3 **Changes to Existing Apparatus**
- 3423 DOC11.4.3.1 Where the **DNO** or a **User** needs or wishes to change the existing numbering
3424 and/or nomenclature of any of its **Apparatus** on any site having **Ownership**
3425 **Boundary**, the provisions of DOC11.4.1 shall apply with any amendments
3426 necessary to reflect that only a change is being made.
- 3427 DOC11.4.3.2 Where a **User** changes the numbering and/or nomenclature of its **Apparatus**,
3428 which is the subject of **DOC11**, the **User** will be responsible for the provision
3429 and erection of clear and unambiguous labelling.
- 3430 DOC11.4.3.3 Where a **DNO** changes the numbering and/or nomenclature of its **Apparatus**,
3431 which is the subject of **DOC11**, the **DNO** will be responsible for the provision
3432 and erection of clear and unambiguous labelling.
- 3433

DISTRIBUTION OPERATING CODE (DOC)

3434 DISTRIBUTION OPERATING CODE 12

DOC12 SYSTEM TEST

3435 DOC12.1 Introduction

3436 DOC12.1.1 This **Distribution Operating Code** DOC12 sets out the responsibilities and
3437 procedures for arranging and carrying out **System Test** which have or may have an
3438 effect on the **Systems** of the **DNO** or **Users**. **System Test** are those tests which
3439 involve either simulating conditions or the controlled application of irregular,
3440 unusual or extreme conditions on the **Total System** or any part of the **Total System**,
3441 but do not include commissioning or recommissioning tests or any other tests of a
3442 minor nature.

3443 DOC12.1.2 **System Test** which have a minimal effect on the **Distribution System** of the **DNO**
3444 or the **Systems** of others will not be subject to this procedure; minimal effect will
3445 be taken to mean variations in voltage, **Frequency** and waveform distortion of a
3446 value not greater than those figures which are defined in the **Distribution Planning**
3447 **and Connection Code**.

3448 DOC12.1.3 If the **System Test** proposed by the **DNO** or **User** connected to the **DNO's**
3449 **Distribution System** will or may have an effect on the **National Electricity**
3450 **Transmission System** then the provisions of the **Grid Code** shall apply.

3451 DOC12.1.4 A **System Test** proposed by **NGC** under the **Grid Code** will be treated by the **DNO**
3452 as a **System Test** under this DOC 12 if it is considered by the **DNO** to have any
3453 effect on **Users** as defined in DOC 12.3.1.

3454 DOC12.2 Objectives

3455 DOC12.2.1 The objectives of this **Distribution Operating Code** are to:-

3456 (a) Ensure that the procedures for arranging and carrying out of **System Test** do
3457 not so far as practicable, threaten the safety of either personnel or the general
3458 public and cause minimum threat to the security of supplies, the integrity of
3459 **Plant** and/or **Apparatus** and cause minimum detriment to the **DNO** and **Users**.

3460 (b) Set out procedures to be followed for establishing and reporting **System Test**.

3461 DOC12.3 Scope

3462 DOC12.3.1 This **Distribution Operating Code** applies to the **DNO** and to **Users**, which in this
3463 **Distribution Operating Code** means:-

3464 (a) **High Voltage Customers**.

3465 (b) **Embedded Generators** connected to the **DNO's Distribution System** at **HV**.

3466 (c) **Other Authorised Distributors** connected to the **DNO's Distribution**
3467 **System** at **HV**.

DISTRIBUTION OPERATING CODE (DOC)

3468 DOC12.4 **Procedure**

3469 DOC12.4.1 **Proposal Notice**

3470 DOC12.4.1.1 When the **DNO** or a **User** intends to undertake a **System Test** which will have or
3471 may have an effect on the **System** of others normally six months notice, or as
3472 otherwise agreed by the **DNO**, of the proposed **System Test** will be given by the
3473 person proposing the **System Test** (the "Test Proposer") to the **DNO** and to those
3474 **Users** who may be affected by such a **System Test**.

3475 DOC12.4.1.2 The proposal shall be in writing (the "Proposal Notice") and shall contain details of
3476 the nature and purpose of the proposed **System Test** and will indicate the extent
3477 and situation of the **Plant** or **Apparatus** involved.

3478 DOC12.4.1.3 If in the view of the recipients the information set out in the Proposal Notice is
3479 considered insufficient by the recipients they shall as soon as is reasonably
3480 practicable contact the Test Proposer with a request in writing for further
3481 information which shall be supplied as soon as reasonably practicable. The **DNO**
3482 shall not be required to do anything under this **Distribution Operating Code** until
3483 it is satisfied with the details supplied in the Proposal Notice or pursuant to a request
3484 for further information.

3485 DOC12.4.1.4 If the **DNO** wishes to undertake a **System Test** the **DNO** shall be deemed to have
3486 received a proposal of that **System Test**.

3487 DOC12.4.2 **Preliminary Notice and Establishment of Test Panel**

3488 DOC12.4.2.1 The **DNO** shall have overall co-ordination of the **System Test**. Using the
3489 information supplied to it under DOC12.4.1 the **DNO** shall determine in its
3490 reasonable estimation, which **Users** other than the Test Proposer may be affected
3491 by the proposed **System Test**.

3492 DOC12.4.2.2 The **DNO** shall, with the agreement of the **Users** which it has identified may be
3493 affected, appoint a **Test Coordinator** as soon as reasonably practicable after it has
3494 received a Proposal Notice and in any event prior to the distribution of the
3495 Preliminary Notice referred to below.

3496 (a) Where the **DNO** decides that the **DNO's Distribution System** will or may be
3497 significantly affected by the proposed **System Test**, then the **Test Coordinator**
3498 shall be a suitably qualified person nominated by the **DNO**.

3499 (b) Where the **DNO** decides that the **DNO's Distribution System** will not be
3500 significantly affected by the proposed **System Test**, then the **Test Coordinator**
3501 shall be a suitably qualified person nominated by the proposer of the **System**
3502 **Test**, in consultation with the **DNO**.

3503 (c) The **DNO** shall as soon as reasonably practicable after it has received a
3504 Proposal Notice contact the Test Proposer where the **Test Coordinator** is to
3505 be (pursuant to this **Distribution Operating Code**) a person nominated by the
3506 Test Proposer and invite him to nominate a person. If the Test Proposer is
3507 unable or unwilling to nominate a person within seven days of being contacted
3508 by the **DNO** then the proposed **System Test** will not take place.

3509 DOC12.4.2.3 The **DNO** will notify all **Users** identified by it under DOC12.4.2.1 in writing of the
3510 proposed **System Test** which in this **Distribution Operating Code** shall be known
3511 as a Preliminary Notice. The Preliminary Notice will contain:

DISTRIBUTION OPERATING CODE (DOC)

- 3512 (a) The details of the nature and purpose of the proposed **System Test**, the extent
3513 and situation of the **Plant** and/or **Apparatus** involved and the **Users** involved.
- 3514 (b) An invitation to nominate within fourteen days a suitably qualified
3515 representative (or representatives if the **Test Coordinator** informs the **DNO**
3516 that it is appropriate for a particular **User**) to be a member of a **Test Panel** for
3517 the proposed **System Test**.
- 3518 (c) The name of the **DNO** representative (or representatives) on the **Test Panel** for
3519 the proposed **System Test**.
- 3520 (d) The name of the **Test Coordinator** and whether he was nominated by the
3521 proposer of the **System Test** or by the **DNO**.
- 3522 DOC12.4.2.4 The Preliminary Notice shall be sent within one month of the receipt by the **DNO**
3523 of the Proposal Notice or the receipt of any further information requested under
3524 DOC12.4.13, whichever is the later. Where the **DNO** is the Test Proposer the
3525 Preliminary Notice will be sent as soon as possible after the proposed **System Test**
3526 has been formulated.
- 3527 DOC12.4.2.5 If replies to the invitation in the Preliminary Notice to nominate a representative to
3528 be a member of the **Test Panel** have not been received within fourteen days, the
3529 **User** which has not replied shall not be entitled to be represented on the **Test Panel**.
- 3530 DOC12.4.2.6 The **DNO** shall as soon as possible after the expiry of that fourteen day period
3531 appoint nominated persons to the **Test Panel** and notify all relevant **Users** - of the
3532 composition of the **Test Panel**.
- 3533 DOC12.4.3 **Test Panel**
- 3534 DOC12.4.3.1 A meeting of the **Test Panel** shall take place as soon as possible after the **DNO** has
3535 notified relevant **Users** of the composition of the **Test Panel**, and in any event
3536 within one month of the appointment of the **Test Panel**.
- 3537 DOC12.4.3.2 The **Test Panel** shall consider:-
- 3538 (a) The details of the nature and purpose of the proposed **System Test** and other
3539 matters set out in the Proposal Notice (together with any further information
3540 requested under DOC12.4.2).
- 3541 (b) The economic, operational and risk implications of the proposed **System Test**.
- 3542 (c) The possibility of combining the proposed **System Test** with any other tests
3543 and with **Plant** and/or **Apparatus** outages which arise pursuant to the
3544 **Operational Planning** requirements of the **DNO**, **NGC** and **Users**.
- 3545 (d) The implications of the proposed **System Test** on plant which comprise or
3546 contain **BM Units** which are active (ie. submitting bid-offer data) in the
3547 **Balancing Mechanism** insofar as it is able to do so.
- 3548 DOC12.4.3.3 **Users** who received a Preliminary Notice concerning the proposed **System Test**
3549 (whether or not they are represented on the **Test Panel**) shall be obliged to supply
3550 that **Test Panel** upon written request with such details as the **Test Panel** reasonably
3551 requires in order to consider the proposed **System Test**.
- 3552 DOC12.4.3.4 The **Test Panel** will meet as often as the **Test Co-ordinator** deems necessary to
3553 conduct its business and he shall be the person to convene a meeting.

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3554 DOC12.4.4 **Proposal Report**

3555 (a) DOC12.4.4.1 Within two months of the first meeting, the **Test Panel** shall
3556 submit a report, which in this **Distribution Operating Code** shall be called a
3557 Proposal Report, which shall contain: **System Test** (including the manner in
3558 which the **System Test** is to be monitored).

3559 (b) An allocation of costs (including unanticipated costs) between the affected
3560 parties, (the general principle being that the Test Proposer will bear the costs).

3561 (c) Such other matters as the **Test Panel** consider appropriate.

3562 The Proposal Report may include requirements for indemnities to be given in
3563 respect of claims and losses arising from the **System Test**. All **System Test**
3564 procedures must comply with all applicable legislation.

3565 DOC12.4.4.2 If the **Test Panel** is unable unanimously to agree on any decision in preparing its
3566 Proposal Report the proposed **System Test** shall not take place and the **Test Panel**
3567 will be dissolved.

3568 DOC12.4.4.3 The Proposal Report will be submitted to the **DNO** and to each **User** who received
3569 a Preliminary Notice under DOC12.4.2.

3570 DOC12.4.4.4 Within fourteen days of receipt of the Proposal Report, each recipient shall respond
3571 to the **Test Coordinator** with its approval of the Proposal Report or its reason for
3572 non-approval.

3573 DOC12.4.4.5 In the event of non-approval by one or more recipients, the **Test Panel** shall as soon
3574 as practicable meet in order to determine whether the proposed **System Test** can be
3575 modified to meet the objection or objections.

3576 DOC12.4.4.6 If the proposed **System Test** cannot be so modified, then the **System Test** will not
3577 take place.

3578 DOC12.4.4.7 If the proposed **System Test** can be so modified, the **Test Panel** shall as soon as
3579 practicable, and in any event within one month of meeting to discuss the responses
3580 to the Proposal Report, submit a revised Proposal Report and the provisions of
3581 DOC12.4.4.3 and DOC12.4.4.4 will apply to that submission.

3582 DOC12.4.4.8 In the event of non-approval of the revised Proposal Report by one or more
3583 recipients, the **System Test** will not take place and the **Test Panel** will be dissolved.

3584 DOC12.4.5 **Final Test Programme**

3585 DOC12.4.5.1 If the Proposal Report (or, as the case may be, the revised Proposal Report) is
3586 approved by all recipients, the proposed **System Test** can proceed and at least one
3587 month prior to the date of the proposed **System Test**, the **Test Panel** shall submit
3588 to the **DNO** and all recipients of the Proposal Notice a programme which in this
3589 **Distribution Operating Code** shall be called a "Final Test Programme" stating the
3590 switching sequence and proposed timings, a list of those staff involved in the
3591 carrying out of the **System Test** (including those responsible for site safety) and
3592 such other matters as the **Test Panel** deem appropriate.

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- 3593 DOC12.4.5.2 The Final Test Programme shall bind all recipients to act in accordance with the
3594 provisions contained within the programme in relation to the proposed **System**
3595 **Test**.
- 3596 DOC12.4.5.3 Any problems with the proposed **System Test** which arise or are anticipated after
3597 the issue of the Final Test Programme and prior to the day of the proposed **System**
3598 **Test** must be notified to the **Test Coordinator** as soon as possible in writing. If
3599 the **Test Coordinator** decides that these anticipated problems merit an amendment
3600 to or postponement of the **System Test**, he shall notify any party involved in the
3601 proposed **System Test** accordingly.
- 3602 DOC12.4.5.4 If on the day of the proposed **System Test** operating conditions on the **System** are
3603 such that any party involved in the proposed **System Test** wishes to delay or cancel
3604 the start or continuance of the **System Test**, they shall immediately inform the **Test**
3605 **Coordinator** of this decision and the reasons for it. The **Test Coordinator** shall
3606 then postpone or cancel, as the case may be, the **System Test** and shall if possible,
3607 agree with all parties involved in the proposed **System Test** another suitable time
3608 and date or if he cannot reach such agreement, shall reconvene the **Test Panel** as
3609 soon as practicable which will endeavour to arrange another suitable time and date
3610 and the relevant provisions of the **Distribution Operating Code** shall apply.
- 3611 DOC12.4.6 **Final Report**
- 3612 DOC12.4.6.1 At the conclusion of the **System Test**, the Test Proposer shall be responsible for
3613 preparing a written report (the “Final Report”) of the **System Test** for submission
3614 to the **DNO** and other members of the **Test Panel**.
- 3615 DOC12.4.6.2 The Final Report shall include a description of the **Plant** and/or **Apparatus** tested
3616 and of the **System Test** carried out, together with the results, conclusions and
3617 recommendations for submission to other members of the **Test Panel**.
- 3618 DOC12.4.6.3 The Final Report shall not be distributed to any party which is not represented on
3619 the **Test Panel** unless the **Test Panel**, having considered the confidentiality issues,
3620 shall have unanimously approved such distribution.
- 3621 DOC12.4.6.4 When the Final Report has been submitted under DOC12.4.2.1 the **Test Panel** shall
3622 be dissolved.
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DISTRIBUTION DATA REGISTRATION CODE (DDRC)

DDRC1 INTRODUCTION

3631 DDRC1.1 The various sections of the **Distribution Code** require the **DNO** and **Users** to
3632 exchange and update data from time to time. The data which is specified in each
3633 section of the **Distribution Code** is summarised in the **Distribution Data**
3634 **Registration Code (DDRC)**.

3635 DDRC1.2 The **Distribution Data Registration Code (“DDRC”)** provides a series of
3636 schedules summarising all requirements for information of a particular type. Each
3637 class of **User** is then referred to the appropriate schedule or group of schedules for
3638 a statement of the total data requirements in his case.

3639 DDRC1.3 The **DDRC** specifies procedures and timings for the supply of data and subsequent
3640 updating, where the timings are covered by detailed timetables laid down in other
3641 sections of the **Distribution Code** they are not necessarily repeated in full in the
3642 **DDRC**.

3643 DDRC1.4 In the case of an **Embedded Generator** seeking a connection to the **DNO’s**
3644 **Distribution System** then irrespective of its potential involvement in the
3645 **Balancing Mechanism**, discussions on connection will be with the **DNO**
3646 concerned with the connection arrangements, in addition to any discussions
3647 required with **NGC** under the **Grid Code**. References to “**Embedded Generator**”
3648 in the **DDRC** shall include existing and prospective **Embedded Generators**.

DDRC2 OBJECTIVE

3649 The objective of the **DDRC** is to collate and list in a readily identifiable form all
3650 the data to be provided by:

- 3651 (a) Each category of **User** to the **DNO** under the **Distribution Code**.
3652 (b) The **DNO** to each category of **User** under the **Distribution Code**.

DDRC3 SCOPE

3653 The **DDRC** will apply to the **DNO** and to all **Users** which for the purpose of the
3654 **DDRC** are listed below:

- 3655 (a) **Customers** It is not intended that the **Distribution Code** shall generally apply
3656 to small **Customers** individually; their obligations will be dealt with on their
3657 behalf by their **Supplier**.
3658 (b) **Embedded Generators**.
3659 (c) **Other Authorised Distributors** connected to the **DNO’s Distribution**
3660 **System**.
3661 (d) **Suppliers**
3662 (e) Any other person who is making application for use of or connection to the
3663 **DNO’s Distribution System**.

DDRC4 DATA CATEGORIES

3664 DDRC4.1 **Categories of Data**

3665 Within the **DDRC** the data required by the **DNO** is allocated to one of the following
3666 three categories:

3667		(a) Standard Planning Data (SPD)
3668		(b) Detailed Planning Data (DPD)
3669		(c) Operational Data (OD)
3670	DDRC4.2	Standard Planning Data (SPD)
3671	DDRC4.2.1	Standard Planning Data is that data listed in the Distribution Planning and Connection Code which is required to be supplied by all Users when making application for connection to and/or use of the DNO's Distribution System in order that the DNO may assess the implications for making the connection.
3672		
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3675	DDRC4.2.2	Standard Planning Data will be provided to the DNO in accordance with Section DPC6 and DPC7 of the Distribution Planning and Connection Code <u>for Power Generating Modules compliant with EREC G59, and in accordance with EREC G99 for Power Generating Modules compliant with EREC G99.</u>
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3680	DDRC4.2.3	Following an agreement for connection/use of System , it is a requirement of the Distribution Planning and Connection Code that estimated data supplied by Users should be replaced by actual values prior to connection which will be referred to as Registered Data .
3681		
3682		
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3684	DDRC4.3	Detailed Planning Data (DPD)
3685	DDRC4.3.1	Detailed Planning Data is that data listed in the Distribution Planning and Connection Code which is required to be supplied by the Users specified for connection to and/or use of the DNO's Distribution System .
3686		
3687		
3688	DDRC4.3.2	Detailed Planning Data will be provided to the DNO in accordance with Section DPC6 and DPC7 of the Distribution Planning and Connection Code <u>for Power Generating Modules compliant with EREC G59, and in accordance with EREC G99 for Power Generating Modules compliant with EREC G99.</u>
3689		
3690		
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3692	DDRC4.3.3	Following an agreement for connection/use of System , it is a requirement of the Distribution Planning and Connection Code that estimated data supplied by Users should be replaced by measured values prior to connection.
3693		
3694		
3695	DDRC4.4	Operational Data (OD)
3696	DDRC4.4.1	Operational Data is data, which is required by the Distribution Operating Codes .
3697	DDRC4.4.2	Operational Data is required to be supplied in accordance with timetables set down in the relevant Distribution Operating Codes and is repeated in tabular form in the schedules attached to this DDRC .
3698		
3699		

DDRC5 PROCEDURES AND RESPONSIBILITIES

3700 DDRC5.1 Responsibility for Submission and Updating of Data

3701 In accordance with the provisions of the various sections of the **Distribution Code**
3702 and unless otherwise agreed or specified by the **DNO**, each **User** is required to
3703 submit data as defined in DDRC6 following and the attached schedules.

3704 DDRC5.2 Methods of Submitting Data

3705 DDRC5.2.1 Data must be submitted to the **DNO** in writing and where possible in the format
3706 specified by the **DNO** and must indicate the name of the person who is submitting
3707 those schedules.

3708 DDRC5.2.2 If a **User** wishes to change any data item then this must first be discussed with the
3709 **DNO** concerned in order for the implications to be considered and the change if
3710 agreed (such agreement not to be unreasonably withheld), should be confirmed by
3711 the submission of a revised data scheduler by verbal means with confirmation in
3712 writing if short timescales are involved.

3713 DDRC5.2.3 The **DNO** will supply data as requested by **Users** and as agreed by the **DNO** where
3714 no obligation of confidentiality exists.

3715 DDRC5.3 Changes to User's Data

3716 Whenever a **User** becomes aware of a change to an item of data, which is registered
3717 with the **DNO** the **User**, must notify the **DNO** in accordance with the appropriate
3718 section of the **Distribution Code**. The method and timing of the notification to the
3719 **DNO** is set out in the appropriate section of the **Distribution Code**.

3720 DDRC5.4 Data Accuracy and Data not Supplied

3721 DDRC5.4.1 The **User** is solely responsible for the accuracy of data (or of changes to data)
3722 supplied to the **DNO**.

3723 DDRC5.4.2 Any data which the **User** fails to supply when required by any section of the
3724 **Distribution Code** may be estimated by the **DNO** if and when, in the **DNO's** view,
3725 it is necessary to do so. Such estimates will be based upon data supplied previously
3726 for the same **Plant** or **Apparatus** or upon corresponding data for similar **Plant** or
3727 **Apparatus** or upon such other information as the **DNO** deems appropriate.

3728 DDRC5.4.3 The **DNO** will advise a **User** in writing of any estimated data it intends to use
3729 pursuant to DDRC5.4.2 relating directly to that **User's Plant** or **Apparatus** in the
3730 event of data not being supplied. The **DNO** will not be liable as a result of using
3731 that estimated data; the responsibility for the accuracy of that data will rest with the
3732 **User** as if the data has been supplied by that **User**.

3733 DDRC5.4.4 It is a requirement of the **Distribution Planning and Connection Code** that
3734 Registered Project Planning Data is updated by the **User** annually.

DDRC6 DATA TO BE REGISTERED

3735	DDRC6.1	Schedules 1-4 are not used within the Distribution Code .
3736 3737	DDRC6.2	Schedules 5a, 5b and 5c - Embedded <u>Power Generating Module</u> Technical Information.
3738	DDRC6.3	Schedule 5e - Embedded Transmission System
3739 3740	DDRC6.4	Schedule 6 - Demand forecasts - as described in DOC1, time varying output/generation forecasts for the Users defined in the scope.
3741 3742	DDRC6.5	Schedule 7 - Operational Planning - as described in DOC2 , outage planning information.
3743	DDRC6.6	Schedule 8 - System Design Information - comprising System technical data.
3744 3745 3746	DDRC6.7	Schedule 9 - Load Characteristics - comprising the forecast data for load points indicating for example, the maximum load, the equipment that comprises the load, and the harmonic content of the load.
3747	DDRC6.8	The schedules applicable to each class of User are as follows:-

Schedule Number:-	Title	Applicable to:-
Schedule 5a	Power Station Data	All <u>Every</u> Power Stations
Schedule 5b	<u>Power Generating Module</u> Data	All Embedded <u>Power Generating Modules</u>
Schedule 5c	<u>Power Generating Module</u> Data	For specified types of <u>Power Generating Module</u> and ancillary Plant and Apparatus (i) Synchronous <u>Power Generating Module</u> (ii) Fixed speed induction <u>Power Generating Module</u> (iii) Doubly fed induction <u>Power Generating Module</u> (iv) Series Converter Connected <u>Power Generating Module</u> (v) Transformers
Schedule 5d	DNO Network Data	DNO's Distribution System
Schedule 5e	All Embedded Transmission System	All Embedded Transmission System

Schedule Number:-	Title	Applicable to:-
Schedule 6	Demand Forecasts	All Embedded Generators greater than 1MW; Any Other Authorised Distributor connected to the host DNO System ; All Suppliers ; All Customers connected at HV _whose Demand is greater than 5MW
Schedule 7a	Operational Planning	All Embedded Generators greater than 1MW; Any Other Authorised Distributor connected to the host DNO System ; All Suppliers ; All Customers connected at HV _whose Demand is greater than 5MW
Schedule 8 Schedule 9	System Design Information and Load Characteristics	Embedded Generators ; Any Other Authorised Distributor connected to the host DNO's Distribution System ; All Suppliers ; All Customers

3748

Schedule 5a

3749 DATA REGISTRATION CODE

3750 **Power Generating FacilityPOWER STATION DATA FOR ~~ALL-EVERY~~ EMBEDDED Power**
 3751 **Generating FacilityPOWER STATIONS EXCLUDING THE OTSO**

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>DATA CATEGORY</u>
5a Power Station Data		
APPLICANT'S DETAILS		
Customer's Details		
Company name	Text	SPD
Company registered number	Text	SPD
Postal address	Text	SPD
Contact name	Text	SPD
Email address	Text	SPD
Telephone number	Text	SPD
Facsimile number	Text	SPD
Consultant's Details (if applicable)		
Consultant's name	Text	SPD
Postal address	Text	SPD
Contact name	Text	SPD
Email address	Text	SPD
Telephone number	Text	SPD
Facsimile number	Text	SPD
<u>Power Generating Facility</u>POWER STATION LOCATION AND OPERATION		
Power Station name	Text	SPD
Details of any existing Connection Agreements for this Power Station	Text	SPD
Target date for the provision of the connection / commissioning of the Power Station	Text	SPD
Postal address or site boundary plan (1/500)	Text / Plan	SPD
Connection Point (OS grid reference or description)	Text	SPD
Connection Point voltage	V	SPD
Single line diagram of any on-site existing or proposed electrical plant or, where available, Operation Diagrams	Diagram	SPD
What security is required for the connection? (see note 1)	Text	SPD
Number of <u>Power Generating Modules</u> in Power Station	Number	SPD

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>DATA CATEGORY</u>
5a Power Station Data		
Are all Power Generating Modules of the same design/rating? (If not complete the relevant Schedules 5b and 5c for each type)	Y/N	SPD
Will the Power Station operate in islanded mode?	Y/N	SPD
Will Power Generating Module supply electricity to on-site premises?	Y/N	SPD
Power Generating Facility POWER STATION_y STANDBY IMPORT REQUIREMENTS (see note 2)		
Maximum Active Power import	MW	SPD
Maximum Reactive Power import (lagging)	MVAr	SPD
Maximum Reactive Power export (leading)	MVAr	SPD
Power Generating Facility POWER STATION_y TOP-UP IMPORT REQUIREMENTS (see note 3)		
Maximum Active Power import	MW	SPD
Maximum Reactive Power import (lagging)	MVAr	SPD
Maximum Reactive Power export (leading)	MVAr	SPD
Power Generating Facility POWER STATION_y EXPORT REQUIREMENTS (see note 4)		
Total Power Station output at Registered Capacity (net of auxiliary loads)		
Registered Capacity (maximum Active Power export)	MW	SPD
Maximum Reactive Power export (lagging)	MVAr	SPD
Maximum Reactive Power import (leading)	MVAr	SPD
Total Power Station output at Minimum Generation (net of auxiliary loads)		
Minimum Generation (minimum Active Power export)	MW	DPD
Maximum Reactive Power export (lagging)	MVAr	DPD
Maximum Reactive Power import (leading)	MVAr	DPD
Power Station Power Station performance chart (net, at Connection Point , as per DPC7 Figure 1)	Figure	DPD
Power Generating Facility POWER STATION_y MAXIMUM FAULT CURRENT CONTRIBUTION (see note 5)		
Peak asymmetrical short circuit current at 10ms (i_p) for a 3 ϕ short circuit fault at the Connection Point	kA	SPD
RMS value of the initial symmetrical short circuit current (I_k) for a 3 ϕ short circuit fault at the Connection Point	kA	SPD

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>DATA CATEGORY</u>
5a Power Station Data		
RMS value of the symmetrical short circuit current at 100ms ($I_{k(100)}$) for a 3 ϕ short circuit fault at the Connection Point	kA	SPD
Short circuit time constant T'', corresponding to the change from I_k'' to $I_{k(100)}$	s	DPD
Positive sequence X/R ratio at the instant of fault	-	DPD
<u>Power Generating Facility</u>POWER STATIONy INTERFACE ARRANGEMENTS (see note 6)		
Means of connection, disconnection and synchronising between DNO and User	Method statement	SPD
Site protection / co-ordination arrangements with DNO	Report	DPD
Precautions should neutral become disconnected from earth (LV only see ER G59/3-3 <u>or ER G99</u>)	Report	DPD
Site communications, control and monitoring (HV / LV)	Report	DPD

3752

<u>DATA DESCRIPTION</u>	<u>Units</u>	<u>Data Category for Generators connected at LV</u>	<u>Data Category for Generators Connected at HV</u>
5a continued			
<u>Power Generating Facility</u>POWER STATIONy G59 <u>OR G99</u> PROTECTION – see note 7			
U/V Stage 1	V and s	SPD	SPD
U/V Stage 2 <u>(if fitted)</u>	V and s	SPD	SPD
O/V Stage 1	V and s	SPD	SPD
O/V Stage 2	V and s	SPD	SPD
U/F Stage 1	Hz and s	SPD	SPD
U/F Stage 2 <u>(if fitted)</u>	Hz and s	SPD	SPD
O/F Stage 1	Hz and s	SPD	SPD
O/F Stage 2	Hz	SPD	SPD
LoM (RoCoF)	Hzs ⁻¹ and s	SPD	SPD

DATA DESCRIPTION 5a continued	<u>Units</u>	<u>Data Category</u> <u>for Generators</u> <u>connected at</u> <u>LV</u>	<u>Data Category</u> <u>for Generators</u> <u>Connected at</u> <u>HV</u>
LoM (Vector Shift)	degrees	SPD	SPD
LoM – other		SPD	SPD

- 3753
- 3754 **Notes:**
- 3755 1. The **DNO** will assume a single circuit connection to the **Power Station** is required unless stated
- 3756 otherwise. Options include:-
- 3757 a. Single circuit connection
- 3758 b. Manually switched alternative connection
- 3759 c. Automatic switched alternative connection
- 3760 d. Firm connection (secure for first circuit outage)
- 3761 2. This section relates to operating conditions when the **Power Station** is importing **Active Power**,
- 3762 typically when it is not generating. The maximum **Active Power** import requirement and the
- 3763 associated maximum **Reactive Power** import and/or export requirements should be stated.
- 3764 3. This section relates to operating conditions when the **Power Station** is importing **Active Power**,
- 3765 typically when it is generating, but is not generating sufficient power to cater for all the on-site
- 3766 demand. The maximum **Active Power** import requirement and the associated maximum **Reactive**
- 3767 **Power** import and/or export requirements should be stated.
- 3768 4. This section relates to operating conditions when the **Power Station** is exporting **Active Power**. The
- 3769 **Active Power** export and associated maximum **Reactive Power** range should be stated for operation
- 3770 at **Registered Capacity** and for operation at **Minimum Generation**.
- 3771 5. See ER G74, ETR 120 and IEC 60909 for guidance on fault current data. Additionally, fault current
- 3772 contribution data may be provided in the form of detailed graphs, waveforms and/or tables. This
- 3773 information need not be provided where detailed fault level contribution / impedance data is provided
- 3774 for each **Generation Set Power Generating Module** in Schedules 5b or 5c.
- 3775 6. The interface arrangements need to be agreed and implemented between the **User** and the **DNO**
- 3776 before energisation and consideration should be given to addressing the Distribution Code
- 3777 requirements including DGC5, DGC8, DPC6.7, **DPC7.2.6**, DOC5, DOC7.4, DOC8.6.3, DOC8.6.4,
- 3778 DOC9 and DOC10. For example DOC7 requires that up to date contact details are provided and
- 3779 procedures are agreed to establish an effective means of communication between the **Generator** and
- 3780 the **DNO**.
- 3781 7. This information need not be provided where the **G59**-interface protection is provided on each
- 3782 individual **Power Generating Module**. In such cases the information should be provided in Schedule
- 3783 5b.

Schedule 5b

3784 DATA REGISTRATION CODE

3785 **GENERATION SET**Power Generating Module DATA FOR ALL EMBEDDED **GENERATION**
3786 SETPower Generating ModuleS

<u>DATA DESCRIPTION</u> 5b Data	<u>UNITS</u>	<u>Data Category for Generators connected at LV</u>	<u>Data Category for Generators Connected at HV</u>
<u>GENERATION SET</u>Power Generating Module GENERAL DATA			
Number of <u>Power Generating Modules</u> to which this data applies	Value	SPD	SPD
Type of <u>Power Generating Module</u> : Synchronous Generator, Fixed Speed Induction Generator, Double Fed Induction Generator, Series Convertor Connected Generator, Other (provide details)	Text	SPD	SPD
Technology/Production type (see note 1)	Text	SPD	SPD
Operating regime – intermittent or non-intermittent (see note 2)	Text	SPD	SPD
<u>GENERATION SET</u>Power Generating Module OUTPUT DATA			
Rated terminal voltage (generator)	V	SPD	SPD
Rated terminal current (generator)	A	SPD	SPD
<u>Power Generating Module</u> Registered Capacity	MW	SPD	SPD
<u>Power Generating Module</u> apparent power rating (to be used as base for generator parameters)	MVA	SPD	SPD
<u>Power Generating Module</u> rated Active Power	MW	SPD	SPD
Maximum measured Active Power P_{60} (see note 3)	MW	DPD	DPD
Maximum measured Active Power $P_{0.2}$ (see note 3)	MW	DPD	DPD
Minimum Generation (set connected; net of auxiliary loads)	MW	DPD	DPD
<u>Power Generating Module</u> Reactive Power capability at rated Active Power (gross, at generator terminals)			
Maximum Reactive Power export (lagging)	MVAr	DPD	SPD
Maximum Reactive Power import (leading)	MVAr	DPD	SPD
<u>Power Generating Module</u> performance chart	Figure	DPD	DPD

<u>DATA DESCRIPTION</u> 5b Data	<u>UNITS</u>	<u>Data Category for Generators connected at LV</u>	<u>Data Category for Generators Connected at HV</u>
(gross, at generator either the Power Generating Module terminals <u>or Connection Point as agreed between the DNO and Generator</u> , as per DPC7 Figure 1)			
<u>GENERATION SET</u>Power Generating Module MAXIMUM FAULT CURRENT CONTRIBUTION (see note 4)			
Peak asymmetrical short circuit current at 10ms (i_p) for a 3 ϕ short circuit fault at the Power Generating Module terminals	kA	None	SPD
RMS value of the initial symmetrical short circuit current (I_k'') for a 3 ϕ short circuit fault at the Power Generating Module terminals	kA	None	SPD
RMS value of the symmetrical short circuit current at 100ms ($I_{k(100)}$) for a 3 ϕ short circuit fault at the Power Generating Module terminals	kA	SPD	SPD
Short circuit time constant T'' , corresponding to the change from I_k'' to $I_{k(100)}$	s	None	DPD
Positive sequence X/R ratio at the instant of fault	-	None	DPD
<u>GENERATION SET</u>Power Generating Module VOLTAGE CONTROL			
If operating in Power Factor control mode, allowable Power Factor range		SPD	SPD
If operating in Power Factor control mode, target Power Factor		SPD	SPD
If operating in voltage control mode, voltage set point	V	SPD	SPD
<u>If operating in reactive power control mode, reactive power set point</u>	<u>VA</u>	<u>SPD</u>	<u>SPD</u>
If operating to any other control mode, description of parameters and set points.	Text	SPD	SPD
<u>Frequency Response Settings</u>			
<u>Frequency response droop setting in LFSM</u>	<u>Per cent</u>	<u>DPD</u>	<u>DPD</u>
<u>Frequency response droop setting in FSM (if applicable)</u>	<u>Per cent</u>	<u>DPD</u>	<u>DPD</u>
<u>Frequency response mode, ie LFSM or FSM</u>	<u>text</u>	<u>DPD</u>	<u>DPD</u>

<u>DATA DESCRIPTION</u> 5b Data	<u>UNITS</u>	<u>Data Category for Generators connected at LV</u>	<u>Data Category for Generators Connected at HV</u>
GENERATION SETPower Generating Module INSTALLED G59INTERFACE PROTECTION (see note 5)			
U/V Stage 1	V and s	SPD	SPD
U/V Stage 2	V and s	SPD	SPD
O/V Stage 1	V and s	SPD	SPD
O/V Stage 2 <u>(if fitted)</u>	V and s	SPD	SPD
U/F Stage 1	Hz and s	SPD	SPD
U/F Stage 2	Hz and s	SPD	SPD
O/F Stage 1	Hz and s	SPD	SPD
O/F Stage 2 <u>(if fitted)</u>	Hz	SPD	SPD
LoM (RoCoF)	Hzs ⁻¹ and s	SPD	SPD
LoM (Vector Shift)	degrees	SPD	SPD
LoM – other	Text	SPD	SPD

3787

3788 **Notes:**

3789

- 3790 1. The Production Type should be quoted for all new connections on or after 1 January 2015 and
3791 selected from the list below derived from the Manual of Procedures for the ENTSO-E Central
3792 Information Transparency Platform:
- 3793 • Biomass;
 - 3794 • Fossil brown coal/lignite;
 - 3795 • Fossil coal-derived gas;
 - 3796 • Fossil gas;
 - 3797 • Fossil hard coal;
 - 3798 • Fossil oil;
 - 3799 • Fossil oil shale;
 - 3800 • Fossil peat;
 - 3801 • Geothermal;
 - 3802 • Hydro pumped storage;

- 3803 • Hydro run-of-river and poundage;
 3804 • Hydro water reservoir;
 3805 • Marine;
 3806 • Nuclear;
 3807 • Other renewable;
 3808 • Solar;
 3809 • Waste;
 3810 • Wind offshore;
 3811 • Wind onshore; or
 3812 • Other.
- 3813
- 3814 For connections made before 1 January 2015, the technology type(s) used, selected from the list set
 3815 out at paragraph 2.23 in Version 2 of the Regulatory Instructions and Guidance relating to the
 3816 distributed generation incentive, innovation funding incentive and registered power zones, reference
 3817 83/07, published by Ofgem, in April 2007, may be submitted as an alternative to the production type.
- 3818 2. Intermittent and Non-intermittent Generation is defined in ER P2/6 as follows:
- 3819 • Intermittent Generation: Generation plant where the energy source for the prime mover can not
 3820 be made available on demand
- 3821 • Non-intermittent Generation: Generation plant where the energy source for the prime mover can
 3822 be made available on demand
- 3823 3. For wind turbines only - IEC 61400-21 (P_{60} and $P_{0.2}$)
- 3824 4. See ER G74, ETR 120 and IEC 60909 for guidance on fault current data. Additionally, fault current
 3825 contribution data may be provided in the form of detailed graphs, waveforms and/or tables. This
 3826 information need not be provided where detailed fault level contribution / impedance data is provided
 3827 for the site in Schedule 5a or for each **Power Generating Module** in Schedules 5c.
- 3828 5. This information need not be provided where the ~~G59~~ interface protection is provided on a per **Power**
 3829 **Station** basis. In such cases the information should be provided in Schedule 5a.

Schedule 5c (i)

3830 DATA REGISTRATION CODE

3831 Power Generating Module DATA FOR EMBEDDED GENERATION SET Power Generating 3832 ModuleS

DATA DESCRIPTION	UNITS	Data Category for Generators connected at LV	Data Category for Generators Connected at HV
5c (i) Synchronous <u>Power Generating Modules</u> (or Equivalent Synchronous <u>Power Generating Modules</u> – see note 1)			
<u>GENERATION SET</u> <u>Power Generating Module</u> MODEL DATA			
<u>Power Generating Module</u> identifier	Text	SPD	SPD
Type of <u>Power Generating Module</u> (round rotor, salient pole or asynchronous equivalent – see note 1)	Text	SPD	SPD
Positive sequence (armature) resistance	per unit	DPD	SPD
Short circuit ratio (see note 2)	Number	DPD	DPD
Inertia constant (<u>Power Generating Module</u> and Prime Mover)	MWsec/ MVA	DPD	SPD
Direct axis reactances: Sub-transient (X''_d) – unsaturated / saturated Transient (X'_d) – unsaturated / saturated Synchronous (X_d) – unsaturated / saturated	per unit per unit per unit	SPD / SPD DPD / DPD DPD / DPD	SPD / SPD SPD / SPD SPD / SPD
Quadrature axis reactances: Sub-transient (X''_q) – unsaturated / saturated Transient (X'_q) – unsaturated / saturated Synchronous (X_q) – unsaturated / saturated	per unit per unit per unit	None None None	DPD / DPD DPD / DPD DPD / DPD
Time constants: State whether time constants are open or short circuit D-axis sub-transient – unsaturated / saturated D-axis transient – unsaturated / saturated Q-axis sub-transient – unsaturated / saturated Q-axis transient – unsaturated / saturated	Text s s s s	DPD DPD / DPD DPD / DPD None None	SPD SPD / SPD SPD / SPD DPD / DPD DPD / DPD
Stator leakage reactance (unsaturated)	per unit	None	DPD
Zero sequence resistance (earthed star only, including any neutral earthing resistance)	per unit	DPD	DPD
Zero sequence reactance (earthed star only, including any neutral earthing reactance)	per unit	DPD	DPD
Negative sequence resistance	per unit	DPD	DPD
Negative sequence reactance	per unit	DPD	DPD

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>Data Category for Generators connected at LV</u>	<u>Data Category for Generators Connected at HV</u>
5c (i) Synchronous <u>Power Generating Modules</u> (or Equivalent Synchronous <u>Power Generating Modules</u> – see note 1)			
Rated field current	A	DPD	DPD
Field current open circuit saturation curve (from 50% to 120% of rated terminal voltage)	Graph	DPD	DPD
Potier reactance (if saturation factor available – see note 3)	per unit	DPD	DPD
Saturation factor (pu field current to produce 1.2pu terminal voltage on open circuit)	per unit	DPD	DPD
<u>Frequency response droop setting</u>	<u>Per cent</u>	<u>DPD</u>	<u>DPD</u>
<u>Frequency response mode, ie LFSM-O or FSM</u>	<u>text</u>	<u>DPD</u>	<u>DPD</u>
<u>GENERATION SET</u><u>Power Generating Module MODELS</u>			
Governor and prime mover model (see note 4)	Model	DPD	DPD
AVR / excitation model (see note 4)	Model	DPD	DPD

3833

3834 **Notes:**

- 3835 1. Asynchronous generators may be represented here by an equivalent synchronous generator data set
- 3836 2. The short circuit ratio (SCR) of a Power Generating Module is one measure of the performance of a
- 3837 machine under short circuit conditions and is important in determining the unit's stability
- 3838 performance. The reciprocal of the per unit on rating saturated synchronous reactance, $X_d(\text{sat})$, is
- 3839 equal to the SCR.
- 3840 3. The Potier reactance is only required if the saturation factor is available. The saturation factor is
- 3841 defined as the pu value of field current required to generate 1.2pu stator terminal voltage on open
- 3842 circuit.
- 3843 4. **SPD** will normally be sufficient, except where the **DNO** considers that the stability and security of the
- 3844 network is at risk. Sufficient **DPD** should then be provided in order to build up a suitable Power
- 3845 Generating Module dynamic model for analysis. Alternatively a 'Black Box' dynamic model of the
- 3846 Power Generating Module may be provided. All models should be suitable for the software analysis
- 3847 package used by the **DNO**.

Schedule 5c (ii)

3848 DATA REGISTRATION CODE

3849 Power Generating Module DATA FOR EMBEDDED GENERATION SET Power Generating
3850 ModuleS

<u>DATA DESCRIPTION</u> 5c (ii) Fixed Speed Induction <u>Power Generating</u> <u>Modules</u>	<u>UNITS</u>	<u>Data</u> <u>Category</u> <u>for</u> <u>Generators</u> <u>connected</u> <u>at LV</u>	<u>Data</u> <u>Category</u> <u>for</u> <u>Generators</u> <u>Connected</u> <u>at HV</u>
<u>GENERATION SET</u>Power Generating Module MODEL DATA (see notes 1 and 2)			
Magnetising reactance	per unit	DPD	SPD
Stator resistance	per unit	DPD	SPD
Stator reactance	per unit	DPD	SPD
Inner cage or running rotor resistance	per unit	DPD	SPD
Inner cage or running rotor reactance	per unit	DPD	SPD
Outer cage or standstill rotor resistance	per unit	DPD	SPD
Outer cage or standstill rotor reactance	per unit	DPD	SPD
State whether data is inner-outer cage or running-standstill	Text	DPD	SPD
Number of pole pairs	number	DPD	DPD
Gearbox ratio	number	DPD	DPD
Slip at rated output	%	DPD	SPD
Total effective inertia constant (generator and prime mover)	MWsec/ MVA	DPD	SPD
Inertia constant of the generator rotor	MWsec/ MVA	DPD	DPD
Inertia constant of the prime mover rotor	MWsec/ MVA	DPD	DPD
Equivalent shaft stiffness between the two masses	Nm/ Electrical radian	DPD	DPD
Describe method of adding star capacitance over operating range (see notes 3 and 4)	Text	DPD	DPD

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>Data Category for Generators connected at LV</u>	<u>Data Category for Generators Connected at HV</u>
5c (ii) Fixed Speed Induction <u>Power Generating Modules</u>			
Shunt capacitance connected in parallel at % of rated output Starting 20% 40% 60% 80% 100%	kVAr or Graph	SPD	SPD
Active Power and Reactive Power import during start-up Active Power and Reactive Power import during switching operations eg '6 to 4 pole' change-over	MW- MVAr / Time Graphs	SPD DPD	SPD SPD
Under voltage protection setting & time delay	puV, s	SPD	SPD
Governor and prime mover model (see note 5)	Model	DPD	DPD

3851

3852 **Notes:**

- 3853 1. Asynchronous generators may be represented by an equivalent synchronous data set
- 3854 2. The **User** will need to provide the above data for each asynchronous **Power Generating Module**
- 3855 based on the number of pole sets (ie two data sets for dual speed 4/6 pole machines).
- 3856 3. LV connected generators may just have a simple fixed capacitor bank.
- 3857 4. If electronic power factor control (e.g. SVC) is installed, provide details of the operating range and
- 3858 characteristics eg pf or MVAr range - operating regime: constant or voltage set-point / slope and
- 3859 response times.
- 3860 5. **SPD** will normally be sufficient, except where the **DNO** considers that the stability and security of the
- 3861 network is at risk. Sufficient **DPD** should then be provided in order to build up a suitable **Power**
- 3862 **Generating Module** dynamic model for analysis. Alternatively a 'Black Box' dynamic model of the
- 3863 **Power Generating Module** may be provided. All models should be suitable for the software
- 3864 analysis package used by the **DNO**.

Schedule 5c (iii)

3865 DATA REGISTRATION CODE

3866 ~~GENERATION SET~~Power Generating Module DATA FOR EMBEDDED GENERATION
3867 ~~SET~~Power Generating ModuleS

<u>DATA DESCRIPTION</u> 5c (iii) Doubly Fed Induction <u>Power Generating Modules</u>	<u>UNITS</u>	<u>Data Category for Generators connected at LV</u>	<u>Data Category for Generators Connected at HV</u>
<u>Power Generating Module</u> maximum fault current contribution data (see note 1)	Schedule	SPD	SPD
GENERATION SET Power Generating Module MODEL DATA (see note 2)			
Magnetising reactance	per unit	DPD	SPD
Stator resistance	per unit	DPD	SPD
Stator reactance	per unit	DPD	SPD
Running rotor resistance	per unit	DPD	SPD
Running rotor reactance	per unit	DPD	SPD
Standstill rotor resistance	per unit	DPD	SPD
Standstill rotor reactance	per unit	DPD	SPD
Rotor current limit	A	DPD	DPD
Number of pole pairs	number	DPD	DPD
Gearbox ratio	number	DPD	DPD
Generator rotor speed range (minimum to rated speed)	rpm	DPD	SPD
Electrical power output versus generator rotor speed	Graph / Table	DPD	DPD
Total effective inertia constant (generator and prime mover) at rated speed	MWsec/MVA	DPD	SPD
Inertia constant of the generator rotor at rated speed	MWsec/MVA	DPD	DPD
Inertia constant of the prime mover rotor at rated speed	MWsec/MVA	DPD	DPD
Equivalent shaft stiffness between the two masses	Nm/ Electrical radian	DPD	DPD
DFIG unit models including excitation and prime mover control systems (see note 2)	Models	DPD	DPD

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>Data Category for Generators connected at LV</u>	<u>Data Category for Generators Connected at HV</u>
5c (iii) Doubly Fed Induction <u>Power Generating Modules</u>			
<u>Number of operations of fast fault current injection that can be sequentially accomplished and any limitations on time, thermal limitations, protection etc.</u>	<u>Text</u>	<u>DPD</u>	<u>SPD</u>

Notes:

1. Fault current contribution data should be provided under Schedule 5b.
2. **SPD** will normally be sufficient, except where the **DNO** considers that the stability and security of the network is at risk. Sufficient **DPD** should then be provided in order to build up a suitable **Power Generating Module** dynamic model for analysis. Alternatively a 'Black Box' dynamic model of the **Power Generating Module** may be provided. All models should be suitable for the software analysis package used by the **DNO**.

Schedule 5c (iv)

DATA REGISTRATION CODE

GENERATION SET Power Generating Module DATA FOR EMBEDDED GENERATION SET Power Generating Modules

DATA DESCRIPTION 5c (iv) Series Converter Connected Power Generating Modules	UNITS	Data Category for Generators connected at LV	Data Category for Generators Connected at HV
Power Generating Module maximum fault current contribution data (see note 1)	Schedule	SPD	SPD
GENERATION SET Power Generating Module MODEL DATA (see note 2)			
Gearbox ratio	number	DPD	DPD
Generator rotor speed range (minimum to rated speed)	rpm	DPD	SPD
Electrical power output versus generator rotor speed	Graph / Table	DPD	DPD
Total effective inertia constant (generator and prime mover)	MWsec/ MVA	DPD	SPD
Inertia constant of the generator rotor at rated speed	MWsec/ MVA	DPD	DPD
Inertia constant of the prime mover rotor at rated speed	MWsec/ MVA	DPD	DPD
Equivalent shaft stiffness between the two masses	Nm/ Electrical radian	DPD	DPD
Series Converter Power Generating Module models including excitation, voltage/Reactive Power and prime mover control systems (see note 2)	Models	DPD	DPD
Number of operations of fast fault current injection that can be sequentially accomplished and any limitations on time, thermal limitations, protection etc.	Text	DPD	SPD

Notes:

1. Fault current contribution data should be provided under Schedule 5b.
2. SPD will normally be sufficient, except where the DNO considers that the stability and security of the network is at risk. Sufficient DPD should then be provided in order to build up a suitable **Power Generating Module** dynamic model for analysis. Alternatively a 'Black Box' dynamic model of the **Power Generating Module** may be provided. All models should be suitable for the software analysis package used by the DNO. Where required by the DNO, generator electrical parameters should be provided based on Schedule 5c (i) or 5c (ii), according to the type of machine used.

Schedule 5c (v)

3888 **DATA REGISTRATION CODE**

3889 **GENERATION SETPower Generating Module DATA FOR EMBEDDED GENERATION**
 3890 **SETPower Generating ModuleS**

<u>DATA DESCRIPTION</u> 5c (v) Transformers	<u>UNITS</u>	<u>Data Category for Generators connected at LV</u>	<u>Data Category for Generators Connected at HV</u>
Transformer identifier	Text	SPD	SPD
Transformer type (Unit/Station/Auxiliary)	Text	SPD	SPD
Number of identical units	Number	SPD	SPD
Type of cooling	Text	SPD	SPD
Rated (apparent) power	MVA	SPD	SPD
Rated voltage ratio (on principal tap)	kV/kV	SPD	SPD
Positive sequence resistance on principal tap	per unit	DPD	SPD
Positive sequence reactance at principal tap	per unit	SPD	SPD
Positive sequence reactance at minimum tap	per unit	None	DPD
Positive sequence reactance at maximum tap	per unit	None	DPD
Zero sequence resistance	per unit	DPD	DPD
Zero sequence reactance	per unit	DPD	DPD
Winding configuration (eg Dyn11)	Text	DPD	SPD
Type of tap changer (on load / off circuit)	Text	SPD	SPD
Tap step size	%	SPD	SPD
Maximum ratio tap	%	SPD	SPD
Minimum ratio tap	%	SPD	SPD
Tap position in service (for off load tapchangers only)	%	DPD	DPD
Method of voltage control	Text	DPD	SPD
Method of earthing of high-voltage winding	Text	SPD	SPD
Method of earthing of low-voltage winding	Text	SPD	SPD

Schedule 5d

3891 DATA REGISTRATION CODE

3892 DNO NETWORK DATA

3893 (Data indicative of that which may be requested by Users for parts of the Distribution System)

<u>DATA DESCRIPTION</u>	<u>UNITS</u>
5d DNO Network Data (see note 1)	
Fault Level at Connection Point prior to <u>Power Generating Facility</u> connection.	
Peak asymmetrical short circuit current at 10ms (i_p) for a 3 ϕ short circuit fault at the Connection Point	kA
RMS value of the initial symmetrical short circuit current (I_k) for a 3 ϕ short circuit fault at the Connection Point	kA
RMS value of the symmetrical short circuit current at 100ms ($I_{k(100)}$) for a 3 ϕ short circuit fault at the Connection Point	kA
Peak asymmetrical short circuit current at 10ms (i_{p-e}) for a 1 ϕ -E short circuit fault at the Connection Point	kA
RMS value of the initial symmetrical short circuit current (I_{k-e}) for a 1 ϕ -E short circuit fault at the Connection Point	kA
RMS value of the symmetrical short circuit current at 100ms ($I_{k-e(100)}$) for a 1 ϕ -E short circuit fault at the Connection Point	kA
Circuit Data	
Circuit schematic diagram and geographic diagram showing normal open points	Diagram
Circuit impedances (R, X, B positive & zero sequence)	Specify
Circuit ratings and any seasonal variations	Specify
Is the network operated radial or non-radial?	Text
Circuit transformer voltage ratios eg HV/433/250	kV/V/V
Are circuit transformers zoned by applying the progressively higher tap settings for each group of transformers in zones along the circuit to optimise voltage regulation?	Y/N
Transformer Data (for each transformer)	
Transformer identifier	Text
Rated voltage ratio (on principal tap)	kV/kV
Winding configuration eg Dyn11	Text
Rated (apparent) power	MVA
Type of tap changer (on load / off circuit)	Text
Tap changer rating (forward and reverse power)	MVA / MVA
Tap step size	%

<u>DATA DESCRIPTION</u>	<u>UNITS</u>
5d DNO Network Data (see note 1)	
Maximum ratio tap	%
Minimum ratio tap	%
Normal tap position	%
Method of voltage control (voltage / LDC / NRC / other)	Text / Report
Controlled busbar (high-voltage side / low-voltage side / remote busbar)	Text
Target voltage and limits	kV, ±%
Normal system voltage on the high-voltage side	kV
Normal system voltage on the low-voltage side	kV
Positive sequence resistance	% on rating
Positive sequence reactance at principal tap	% on rating
Zero sequence resistance	% on rating
Zero sequence reactance	% on rating
Method of earthing of the high-voltage winding	Text
Method of earthing of the low-voltage winding	Text

3894

3895 **Notes:**

3896 1. **Users** are advised to refer to network data items published in the **DNO's** Long Term Development
3897 Statement.

3898

Schedule 5e

3899 DATA REGISTRATION CODE

3900 DATA FOR EMBEDDED TRANSMISSION SYSTEMS

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>DATA CATEGORY</u>
5e Embedded Transmission System Data		
EMBEDDED TRANSMISSION SYSTEM LOCATION & OPERATION		
Embedded Transmission System name	Text	SPD
Postal address or site boundary plan (1/500)	Text / Plan	SPD
Connection Point (OS grid reference or description)	Text	SPD
Connection Point voltage	V	SPD
Single line diagram of existing and proposed connections or Operation Diagrams when available	Diagram	SPD
Number of Power Station(s) and/or Power Generating Modules connected to the Embedded Transmission System	Number	SPD
Operating regime of Power Station and/or Power Generating Modules – intermittent or non-intermittent (see note 1)	Text	SPD
Means of carrying out voltage control and/or power factor control at the Connection Point	Report	SPD
Embedded Transmission System performance chart (net, at Connection Point , as per DPC7 Figure 1)	Figure	DPD
EMBEDDED TRANSMISSION SYSTEM IMPORT REQUIREMENTS (see note 2)		
Maximum Active Power import	MW	SPD
Maximum Reactive Power import (lagging)	MVAr	SPD
Maximum Reactive Power export (leading)	MVAr	SPD
Requirements for Top - Up and / or Standby supplies	Text	SPD
EMBEDDED TRANSMISSION SYSTEM EXPORT REQUIREMENTS (see note 3)		
Total Embedded Transmission System output at Registered Capacity (net of auxiliary loads)		
Registered Capacity (maximum Active Power export)	MW	SPD
Maximum Reactive Power export (lagging)	MVAr	SPD
Maximum Reactive Power import (leading)	MVAr	SPD

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>DATA CATEGORY</u>
5e Embedded Transmission System Data		
Total Embedded Transmission System output at Minimum Generation (net of auxiliary loads)		
Minimum Generation (minimum Active Power export)	MW	DPD
Maximum Reactive Power export (lagging)	MVAr	DPD
Maximum Reactive Power import (leading)	MVAr	DPD
Embedded Transmission System MAXIMUM FAULT CURRENT CONTRIBUTION (see note 4)		
Peak asymmetrical short circuit current at 10ms (i_p) for a 3 ϕ short circuit fault at the Connection Point	kA	SPD
RMS value of the initial symmetrical short circuit current (I_k'') for a 3 ϕ short circuit fault at the Connection Point	kA	SPD
RMS value of the symmetrical short circuit current at 100ms ($I_{k(100)}$) for a 3 ϕ short circuit fault at the Connection Point	kA	SPD
Short circuit time constant T'' , corresponding to the change from I_k'' to $I_{k(100)}$	s	DPD
Positive sequence X/R ratio at the instant of fault	-	DPD
Embedded Transmission System INTERFACE ARRANGEMENTS (see note 5)		
Means of connection, disconnection and synchronising between DNO and User	Method statement	SPD
Site protection / co-ordination arrangements with DNO	Report	DPD
Site communications, control and monitoring (HV / LV)	Report	DPD

- 3901
- 3902 **Notes:**
- 3903 1. Intermittent and Non-intermittent Generation is defined in ER P2/6 as follows:
- 3904 • Intermittent Generation: Generation plant where the energy source for the prime mover can not
- 3905 be made available on demand
- 3906 • Non-intermittent Generation: Generation plant where the energy source for the prime mover can
- 3907 be made available on demand
- 3908 2. This section relates to operating conditions when the **Embedded Transmission System** is
- 3909 importing **Active Power**, typically when it is not generating. The maximum **Active Power** import
- 3910 requirement and the associated maximum **Reactive Power** import and/or export requirements should
- 3911 be stated.
- 3912 3. This section relates to operating conditions when the **Embedded Transmission System** is
- 3913 exporting **Active Power**. The **Active Power** export and associated maximum **Reactive Power** range
- 3914 should be stated for operation at **Registered Capacity** and for operation at **Minimum Generation**.
- 3915 4. See ER G74, ETR 120 and IEC 60909 for guidance on short-circuit current data. Additionally, fault
- 3916 current contribution data may be provided in the form of detailed graphs, waveforms and/or tables.

3917 5. The interface arrangements need to be agreed and implemented between the **User** and the **DNO**
3918 before energisation and consideration should be given to addressing the Distribution Code
3919 requirements including DGC5, DGC8, DPC6.7, ~~DPC7.2.6~~, DOC5, DOC7.4, DOC8.6.3, DOC8.6.4,
3920 DOC9 and DOC10 and the requirements of EREC G59 and EREC G99 as applicable. For example
3921 DOC7 requires up to date contact details and procedures are required to establish an effective means
3922 of communication between the **Generator** and the **DNO**.

Schedule 6

3923 DATA REGISTRATION CODE

3924 DEMAND FORECASTS

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>TIME PERIOD COVERED</u>	<u>UPDATE TIME</u>	<u>DATA CATEGORY</u>
1. Half hour Active Power and Power Factor at Annual ACS Conditions for specified time of the annual peak half hour at the associated Grid Supply Points and at the specified time of the annual peak half-hour of the National Electricity Transmission System Demand	MW/ MVA _r	8 weeks - 3 years	Week 35	OD
2. Half hour Active Power and Power Factor at Average Conditions at the specified half hour of the annual minimum National Electricity Transmission System Demand .	MW/ MVA _r	8 weeks - 3 years	Week 35	OD
3. Half hour Power output of Embedded <u>Power Generating Module</u> and/or Embedded Transmission System at the specified half hour of the annual peak half hour of the National Electricity Transmission System	MW	8 weeks - 3 years	Week 35	OD
4. Schedules for the operation of Embedded <u>Power Generating Modules</u> and/or Embedded Transmission Systems whose output is greater than 5MW on a half-hourly basis	MW Date Time	2 weeks to 8 weeks ahead	1600 hrs Friday	OD

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>TIME PERIOD COVERED</u>	<u>UPDATE TIME</u>	<u>DATA CATEGORY</u>
5. Suppliers will provide details of their proposed use of Demand Control measures aggregated to 5MW or more (averaged over any half hour) on a half hourly basis for each DNO Connection Point .	MW Date Time	2 weeks to 8 weeks ahead	1600 hrs Friday	OD
6. Customers, Suppliers, Other Network Operators and other DNOs connected to the DNO's Distribution System shall notify the DNO where their or their Customers operations are likely to result in an aggregated change in Demand at the DNO Connection Point of supply of greater than 5MW of the Demand at that time on a half hourly basis.	MW Date Time	2 weeks to 8 weeks ahead	1600 hrs Friday	OD
7. Items 5, 6 and 7 above updated.		2 days to 12 days ahead	0900 hrs each Wednesday	OD
8. Details of differences greater than 5MW from the schedules of operation of any Embedded Power Generating Module and/or Embedded Transmission System on a half-hourly basis submitted under item 5 above.	MW Date Time	0 - 24 hrs ahead	As specified	OD
9. Details from Suppliers of any differences of the amount and donation of their proposed use of Customer Demand Control (aggregated over any half hourly basis submitted under item 6 above).	MW Date Time	0 - 24 hrs ahead	As specified	OD

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>TIME PERIOD COVERED</u>	<u>UPDATE TIME</u>	<u>DATA CATEGORY</u>
10. Details from each User connected to the DNO's Distribution System of any change in aggregate Demand at the point of surplus of greater than 5MW of the Demand .	MW Date Time	0 - 24 hrs ahead	As specified	OD
11. Details of half hour Active Power and Reactive Power output sent out to the DNO's Distribution System by Embedded Power Generating Module and/or Embedded Transmission System during the previous day on a half hourly basis.	MW MVA _r	Previous day	0300	OD
12. Suppliers , Other Network Operators and other DNOs connected to the DNO's Distribution System will provide details of the amount and duration of Demand Control at the DNO Connection Point aggregated to 5MW or more (arranged over any half hour) which was implemented during the previous Operational Day .	MW Time	Previous day	0300	OD

3925

Schedule 7a

3926 OPERATIONAL PLANNING - LONG TERM

3927 YEARS 3 AHEAD-

3928 EMBEDDED GENERATORS CONNECTED TO THE DNO'S DISTRIBUTION SYSTEM
3929 AS SPECIFIED BY THE DNO

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>TIME PERIOD COVERED</u>	<u>UPDATE TIME</u>	<u>DATA CATEGORY</u>
1. For individual Power Generating Modules or Embedded Transmission Systems the Set/System number and Power Generating Module/ Embedded Transmission System capacity. Preferred outage dates earliest start date latest finish date.	MW Date	Years 3 ahead	Week 2	OD
2. DNO advise Embedded Generators of:-				
(a) details of Embedded Power Generating Module or Embedded Transmission System they may withdraw from service.	Date	Years 3 ahead	Week 12	OD
(b) Output Usable requirements.	MW Date	Years 3 ahead	Week 12	OD
3. Embedded Generators provide DNO with				
(a) update of provisional Embedded Power Generating Module or Embedded Transmission System outage programme.	Date	Years 3 ahead	Week 12	OD
(b) Registered Capacity .	MW			
(c) Neutral weekly Output Usable forecasts.	Date			

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>TIME PERIOD COVERED</u>	<u>UPDATE TIME</u>	<u>DATA CATEGORY</u>
4. DNO following discussion with Embedded Generator will notify, with reason, revision to the provisional Embedded <u>Power Generating Module</u> or Embedded Transmission System outage programme.	Date	Years 3 ahead	Week 28	OD
5. DNO following discussion with Embedded Generator will notify, with reason, revisions to the provisional Embedded <u>Power Generating Module</u> or Embedded Transmission System outage programme. (This taking into account User outages received in Week 28).	Date	Years 3 ahead	Week 42	OD
6. DNO following discussion with Users agree Users outages.	Date	Years 3 ahead	Week 43	OD

Schedule 7b

3930 OPERATIONAL PLANNING - MEDIUM TERM

3931 YEARS 1-2

3932 EMBEDDED GENERATORS CONNECTED TO THE DNO'S DISTRIBUTION
3933 SYSTEM AS SPECIFIED BY THE DNO

3934

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>TIME PERIOD COVERED</u>	<u>UPDATE TIME</u>	<u>DATA CATEGORY</u>
1. For individual Power Generating Modules or Embedded Transmission System the Set/System numbers and Embedded Power Generating Module/ Embedded Transmission System capacity. Preferred outage dates earliest start date latest start date.	MW Date	Years 1 - 2	Week 2	OD
2. Embedded Generators provide the DNO with estimates of:-				
(a) Output Usable	MW Date	Years 1 - 2	Week 10	OD
(b) outage programme	Date	Year 1		
3. DNO following discussion with Embedded Generator provide:-	Date	Years 1 - 2	Week 12	OD
(a) Details of Embedded Power Generating Module or Embedded Transmission System they may withdraw from service for an outage				
(b) Update of Embedded Generator outage programme.				
4. DNO notify each Embedded Generator of Output Usable requirements.	MW Date	Years 1 - 2	Week 12	OD

5. Embedded Generator provides estimates of Output Usable of each Embedded <u>Power Generating Module</u> or Embedded Transmission System	MW Date	Years 1 - 2	Week 41	OD
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3935

Schedule 7c

3936 OPERATIONAL PLANNING - SHORT TERM

3937 EMBEDDED GENERATORS CONNECTED TO THE DNO'S DISTRIBUTION SYSTEM 3938 AS SPECIFIED BY THE DNO

3939

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>TIME PERIOD COVERED</u>	<u>UPDATE TIME</u>	<u>DATA CATEGORY</u>
1. For individual Power Generating Modules or Embedded Transmission Systems the Set/System number and Embedded Power Generating Module/ Embedded Transmission System capacity. Duration of outage earliest start date latest finishing date.	MW Date	Weeks 9 - 52		
Output Usable estimates.	MW Date	Weeks 9 - 52	Week 2	OD
2. DNO informs Embedded Generators of Output Usable requirements.	MW Date	Weeks 9 - 52	Week 4	OD
3. Embedded Generators provide DNO with Embedded Power Generating Module Generating Plant or Embedded Transmission System Output Usable estimates.	MW Date	Weeks 18 - 52	Week 10	OD
4. DNO informs Embedded Generators of change to Output Usable requirements.	MW Date	Weeks 18 - 52	Week 12	OD
5. Embedded Generators provide DNO with Embedded Power Generating Module or Embedded Transmission System Output Usable estimates.	MW Date	Weeks 28 - 52	Week 25	OD
6. DNO informs Embedded Generators of changes to Output Usable requirements.	MW Date	Weeks 31 - 52	Week 27	OD

7. Embedded Generators will provide estimates of Embedded <u>Power Generating Module</u> or Embedded Transmission System Output Usable .	MW Date	Weeks 44 - 52	Week 41	OD
8. DNO inform contracted Embedded Generators of changes to Output Usable requirements.	MW Date	Weeks 44 - 52	Week 43	OD

3940

Schedule 7d

3941 DATA REGISTRATION CODE

3942 OPERATIONAL PLANNING - USER PLANT, APPARATUS AND SYSTEMS

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>TIME PERIOD COVERED</u>	<u>UPDATE TIME</u>	<u>DATA CATEGORY</u>
Users provide the DNO with details of proposed outages which may affect the performance of the DNO's Distribution System . Details of trip testing, risks of trip and other information where known which may affect the security and stability of the DNO's Distribution System shall also be included.	Dates	Years 1 - 2 and Years 3 ahead	Week 28	OD
Update of previously submitted data for year 3 ahead.				
Following consultation with Users and DNO will include agreed outage proposals in the programme.	Date	Years 3 ahead Years1 - 2	Week 43 Week 48	OD OD
As changes occur.	Update of Users proposals agreed in the Medium Term Plan.			

3943

Schedule 8

3944 DATA REGISTRATION CODE

3945 SYSTEM DESIGN INFORMATION

3946

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>DATA CATEGORY</u>
<u>General Information:</u> <u>Type of load and control arrangements</u> <u>Maximum load on each phase at time of Peak Demand</u>		DPD
<u>Fluctuating Loads:</u>		
Rate of change of Demand – Active Power and Reactive Power increasing and decreasing	MW/s MVar/s	DPD
Shortest repetitive time intervals between fluctuations in Demand Active Power and Reactive Power	s	DPD
Largest step change Active Power and Reactive Power increasing and decreasing	MW/s MVar/s	DPD
Maximum energy Demand per half hour	MWh	DPD
Steady state residual Demand (MW) between Demand fluctuations	MW	DPD
<u>Reactive Compensation</u>		
Rating of individual shunt reactors (not associated with cables)	MVar	DPD
Rating of individual capacitor banks	MVar	DPD
Details of any automatic control logic such that operating characteristics can be determined.	Text/ Diagrams	DPD
Point of connection to the System	Diagram	DPD
<u>Lumped Network Susceptance</u>		
Details of the equivalent lumped network susceptance of the User System referred back to the connection with the DNO's Distribution System .	MVar	DPD

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>DATA CATEGORY</u>															
<p>Including shunt reactors which are an integrated part of a cable system and which are not normally in or out of service independent of the cable.</p> <p>Excluding independently switched reactive compensation connected to the User System</p> <p>and</p> <p>any susceptance of the User System inherent in the active and reactive Demand.</p>		DPD															
<u>Fault Infeeds</u>																	
Maximum and minimum short circuit infeeds into the DNO's Distribution System	MVA	DPD															
X/R ratio under maximum and minimum short circuit conditions		DPD															
[Contribution from rotating plant]		DPD															
Equivalent network information at the request of the DNO		DPD															
Interconnection Impedance		DPD															
<p>For User interconnections that operate in parallel with the DNO's Distribution System details of the interconnection impedance shall be exchanged between the DNO and User, including</p> <table> <tr> <td>Positive Sequence Resistance</td><td>% on 100</td><td>DPD</td></tr> <tr> <td>Zero Sequence Resistance</td><td>% on 100</td><td>DPD</td></tr> <tr> <td>Positive Sequence Reactance</td><td>% on 100</td><td>DPD</td></tr> <tr> <td>Zero Sequence Reactance</td><td>% on 100</td><td>DPD</td></tr> <tr> <td>Susceptance</td><td>% on 100</td><td>DPD</td></tr> </table>	Positive Sequence Resistance	% on 100	DPD	Zero Sequence Resistance	% on 100	DPD	Positive Sequence Reactance	% on 100	DPD	Zero Sequence Reactance	% on 100	DPD	Susceptance	% on 100	DPD		
Positive Sequence Resistance	% on 100	DPD															
Zero Sequence Resistance	% on 100	DPD															
Positive Sequence Reactance	% on 100	DPD															
Zero Sequence Reactance	% on 100	DPD															
Susceptance	% on 100	DPD															
If the impedance in the view of the DNO is low then more detailed information will be requested.																	
Demand Transfer Capability		DPD															
Information shall be exchanged on Demand transfer capability where the same Demand may be supplied from alternative DNO or User points of supply including the proportion of Demand normally fed from each point of supply	MW	DPD															

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>DATA CATEGORY</u>
The arrangements for manual/automatic transfer under planned/outage conditions should be provided		DPD
Non - DNO System Data		
The DNO will request information on circuit parameters, switchgear and Protection arrangements	Text/ Diagrams	DPD
Transient Overvoltages		DPD
Demand Profile For Day Of Exit Point Peak Demand		DPD
Demand Profile For Day Of Exit Point Minimum Demand		DPD

3947

Schedule 9

3948 **DATA REGISTRATION CODE**

3949 **LOAD CHARACTERISTICS**

3950

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>DATA CATEGORY</u>
Geographical and electrical point of connection and date connection required Diagrams existing and proposed connections	Text	SPD
Types of Demand :-		
Maximum Active Power Demand Registered Capacity	MW	SPD
Maximum and minimum Reactive Power requirement	MVAr	SPD
Type of load and control arrangements. Eg variable speed motor type of starter employed	Text	SPD
Maximum Phase Voltage Unbalance	Ratio/ Phase at the time	SPD
Maximum harmonic content	% THVD	SPD
Fluctuating Loads:- Graphical indication of typical cycle variation of Demand (Active / Reactive)	Graphical	SPD
Load Management Data	Text	
Maximum short circuit infeed based on <u>Power Generating Module</u> subtransient reactance	MVA	SPD
Maximum zero phase sequence impedance of the User's System at the connection point	% on 100 MVA	SPD
2 hour Demand profiles for Peak Demand	MW and MVAr	SPD
Monthly Peak Demand variation	MW and MVAr	SPD

3951

3952

ANNEX 2 - QUALIFYING STANDARDS

3953 This Annex prescribes the Electricity Supply Industry Standards that have a material effect on
3954 **Users** but do not implement any **Distribution Code** requirements and do not form part of the
3955 **Distribution Code** technical requirements.

3956 Copies of the following Engineering Recommendations and Technical Specifications are freely
3957 available from the **Distribution Code** website at <http://www.dcode.org.uk/> or from Energy
3958 Networks Association, 6th Floor, Dean Bradley House, 52 Horseferry Road, London SW1P 2AF,
3959 <http://www.energynetworks.org/>.

3960 1 **Engineering Recommendation G81** Framework for design and planning, materials
3961 specification and installation and record for Greenfield low voltage housing estate
3962 installations and associated, new, HV/LV distribution substations.

3963 2 **Distributed Generation Connection Guides** (published by Energy Networks Association)

3964 3 **Engineering Technical Report 130-1**

3965 Application Guide for assessing the Capacity of Networks Containing Distributed
3966 Generation

3967 4 **Engineering Technical Report 131**

3968 Analysis Package for Assessing Generation Security Capability – Users’ Guide

3969 5 **Engineering Recommendation P18**

3970 Complexities of 132kV circuits.

3971 6 **Engineering Recommendation G87**

3972 Guidelines for the Provision of Low Voltage Connections to Multiple Occupancy
3973 Buildings

3974

3975

ISSUE SUMMARY

No.	Date	Details of Change
1	01/10/02	<p>This is the first issue of the Distribution Code for Great Britain. The D Code has been formed from an amalgamation of the pre-existing Scottish (Issue 4), and England & Wales (Modification 13) D Codes.</p> <p>There are no deliberate policy changes introduced in this first issue of the GB code: the drafting reflects the requirements existing in both forerunner codes. However there are changes to the wording from both codes necessary in adopting a common text. These changes have been kept to a minimum consistent with developing a common Distribution Code for Great Britain. The detail of these changes from the forerunner codes was publicly consulted on as part of the process of introducing the Distribution Code for Great Britain.</p> <p>Where there are technical, regulatory or institutional differences between Scotland and England & Wales the drafting has preserved these differences in the combined code where necessary.</p>
2	01/03/03	Annex 1 amended to recognize that ER G75 has been re-issued as ER G75/1.
3	01/09/03	<p>Modifications in respect of data requirements for Embedded Generators – particularly:</p> <ul style="list-style-type: none"> • the addition of new DPC1.6 and DPC1.7; • additions to DPC4.5.1; • new DPC5.1.2; • modified DPC7.3 and new DPC7.3.4 <p>Modifications to the Distribution Data Registration Code</p>
4	01/03/04	<p>Introduction of ER G83/1 governing the connection<u>connection</u> of small scale generation. Minor changes to definitions of Embedded Generator and Generator, plus new note in DPC7.1.3 and minor explanatory notes in 5.4.5 and Appendix 1 of the Guide.</p> <p>Rationalization of use of Embedded Generator and Generator throughout the text.</p> <p>Modification to the following clauses for the consequential changes attendant on the replacement of the Electricity Supply Regulations with the Electricity Safety, Quality and Continuity Regulations: DPC4.2.2.1; DPC4.2.2.2; DPC4.4.2; DPC4.4.4; DPC5.2.1; DPC5.3.4; DPC5.4.3; DOC5.4.8; DOC10.1.1; DOC10.4.5.1</p>
5	01/08/04	<p>Governance of Standards</p> <p>Modification to:</p> <p>Glossary and Definitions: addition of Annex 1 Standard; Appendix 1 Standard; Individual DNO Standard; Qualifying Standard.</p> <p>new DGC 4.2 (g) & (h)</p> <p>DGC 4.4</p> <p>House keeping Changes to:</p> <p>DPC 5.4.1 (and Guide 2(e)) and DPC 5.4.3</p>

6	01/04/06o	<p>Modifications for BETTA and LEEMPS</p> <p>Significant definitional and consequential changes to harmonize with BETTA and GB Grid Code drafting.</p> <p>Licence Exempt Embedded Medium Power Station drafting including:</p> <ul style="list-style-type: none"> • New definition of a DC Converter • Modifications to DPC7.3.3 in relation to data requirements • Addition of new section DPC7.5 relating to data and connexionconnection requirements • Addition of new Section DOC 5.6 in relation to compliance testing of Medium Power Stations
7	01/07/06	<p>Replace ER P2/5 with ER P2/6 and the following consequential changes:</p> <ul style="list-style-type: none"> • Addition of ETRs 130 and 131 to Annex 2. • Harmonization of lower limit for DDRC Schedules 6 & 7 at 1MW <p>Replace ER G5/4 with ER G5/4-1 in Annex 1 and in DPC 4.2.3(b)</p>
8	01/11/06	<p>Modify the definitions of Large, Medium and Small Power Stations to align with changes to the GB Grid Code.</p>
9	01/06/08	<p>Minor housekeeping corrections to DGC6.1 and DOC 1.1.5 to point to DGD 2(vi).</p> <p>Replace references to G83/1 with references to G83/1-1</p>
10	15/12/08	<p>Modified to include IDNOs in governance of the D Code. Primarily mods to DGC4.</p> <p>Gas and Electricity Consumers's Committee changed to NCC in accordance with Ofgem directive of 1 October 2008.</p>
11	24/06/09	<p>Modified for Offshore Transmission.</p> <p>New definitions of :</p> <ul style="list-style-type: none"> Embedded Transmission Licensee Embedded Transmission System Existing Offshore Generators Great Britain National Electricity Transmission System National Electricity Transmission System Demand Offshore Offshore Transmission Implementation Plan Offshore Transmission System Operator Offshore Transmission Licensee Offshore Transmission System Onshore Transmission Licensees Onshore Transmission System SHETL SPT <p>and consequential amendments.</p>

		Various changes to the code to ensure that conceptually an embedded transmission system, ie an offshore transmission system connecting to a DNO network is treated like a Large Power Station for planning and operating purposes. Note that for safety interfaces etc, the offshore transmission network is treated in the code in the same way as an existing onshore transmission interface.
12	01/02/10	Addition of revised ENA TS 41-24 to Annex 1
13	01/08/10	<p>Revised for updated requirements for the connexion<u>connection</u> of embedded generation.</p> <p>Revision to the definition of System Stability</p> <p>Replacement of Annex 1 Item 3 with ER G59/2</p> <p>Removal of Annex 1 Item 4 ER G75/1</p> <p>Addition of new document to Annex 2 - ER P18.</p> <p>New section DGC11</p> <p>DPC4.2.3 re-organized and amended to include the treatment of voltage step changes.</p> <p>New DPC4.4.1(f) citing ER P18 as a limit on 132kV system design complexity.</p> <p>New DPC 7.1.4 dealing with short term paralleling requirements</p> <p>New DPC7.2 section dealing with operational requirements transferred from G59</p> <p>New DPC7.4.3section dealing with protection requirements, mainly transferred from G59</p> <p>Modified DPC7.4.4 for fault ride through requirements</p> <p>New DPC 7.4.5 for system stability requirements mainly transferred from ER G75/1</p> <p>New DPC 7.4.6 on earthing, largely incorporating requirements from G59</p> <p>New DPC7.4.9.2 detailing requirements for commissioning tests</p> <p>Review and updating of DDRC schedules.</p>
14	01/02/11	<p>Changes to DGC4.5 and Constitution and Rules to require consideration of greenhouse gas emissions.</p> <p>Update to Annex 2 Item 2, the Distributed Generation Connexion<u>Connection</u> Guide</p>
15	12/04/11	<p>Inclusion of Guidance Note 2 in the published version of the D Code</p> <p>Revision of G59/2 to G59/2-1 in Annex 1</p>
16	01/08/11	Addition of ER G87 Guidelines for the Provision of Low Voltage Connections to Multiple Occupancy Buildings to Annex 2 of the Guide to the Distribution Code
17	07/10/11	Minor amendments to Guidance Note 2.
18	29/03/12	Minor amendments to Guidance Note 2.

19	01/11/12	Replace G83/1-1 with G83/2 and update Guidance Note 2. Add Guidance Note 3
20	01/09/13	Modifications to the protection requirements in 7.4.3.4 to align with G59/3
21	01/01/14	Modifications to DGC to implement the Code Administrators' Code of Practice. Modification to DIN 2.1 to implement EU Third Package requirements. Minor housekeeping changes to definitions of Distribution Data Registration Code and Distribution Code Review Panel to correct typographical errors.
22	01/02/14	Modification to Annex 1 to note the change from ER G12/3 to ER G 12/4
23	01/08/14	Modification to DPC 7.4.3.3 and DPC 7.4.3.4 to increase RoCoF protection settings to provide greater Total System stability
24	21/08/14	Modifications to DPC 7.4.2 and Schedules 5a and 5b to accommodate additional reporting of Small Generator data to National Grid
25	21/08/14	Modifications to DOC2.2 and DOC2.4 to reflect EU Transparency Regulations on demand customers >100MW Housekeeping amendments to: <ul style="list-style-type: none"> • DOC 6.1.3 (Electricity Supply Emergency Code name change) • Amended DGC 4.3(d) to replace National Consumers' Council with Citizens Advice. • Update of reference to ETR130-1
26	31/07/15	Replace EREC G59/3-1 with EREC G59/3-2 in Annex 1
27	01/10/15	Modification to DPC 6.2 Replace reference to G12/4 (2013) with G12/4-1(2015) Following publication of a separate user friendly Distribution Code Summary Guidance document the Guide section has been removed from the Code.
28	01/05/17	Modification to DIN 2.1 – addition of (b) iv) Modification to DOC5 and DOC7 to ensure it is compliant with the EU Network Code “Transmission System Operation Guidelines” (TSOG). The TSOG is expected to enter into force in summer 2017 and some parts of it are effective immediately. These changes are intended to ensure compliance with the TSOG on its entry into force.

29	01/02/18	Modification to DPC7.4.3.4 and DPC7.4.3.7 to change RoCoF compliance requirements, and prohibit the future use of vector shift as LoM protection. Replace reference to ER G59/3-2 with ER G59/3-3
30	01/03/18	To take cognisance of the revision to EREC P25 (amalgamation of ER P25 and ERP26). Modification to Annex 1 list and DPC4.3.2, DPC4.4.1 and DPC6.5.1. Remove reference to ER P26.
<u>xx</u>	<u>[01/05/18]</u>	<u>Definition of Small, Medium and Large Power Stations altered to incorporate introduction of the European Network Code Requirements for Generators.</u> <u>Modification to DPC 7 to allow for compliance with the European Network Code Requirements for Generators achieved by the introduction of Engineering Recommendations G98 and G99.</u> <u>Removal of G59 duplicate clauses:</u> <ul style="list-style-type: none"> • <u>DPC7.1.4 and DPC7.1.5 Parallel operation</u> • <u>DPC7.2.2 and DPC7.2.4 Isolation and safety labelling</u> • <u>DPC7.2.5 Disconnection</u> • <u>DPC7.2.6 Operational & Safety</u> • <u>DPC7.2.8 Synchronising</u> • <u>DPC7.4.1.3 Frequency Operating Range</u> • <u>DPC7.4.3.4, DPC7.4.3.5 and DPC7.4.3.6, DPC7.4.3.9 Protection</u> <u>DOC 5 clarification around Medium Power Stations.</u>

END