

## ENTSO-E draft Demand Connection Code

27 June 2012

### *Notice*

This document represents the status of the work done by ENTSO-E as of 27 June 2012, based on the ACER framework guidelines on electricity grid connections published on 20 July 2011 and the EC mandate letter received by ENTSO-E on 5 January 2012 requesting a network code on DSO and industrial load grid connection rules in electricity within a twelve month period.

It incorporates the input of an extensive informal and formal dialogue with stakeholders, including meetings, public workshops and a “Call for Stakeholder Input” that took place during the period between Summer of 2011 and June 2012 aiming at exchanging views on the challenges and key issues.

This document is now issued for formal public consultation of stakeholders who are invited to submit their comments via the web based ENTSO-E consultation tool by 13 September 2012.

After due consideration of these comments in an open and transparent manner in compliance with Article 10 of Regulation (EC) 714/2009, ENTSO-E will adopt its “Demand Connection Code” and submit it to ACER.

# **Requirements for Demand Connection Code**

## ***including dedicated Requirements for Distribution Networks and Demand Facilities***

### **PURPOSE AND OBJECTIVES**

Having regard to Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC;

Having regard to Regulation (EC) 714/2009 of the European Parliament and of the Council of 13 July 2009 and especially Article 6;

Having regard to the priority list issued by the European Commission on 22 December 2010;

Having regard to the Framework Guidelines on Electricity Grid Connection issued by ACER on 20<sup>th</sup> July 2011;

Whereas:

(1) Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC and Regulation (EC) 714/2009 of the European Parliament and of the Council of 13 July 2009 (whereas section 6) underline the need for an increased cooperation and coordination among transmission system operators within a European network of transmission system operators for electricity (ENTSO-E) to create network codes for providing and managing effective and transparent access to the transmission networks across borders, and to ensure coordinated and sufficiently forward-looking planning and sound technical evolution of the transmission system in the Community, including the creation of interconnection capacities, with due regard to the environment;

(2) Transmission system operators (TSOs) are according to Article 2 and 12 of Directive 2009/72/EC responsible for providing and operating high and extra-high voltage networks for long-distance transmission of electricity as well as for supply of lower-level regional distribution systems and directly connected customers. Besides this transmission and supply task it is also the TSOs' responsibility to ensure the system security with a high level of reliability and quality;

(3) Distribution system operators (DSOs) are according to Articles 2 and 25 of Directive 2009/72/EC responsible for providing and operating low, medium and high voltage networks for regional distribution of electricity as well as for supply of lower-level Distribution Networks and directly connected customers. Besides the regional distribution and supply task it is also the DSOs' responsibility to ensure the security of their networks with a high level of reliability and quality.

(4) Secure system operation is only possible by close cooperation between all users of both distribution and transmission networks and the Network Operators. In context of system security the transmission and distribution Networks and all their respective users need to be considered as one entity from a systems engineering approach respecting that the security of each part of the system (transmission and distribution Networks and/or demand users) is interdependent of the other part. It is therefore of crucial importance that demand users are obliged going forward to meet the relevant technical requirements concerning system security as a prerequisite for network connection. Appropriate dynamic behaviour of applicable users and their protection and control facilities are necessary in normal operating conditions and in a range of disturbed operating conditions in order to preserve or to re-establish system security. The close cooperation between owners and the Network

Operators shall take place in due compliance with the principle of confidentiality, such as further detailed in Article 16 (1) of Directive 2009/72/EC.

(5) ENTSO-E has drafted this Network Code for grid connection requirements (“Demand Connection Code”) aiming at setting out clear and objective requirements for grid users for network connection in order to contribute to non-discrimination, effective competition and the efficient functioning of the internal electricity market and to ensure system security.

(6) Regulation (EC) 714/2009 in its Articles 8(7) defines that “the network codes shall be developed for cross-border network issues and market integration issues and shall be without prejudice to the Member States’ right to establish national network codes which do not affect cross-border trade”.

For the purposes of this Network Code definition of cross border network issues and market integration issues is derived with due consideration to the targets of the 3<sup>rd</sup> legislative package for the internal electricity market, namely:

- supporting the completion and functioning of the internal market in electricity and cross-border trade;
- facilitating the targets for penetration of renewable generation; and
- maintaining security of supply.

The interconnected transmission system establishes the wholesale platform for the internal electricity market. TSOs are responsible for maintaining, preserving and restoring security of the interconnected system with a high level of reliability and quality, which in this context is the essence in facilitating cross-border trading.

As indicated in (4) above, system security cannot be ensured independently from the technical capabilities of all users. Historically generation facilities have formed the backbone of providing technical capabilities however in future the role of demand users is expected to play a more pivotal role in this regard. Regular coordination at the level of dynamic generation and demand as well as for an adequate performance of equipment connected to their networks with robustness to face disturbances and to help to prevent any large disturbance or to facilitate restoration of the system after a collapse are fundamental prerequisites.

Also as stated in (4) above, secure system operation is only possible by close cooperation of all users connected at all voltage levels with the network operators in an appropriate way. Consequently, the Transmission and Distribution Network and the generating and Demand Facilities need to be considered as one entity from a systems engineering perspective. It is therefore of crucial importance that Power Generating Modules, Distribution Networks and Demand Facilities are obliged to meet the requirements and to provide the technical capabilities with relevance to system security.

To ensure system security within the interconnected transmission network and to provide an adequate security level a common understanding on these requirements to Distribution Networks (including Closed Distribution Networks) and demand facilities which are becoming increasingly more active and essential. All requirements that contribute to maintaining, preserving and restoring system security in order to facilitate proper functioning of the internal electricity market within and between synchronous areas, and to achieving cost efficiencies through harmonisation of requirements shall be regarded as “cross-border network issues and market integration issues”.

Pursuant to Article 6 of Regulation (EC) 714/2009, ENTSO-E shall submit this Network Code to ACER.

# Title 1

## GENERAL PROVISIONS

### Article 1

#### SUBJECT MATTER

This Network Code defines a common set of requirements for Transmission Connected Distribution Networks and Significant Demand Facilities, to be connected to the Network and sets up a common framework for Network Connection Agreements between Network Operators and the Demand Facilities Owner or Distribution Asset Owner.

For the avoidance of doubt the requirements, conditions, contained within the Articles for demand (excluding DSO networks) set out below are specified on the basis of a pure demand facility. In situations where generation and demand co-exist, all demand requirements within this code will be evaluated on the basis that the generation is not present. The Power Generating Modules will have to comply with the requirements of the Network Code “Requirements for Grid Connection applicable to all Generators”.

### Article 2

#### DEFINITIONS (glossary)

For the purpose of this Network Code, the following definitions shall apply:

**Active Power** - is the real component of the Apparent Power at fundamental Frequency, expressed in watts or multiples thereof (e.g. kilowatts (kW) or megawatts (MW)).

**Agency** – The Agency for the Cooperation of Energy Regulators (ACER) as established by Regulation (EC) 713/2009.

**Apparent Power** - is the product of Voltage (in volts) and Current (in amperes). It is usually expressed in kilovolt-amperes (kVA) or megavolt-amperes (MVA) and consists of a real component (Active Power) and an imaginary component (Reactive Power).

**Authorised Certifier** - is an entity authorised by European Standards Organisations to issue Equipment Certificates. The accreditation of the Authorised Certifier shall be given from the national affiliation of, European co-operation for Accreditation (EA), established according to Regulation (EC) 765/2008.

**Block Loading** – is the maximum step Active Power loading of reconnected demand during system restoration after black-out.

**Closed Distribution Network (CDN)** – In the context of this Network Code is defined in Article 28 (1) of Directive 2009/72/EC. Broadly this Article 28 defines such a network as a system (network) which distributes electricity within a geographically confined industrial, commercial or shared services site and does not (without prejudice to a small number of households located within the area served by the system and with employment or similar associations with the owner of the system) supply household customers. This Network will either have its operations or the production process of the

users of the system integrated for specific or technical reasons or distribute electricity primarily to the owner or operator of the Network or their related undertakings

**Compliance Monitoring** – is the process to verify that the (technical) capabilities for example of Demand Facilities, Distribution Networks or Power Generating Modules are maintained compliant with the specifications and requirements of this Network Code after starting operation.

**Compliance Simulation** – is the process of verification that Demand Facilities, Distribution Networks or Power Generating Modules are compliant with the specifications and requirements of this Network Code, for example before starting operation of new installations. The verification should include, inter alia, the revision of documentation, the verification of the requested capabilities of the facility by simulation studies and the revision against actual measurements.

**Compliance Testing** – is the process of verification that Demand Facilities, Distribution Networks or Power Generating Modules are compliant with the specifications and requirements of this Network Code, for example before starting operation of new installations. The verification includes the revision of documentation, the verification of the requested capabilities of the facility by practical tests and simulation studies and the revision of actual measurements during trial operation.

**Connection Agreement** – is a contract between the Relevant Network Operator and either the Demand Facility Owner, Distribution Asset Owner or Power Generating Facility Owner which includes technical specifications and site specific requirements for the facility.

**Connection Point** - is the interface at which the Demand Facility, or Power Generating Module is connected to a Transmission, Distribution or Closed-Distribution Network or at which the Distribution Network is connected to a Transmission Network according to Article 28 of Directive 2009/72/EC and as identified in the connection agreement.

**Control Area** - is a part of the interconnected electricity transmission system controlled by a single Transmission System Operator.

**Control Room** – is a Relevant Network Operator’s centralised operation centre.

**Cost-Benefit Analysis** – is a process by which the Relevant Network Operator weighs the expected costs of alternative actions against the expected benefits in order to determine the alternative with the highest net socio-economic benefit.

**Current** - unless stated otherwise, current refers to the root-mean-square value of the positive sequence of the phase current at fundamental Frequency.

**Demand Aggregation** – is a set of Demand Facilities which can be operated as a single facility for the purposes of offering one or more Demand Side Response services.

**Demand Side Response Unit Document (DSRUD)** - is a document issued by either Demand Facility Owner to the Relevant Network Operator for Demand Connections with DSR above 1000V. The DSRUD is intended to contain information confirming that the Demand Unit with DSR has demonstrated compliance with the technical criteria as referred to in this Network Code and provided the necessary data and statements including a Statement of Compliance.

**Demand Facility** – is a facility which consumes electrical energy and is connected at one or more

Connection Points to the Network. For the purpose of avoidance of doubt a Distribution Network and/or Auxiliary Supplies of a Power Generating Modules are not a Demand Facility.

**Demand Facility Operator** - is the entity (usually the owner) that is responsible for the operation of the Demand Facility.

**Demand Facility Owner** - is the owner of the Demand Facility.

**Demand Side Response (DSR)** - is demand offered for the purposes of, but not restricted to, providing Active or Reactive Power management, Voltage and Frequency regulation and System Reserve.

**Demand Side Response Active Power Control (DSR APC)** – Demand within a demand facility that can be modulated by the Relevant TSO, which results in an Active Power modification.

**Demand Side Response Low Frequency Demand Disconnection (DSR LFDD)** – Demand within a Demand Facility that can be disconnected in case of low Frequency.

**Demand Side Response Low Voltage Demand Disconnection (DSR LVDD)** - Demand within a Demand Facility that can be disconnected in case of low voltage.

**Demand Side Response Reactive Power Control (DSR RPC)** - Reactive Power or Reactive Power devices (Mvar's) in a demand facility that are accessible for modulation by the Relevant NO.

**Demand Side Response System Frequency Control (DSR SFC)** - Reduction or increase of the demand of electrical devices in response to Frequency fluctuations, made by an autonomous response to temperature targets of these electrical devices to diminish these fluctuations.

**Demand Side Response Transmission Constraint Management (DSR TCM)** - Demand which can be operated by the Relevant TSO to manage transmission constraints within the Network.

**Demand Side Response Very Fast Active Power Control:** Demand within a Demand Facility that can be modulated very fast in response to a Frequency deviation, which results in a very fast Active Power modification.

**Demand Unit** – is an indivisible set of installations which can be actively controlled by a Demand Facility Operator to moderate its electrical energy demand. A storage device within a Demand Facility or Closed Distribution Network (excluding hydro pump-storage) operating in electricity consumption mode is considered to be a Demand Unit. If there is more than one unit consuming power within a Demand Facility, that cannot be operated independently from each other or can reasonably be considered in a combined way, then each of the combinations of these units shall be considered as one Demand Unit.

**Derogation** – is a time limited or indefinite (as specified) acceptance in writing of a non-compliance of a Demand Facility, Distribution Network or Power Generating Module with regard to identified requirements of this Network Code.

**Distribution Asset Owner** – is an entity whom is recognised as the client for the construction or

adaption of the Distribution Network, typically the ultimate owner of the Distribution Network assets.

**Distribution Network** – is an electrical Network for the distribution of electrical power from and to third party[s] connected to it, a Transmission or another Distribution Network, including Closed Distribution Networks.

**Distribution Network Connection** – is a connection of either a new or existing Distribution Network to the Transmission Network.

**Distribution Network Operator (DNO)** – is an operator of electricity Distribution Network assets. This role will include associated functions and responsibilities.

**Distribution System Operator (DSO)** - is a natural or legal person responsible for operating, ensuring the maintenance of and, if necessary, developing the Distribution Network in a given area and, where applicable, its interconnections with other Networks and for ensuring the long-term ability of the Network to meet reasonable demands for the distribution of electricity.

**Energisation Operational Notification (EON)** – is a notification issued by the Relevant Network Operator to either a Demand Facility Owner, Distribution Network or a Power Generating Facility Owner prior to energisation of its internal Network. EON entitles the Distribution Network Owner, Demand Facility Owner and Power Generating Facility Owner to energise its internal Network by using the Network connection.

**ENTSO-E Network Area** – is the geographic area covered by the Network of the members of ENTSO-E.

**Equipment Certificate** - is a document issued by an Authorised Certifier for equipment used in a Demand Unit providing DSR connected to the Distribution Network, confirming compliance with relevant requirements of this Network Code as far as the influence on overall performance by this specific equipment. The Equipment Certificate shall define the extent of its validity in relation to parameters for which there is only a range of values defined in this document. This will identify its validity at a national or other level at which a specific value is selected from the range allowed at a European level. The Equipment Certificate will have a unique number allowing simple reference to it in Installation Document.

**Existing Connected Distribution Network** – is a Distribution Network which is either physically connected to the Transmission Network or for which the substation to physically connect it to the Transmission Network is under construction or for which a confirmation is provided in accordance with Article 3 (5) by the Distribution Asset Owner that a final and binding contract for the construction, assembly or purchase of lines, transformers, etc which form that connection of the Distribution Network exists at the day of the entry into force of this Network Code.

**Existing Demand Facility** – is a Demand Facility which, at the date of entry into force of this Network Code, is either physically connected to the Network or under construction or for which a confirmation is provided in accordance with Article 3 (5) of this Network Code by the Demand Facility Owner that a final and binding contract for the construction, assembly or purchase of the Main Plant, or of the Demand Facility exists at the date of the entry into force of this Network Code.

**Final Operational Notification (FON)** – is a notification issued by the Relevant Network Operator to a Demand Facility, Distribution Network or Power Generating Facility Owner confirming that the Demand Facility Owner, Distribution Asset Owner, or Power Generating Facility Owner respectively is

entitled to operate its facility, Network or Power Generating Module by using the Network connection because compliance with the technical design and operational criteria has been demonstrated as referred to in this Network Code.

**Frequency** - is the Frequency of the electrical power system that can be measured in all Network areas of the synchronous system under the assumption of a coherent value for the system in the time frame of seconds (with minor differences between different measurement locations only); its nominal value is 50 Hz.

**Installation Document** - is a simple structured document (data of tick sheet) containing information about a Demand Unit with Demand Side Response below 1000V and confirming compliance with the relevant requirements of this Network Code. The blank Installation Document to be available from the Relevant Network Operator for the owner of the Demand Facility or alternatively the site installer on the owner's behalf to fill in and submit to the Relevant Network Operator.

**Instruction** – is a command given orally, manually or by automatic remote control facilities, e.g. reconnection of a Demand Facility, from a Network Operator to either a Demand Facility Owner, Distribution Asset Owner, or Power Generating Facility Owner in order to perform an action.

**Interim Compliance Statement** – is an itemized statement of compliance provided by the Demand Facility Owner, Distribution Asset Owner, or Power Generating Facility Owner to the Relevant Network Operator as established in this Network Code and as additionally required by national legislation including the national codes.

**Interim Operational Notification (ION)** – is a notification issued by the Relevant Network Operator to a Demand Facility Owner, Distribution Asset Owner, or Power Generating Facility Owner confirming that the respective owner is entitled to operate their equipment by using the Network connection for a limited period of time and to undertake compliance tests to meet the technical design and operational criteria of the Network Code.

**Limited Operational Notification (LON)** – is a notification issued by the Relevant Network Operator to a Demand Facility Owner, Distribution Asset Owner, or Power Generating Facility Owner which has previously reached FON status, but is temporarily subject to either a significant modification or loss of capability which has resulted in non-compliance to the Network Code .

**Low Frequency Demand Disconnection (LFDD)** – is a restoration action where demand is disconnected during a low Frequency event in order to recover the balance between demand and generation to restore system Frequency to return to acceptable limits.

**Low Voltage Demand Disconnection (LVDD)** – is a restoration action where demand is disconnected during a low voltage event in order to recover Voltage to a sustainable level within acceptable limits.

**Main Plant** - is at least but not restricted to one of the following equipment: motors, transformers, Connection Point station high voltage equipment and production plant.

**Manufacturer's Data and Performance Type Certificate (MD&PTC)** – is a certificate issued by an Authorised Certifier and registered with Network Operators defining validated data and performance which can include models and testing for the purpose of replacing specific parts of the compliance process. The existence of an MD&PTC does not indicate overall compliance and cannot be used for



sole evidence indicating compliance for specific parts of data and performance of a Demand Facility.

**Maximum Export Capacity (MEC)** – is the maximum continuous Active Power which a Demand Facility, Distribution Network, or Power Generating Module can feed into the Network at the Connection Point as defined in the Connection Agreement or as agreed between the Relevant Network Operator and the Demand Facility Owner, Distribution Asset Owner, or Power Generating Facility Owner respectively.

**Maximum Import Capacity (MIC)** – is the maximum continuous Active Power which a Demand Facility, Demand Unit, Distribution Network, can consume from the Network at the Connection Point as defined in the Connection Agreement or as agreed between the Relevant Network Operator and the Demand Facility Owner, Distribution Asset Owner, or Power Generating Facility Owner respectively.

**Network** - plant and apparatus connected together in order to transmit or distribute electrical power.

**Network Operator (NO)** – is an entity that operates a Network. These can be either a TSO, a DSO, or Closed Distribution Network operator.

**New Demand Facility** – is a Demand Facility for which

- with regard to the provisions of the initial version and subsequent amendments of this Network code, a final and binding contract of purchase of the Main Plant has been signed after the day, which is two years after the day of the entry into force of this Network Code (initially and subsequent amendments), or
- with regard to the provisions of the initial version of this Network code, no confirmation is provided by the Demand Facility Owner, with a delay not exceeding thirty months as from the day of entry into force of this Network Code, that a final and binding contract of purchase of the Main Plant exists prior to the day, which is two years after the day of the entry into force of this Network Code.

**New Distribution Connection** – is a Distribution Connection of either a new or existing Distribution Network, which is or will be connected to the Transmission Network for which

- with regard to the provisions of the initial version and subsequent amendments of this Network code, a final and binding contract of purchase of the Main Plant has been signed after the day, which is two years after the day of the entry into force of this Network Code (initially and subsequent amendments), or
- with regard to the provisions of the initial version of this Network code, no confirmation is provided by the Distribution Network Owner, with a delay not exceeding thirty months as from the day of entry into force of this Network Code, that a final and binding contract of purchase of the Main Plant exists prior to the day, which is two years after the day of the entry into force of this Network Code.

**On Load Tap Change (OLTC) Blocking** – is an action that blocks the on load tap changer(s) during a

low voltage event in order to stop transformers from tapping and suppressing Voltages in an area further. Often employed in association with LVDD.

**Power Factor** – is the ratio of Active Power to Apparent Power.

**Power Generating Facility** - is a facility to convert primary energy to electrical energy which consists of one or more Power Generating Modules or Power Park Modules connected to a Network by one or more Connection Points.

**Power Generating Module** - is either a synchronous Power Generating Module, or a Power Park Module as defined in the Network Code on 'Requirements for Grid Connection applicable to all Generators'.

**Power Generating Facility Owner** – is any natural or legal entity owning a Power Generating Facility.

**Power Park Module** – is any Power Generating Module or ensemble of Power Generating Modules which is not synchronously connected to the Network. This includes any connection through power electronics and any ensemble of modules having a single Connection Point to the Network.

**Reactive Power** - is the imaginary component of the Apparent Power at fundamental Frequency, usually expressed in kilovar (kVAr) or megavar (MVAR).

**Relevant National Regulatory Authority** - is the regulatory authority as referred to in Article 35 (1) of Directive 2009/72/EC.

**Relevant Network Operator** - is the operator of the Network to which a Demand Facility, Demand Unit, Distribution Network or Power Generating Module is or will be connected.

**Relevant TSO** - is the TSO in whose Control Area a Demand Facility, Demand Unit, Distribution Network or Power Generating Module is or will be connected to the Network at any Voltage level.

**Significant Demand Facility** – is a Demand Facility which has the ability either singularly or when considered aggregated to impact on the cross-border system performance via influence on the control area's security of supply.

**Statement of Compliance** – is a document provided by either a Demand Facility Owner, Distribution Asset Owner, or Power Generating Facility Owner to the Network Operator stating the current status with respect to compliance itemised for each element of Network Code

**System Reserve** – refers in the context of this Network Code to Active or Reactive Power reserves to actively manage the Network predominately to respond to Frequency and Voltage fluctuations.

**Target Temperature** – is the Target Temperature for electrical devices providing Demand Side Response System Frequency Control.

**Temperature Controlled Devices** – are devices which heat and cool, and therefore whose electrical usage is proportional to the temperature regulated. Examples include but are not restricted to

fridges, freezers, heat pumps, water heating.

**Transmission Connected Demand Facility** – is a Demand Facility which has a Connection Point to a Transmission Network.

**Transmission Connected Distribution Network** – is a Distribution Network which has a Connection Point to a Transmission Network.

**Transmission Network** – is an electrical Network for the Transmission of electrical power from and to third party[s] connected to it, including Demand Facilities, Distribution Networks or other Transmission Networks. This extent of this Network is defined at a national level.

**Transmission System Operator (TSO)** - is a natural or legal person responsible for operating, ensuring the maintenance of and, if necessary, developing the transmission system in a given area and, where applicable, its interconnections with other systems, and for ensuring the long-term ability of the system to meet reasonable demands for the transmission of electricity.

**Voltage** – is unless stated otherwise, Voltage refers to the root-mean-square value of the positive sequence of the phase-to-phase Voltages.

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**Article 3**  
**SCOPE**

1. The requirements set forth by this Network Code shall apply to Significant Distribution Networks and Significant Demand Facilities unless specified otherwise in this Network Code. For the purposes of this Network Code a Significant Demand Facility will be either a Transmission Connected Demand Facility or a Demand Facility with DSR (excepted DSR SFC), unless explicitly stated otherwise within the Network Code. For the purposes of this Network Code a Significant Distribution Network will be a Transmission Connected Distribution Network or a Closed Distribution Network with DSR (excepted DSR SFC), unless explicitly stated otherwise within the Network Code.
2. Unless stated otherwise any reference to a Demand Facility in this document will designate it as a Significant Demand Facility.
3. The extent of the requirements may be summarised as follows:
  - a) A Transmission Connected Distribution Network where referred to will comply with all requirements within this Network Code, with exception to Article 8 which applies only to a Transmission Connected Distribution Network connected at or above 110kV.
  - b) A Demand Facility where referred to will comply with all the requirements within this Network Code, with exception to provisions specified in Table 1, which summarises the requirements restricted to:
    - the connection Voltage of the Demand Facility; or
    - the presence of embedded generation within the Demand Facility; or
    - the provision of DSR by the Demand Facility.

Article Title	Article	>=110kV	Transmission connected without Embedded Generation	With DSR
<b>GENERAL VOLTAGE REQUIREMENTS</b>	Article 8	<input checked="" type="checkbox"/>		
<b>REACTIVE POWER REQUIREMENTS</b>	Article 10 Paragraph 1 a) –b)		<input checked="" type="checkbox"/>	
<b>GENERAL DEMAND SIDE RESPONSE</b>	Article 15			<input checked="" type="checkbox"/>
<b>DEMAND SIDE RESPONSE ACTIVE AND REACTIVE POWER CONTROL</b>	Article 16			<input checked="" type="checkbox"/>
<b>DEMAND SIDE RESPONSE VERY FAST ACTIVE POWER CONTROL</b>	Article 18			<input checked="" type="checkbox"/>

Table 1: This table shows requirements that only apply if a specific criteria ticked is present in the Demand Facility

- c) Demand Facilities and Distribution Networks which are not connected to the Transmission Network will comply with Article 7(1).
  - d) A Temperature Controlled Device will comply with Article 17 and Article 20 (2).
4. The requirements set forth by this Network Code shall apply to Existing Demand Facilities and Transmission Connected Distribution Networks which are significant according to the provisions of this Network Code, to the extent their applicability has been decided by the National Regulatory Authority, and if this has been proposed by the Relevant TSO, following a public consultation. The proposal by the Relevant TSO shall be made in particular on the basis of a sound and quantitative Cost-Benefit Analysis, including the costs of requiring compliance that shall demonstrate the socio-economic benefit of application of the requirements set forth by this Network Code to Existing Demand Facilities and Transmission Connected Distribution Networks. The Relevant TSO shall have the right to re-assess the applicability of the requirements set forth by this Network Code to Existing Demand Facilities and Transmission Connected Distribution Networks regularly, but not more often than every three years. Prior to the Relevant TSO carrying out the quantitative Cost Benefit Analysis an initial qualitative comparison of costs and benefits shall be undertaken in order to determine the types of demand or locations of demand or clauses of this Network Code for which there may be a viable case for application to Existing Demand Facilities and Transmission Connected Distribution Networks. Where this preparatory stage demonstrates that a subsequent analytical Cost Benefit Analysis has a reasonable prospect of demonstrating positive cost-benefit, the Relevant TSO may proceed with the full transparent quantitative Cost Benefit Analysis. Where the preparatory stage or later stage demonstrate that applicability of the Network Code to Existing Demand Facilities and Transmission Connected Distribution Networks is not required no further action is to be undertaken.
5. Existing Demand Facilities and Transmission Connected Distribution Networks not covered by Article 3(3) shall continue to be bound by such technical requirements that apply to them pursuant to legislation in force in the respective Member States or contractual arrangements in force. Should national legislation be repealed or cease to be in force, the Existing Demand Facilities and Transmission Connected Distribution Networks not covered by Article 3 (3) shall continue to be bound by such technical requirements that applied to it pursuant to the respective national legislation such as it was the day prior to it ceasing to be in force.
6. With regard to Demand Facilities and Transmission Connected Distribution Networks not yet under construction:
- a) Within a delay not exceeding thirty months as from the day of entry into force of this Network Code, the Demand Facilities or Distribution Asset Owner shall provide the relevant Network Operator with a confirmation of final and binding contracts it has concluded for the construction, assembly or purchase of the Main Plant of a Demand Facility or Distribution Network connection and which exists prior to the day, which is two years after the day of entry into force of this Network Code.
  - b) The confirmation shall at least indicate the contract title, its date of signature and of entry into force, and the specifications of the Main Plant to be constructed, assembled or purchased.
  - c) The Relevant Network Operator may demand that the National Regulatory Authority confirms the existence, relevance and finality of such a contract, i.e. that its material terms

can no longer be changed by one of the parties to the contract unilaterally and that no party to the contract has the right to terminate it at will. The Demand Facility or Distribution Asset Owner shall supply the National Regulatory Authority with all documents, in whatever form, as the National Regulatory Authority requests in order to ascertain that a binding and final contract exists.

- d) The Demand Facility or Distribution Network Connection confirmed, in accordance with the procedure set forth in points a) to c) above, shall be considered as an Existing Demand Facility or Existing Connected Distribution Network, provided that:
  - 1) In accordance with paragraphs 6 (a) and (b) above, the Relevant Network Operator is provided with sufficient evidence of the existence of binding and final contracts for the construction, assembly or purchase of the Main Plant of a Demand Facility or Distribution Network Connection exists prior to the day, which is two years after the day of entry into force of this Network Code; or
  - 2) Following the verification performed by the National Regulatory Authority in accordance with paragraph 6 (c) above, it is ascertained that binding and final contracts for the construction, assembly or purchase of the Main Plant of a Demand Facility or Distribution Network Connection exist prior to the day, which is two years after the day of entry into force of this Network Code.
- e) In case the Demand Facility Owner or Distribution Network Owner does not provide the Network Operator with the confirmation within the delay set forth in paragraph 6 (a) above, the Demand Facility or Distribution Network connection shall be considered as a New Demand Facility or a New Distribution Connection.
- f) Any pump-storage Power Generating Module which has both generating and pumping operation mode does not have to meet the requirements of this Network Code.
- g) Any pumping module within a pump-storage station which only provides pumping mode is subject to the requirements of this Network Code.
- h) Without prejudice to the general applicability of the requirements set forth in this Network Code, the Network Operator of an industrial site and the Relevant Network Operator to whose Network the industrial site is connected to, shall have the right in coordination with the Relevant TSO, with respect to Power Generation Modules which are embedded in industrial sites, to agree while respecting the provisions of Article 4(3) on conditions for disconnection of critical loads from the Relevant Network Operator's Network. The only objective of such an agreement shall be to secure production processes of such a site in case of disturbed conditions in the Relevant Network Operator's Network. The requirements of this Network Code, notwithstanding such an agreement, shall apply to all Demand Units embedded in such an industrial site.

#### **Article 4**

#### **REGULATORY ASPECTS**

1. The requirements established in this Network Code and their applications are based on the principle of non-discrimination and transparency as well as the principle of optimisation between the highest overall efficiency and lowest total cost for all involved parties.

2. Notwithstanding the above, the application of the principle of non-discrimination and the principle of optimisation between the highest overall efficiency and lowest total costs for all involved parties shall be balanced with the aim of achieving the maximum transparency and the assignment to the real originator of the costs.

This shall be reflected in objective differences in treatment of different demand technologies with different inherent characteristics as well as by avoiding unnecessary investments in some geographic areas so that their respective regional specificities are appropriately taken into account. RNOs shall have the right to take into account these differences when defining requirements, in compliance with the provisions of this Network Code and their national law.

3. Where reference is made to this paragraph, the determination of the terms and conditions for connection and access to the networks or the methodologies to establish them shall be set in accordance with the national legal framework implementing Article 37(6) (a), (7) and (10) of Directive 2009/72/EC, and with the principles of transparency, proportionality and non-discrimination.

The establishment of these terms and conditions or their methodologies shall be performed by entities and based on the legal framework indicated in this Network Code where reference is made to this paragraph, unless the rules of national law at the date of the entry into force of this Network Code assigns this establishment to a different entity and according to a different legal framework.

4. Any decision by a Network Operator other than the Relevant TSO and any agreement between a Network Operator other than the Relevant TSO and a Demand Facility or Distribution Network Operator shall be exercised in compliance with and respecting the Relevant TSO's responsibility to ensure system security according to national legislation. Further details to ensure this principle may be specified either by national legislation or by agreements between the Relevant TSO and the Network Operators in its control area, as the case may be.

5. With regard to cost recovery:

- a) The costs related to the obligations referred to in this Network Code which have to be borne by regulated Network Operators shall be assessed by National Regulatory Authorities.
- b) Costs assessed as reasonable and proportionate shall be recovered in a timely manner via network tariffs or appropriate mechanisms as determined by National Regulatory Authorities.
- c) If requested to do so by National Regulatory Authorities, regulated Network Operators shall, within 3 months of such a request, use best endeavours to provide such additional information as reasonably requested by National Regulatory Authorities to facilitate the assessment of the costs incurred.

## **Article 5**

### **CONFIDENTIALITY OBLIGATIONS**

1. Each Relevant Network Operator, Relevant TSO, Relevant DSO, shall preserve the confidentiality of the information and data submitted to them in implementation of the

Network Code and shall use them exclusively for the purpose they have been submitted in compliance with the Network Code and their duties as NO, TSO or DSO, notably to verify the compliance of requirements set forth in this Network Code.

2. Notwithstanding the above, disclosure of such information and data may occur in case a Relevant Network Operator, a Relevant TSO or a Relevant DSO is compelled under EU or national law to disclose it, under the conditions set forth in the relevant legislation. The disclosure shall be reported to the owner of such information and data. In case of disclosure for other purposes than those described in Article 5 (1) and/or (2), a Relevant Network Operator, a Relevant TSO or a Relevant DSO shall seek the consent of the owner of such information and data. This consent cannot be unreasonably withheld.

## **Article 6**

### **RELATIONSHIP WITH NATIONAL LAW PROVISIONS**

This Network Code shall be without prejudice to the rights of Member States to maintain or introduce measures that contain more detailed or more stringent provisions than those set out herein, provided that these measures are compatible with the principles set forth in this Network Code.



## **Title 2 REQUIREMENTS**

### **Chapter 1 GENERAL REQUIREMENTS**

#### **Article 7 GENERAL FREQUENCY REQUIREMENTS**

1. All Demand Facilities (either connected to the Transmission Network or to the Distribution Network) and Distribution Networks shall fulfil the following requirements referring to Frequency stability:
  - a) With regard to Frequency ranges:
    - 1) In case of deviation of the Network Frequency from its nominal value, Demand Facilities and Distribution Networks will be designed with an expectation of system Frequency being typically within the Frequency ranges and time periods specified by table 2.

Synchronous Area	Frequency Range	Time period for operation
Continental Europe	47.5 Hz – 48.5 Hz	To be defined by each TSO, while respecting the provisions of Article 4 (3), but not less than 30 minutes
	48.5 Hz – 49.0 Hz	To be defined by each TSO, while respecting the provisions of Article 4 (3), but not less than the period for 47.5 Hz – 48.5 Hz
	49.0 Hz – 51.0 Hz	Unlimited
	51.0 Hz – 51.5 Hz	30 minutes
Nordic	47.5 Hz – 48.5 Hz	30 minutes
	48.5 Hz – 49.0 Hz	To be defined by each TSO, while respecting the provisions of Article 4 (3), but not less than 30 minutes
	49.0 Hz – 51.0 Hz	Unlimited
	51.0 Hz – 51.5 Hz	30 minutes
Great Britain	47.0 Hz – 47.5 Hz	20 seconds
	47.5 Hz – 48.5 Hz	90 minutes
	48.5 Hz – 49.0 Hz	To be defined by each TSO, while respecting the provisions of Article 4 (3), but not less than 90 minutes
	49.0 Hz – 51.0 Hz	Unlimited
	51.0 Hz – 51.5 Hz	90 minutes
	51.5 Hz – 52.0 Hz	15 minutes
Ireland	47.5 Hz – 48.5 Hz	90 minutes
	48.5 Hz – 49.0 Hz	To be defined by each TSO, while respecting the provisions of Article 4 (3), but not less than 90 minutes
	49.0 Hz – 51.0 Hz	Unlimited
	51.0 Hz – 51.5 Hz	90 minutes
Baltic	47.5 Hz – 48.5 Hz	90 minutes
	48.5 Hz – 49.0 Hz	To be defined by each TSO, while respecting the provisions of Article 4 (3), but not less than 90 minutes
	49.0 Hz – 51.0 Hz	Unlimited
	51.0 Hz – 51.5 Hz	90 minutes

Table 2: This table shows the minimum time periods each Demand Facility will be designed with an expectation of system Frequency to be typically within.

- 2) Wider Frequency ranges or longer minimum times for operation can be agreed between the Relevant Network Operator in coordination with the Relevant TSO, while respecting the provisions of Article 4 (3). If wider Frequency ranges or longer minimum times for operation are technically feasible, the consent of the Distribution Asset Owner or Demand Facility Owner shall not be unreasonably withheld.
- 3) While respecting the provisions of Article 7 ( 1) a Distribution Network or Demand Facility shall be capable of automatic disconnection at specified frequencies, if required

by the Relevant Network Operator. The terms and settings for automatic disconnection shall be agreed, with the Relevant Network Operator and the Demand Facility or Distribution Network while respecting the provisions of Article 4 (3).

## **Article 8**

### **GENERAL VOLTAGE REQUIREMENTS**

1. Demand Facilities and Transmission Connected Distribution Networks shall fulfil the following requirements referring to Voltage stability:

a) With regard to Voltage ranges:

- 1) In case of a deviation of the Network Voltage at the Connection Point from its nominal value, any Transmission Connected Distribution Network or Demand Facility with a Connection Point at 110 kV or above, shall ensure the equipment at the Connection Point site (typically an electrical substation) is capable of withstanding the Voltage range at the Connection Point, expressed by the Voltage at the Connection Point related to nominal Voltage (per unit), and within the time periods specified by tables 3.1 and 3.2. Note the reference per unit Voltage at each TSO in the same synchronous area may differ i.e. the Voltage range in kV for all TSOs within a synchronous area may not be the same requiring co-ordination between adjacent TSOs.

Synchronous Area	Voltage Range	Time period for operation
Continental Europe	0.90 pu – 1.05 pu	Unlimited
	1.05 pu – 1.0875 pu	To be defined by each TSO while respecting the provisions of Article 4 (3) with required co-ordination at interconnection points with adjacent TSOs under the conditions, but not less than 60 minutes
	1.0875 pu – 1.10 pu	60 minutes
Nordic	0.90 pu – 1.05 pu	Unlimited
	1.05 pu – 1.10 pu	60 minutes
Great Britain	0.90 pu – 1.05 pu	Unlimited
	1.05 pu – 1.10 pu	15 minutes
Ireland	0.90 pu – 1.05 pu	Unlimited
Baltic	0.88 pu – 0.90 pu	20 minutes
	0.90 pu – 1.10 pu	Unlimited
	1.10 pu – 1.15 pu	20 minutes

Table 3.1: This table shows the minimum time periods each Transmission Connected Distribution Network and Demand Facility shall be able to operate for Voltages deviating from the nominal value at the Connection Point. The Voltage base for pu values is between and including 300 kV and 400 kV.

Synchronous Area	Voltage Range	Time period for operation
Continental Europe	0.90 pu – 1.118 pu	Unlimited
	1.118 pu – 1.15 pu	To be defined by each TSO while respecting the provisions of Article 4 (3) with required co-ordination at interconnection points with adjacent TSOs under the conditions, but not less than 20 minutes
Nordic	0.90 pu – 1.05 pu	Unlimited
	1.05 pu – 1.10 pu	60 minutes
Great Britain	0.90pu–1.10pu	Unlimited
Ireland	0.90 pu – 1.118 pu	Unlimited
Baltic	0.80 pu – 0.90 pu	30 minutes
	0.90 pu – 1.12 pu	Unlimited
	1.12 pu – 1.15 pu	20 minutes

Table 3.2: This table shows the minimum time periods each Transmission Connected Distribution Network or Demand Facilities has to able to operate for Voltages deviating from the nominal value at the Connection Point without disconnecting from the Network. (The Voltage base for pu values is between and including 110 kV and under 300 kV)

- 2) Notwithstanding the provisions of point 1) a Distribution Network and Demand Facility shall be capable of automatic disconnection at specified Voltages, if required by the Relevant Network Operator. The terms and settings for automatic disconnection shall be agreed with the Relevant Network Operator while respecting the provisions of Article 4 (3).

## Article 9

### SHORT CIRCUIT REQUIREMENTS

1. Transmission Connected Demand Facilities and Transmission Connected Distribution Networks shall fulfil the following requirements referring to short circuit Current:
  - a) The Relevant Network Operator shall define the maximum value of short circuit Current that the Demand Facility and Transmission Connected Distribution Network must be able to withstand.
  - b) The Relevant TSO shall request information from a Demand Facility Owner or a Distribution Asset Owner, concerning the contribution in terms of short-circuit current from that owners Network.

- c) In compliance with Article 13, the Demand Facility Owner and Distribution Asset Owner will inform the Relevant Network Operator as soon as practicable but no later than 1 week of changes in short-circuit contribution from its Network in Article 9 (1) (b).
- d) The Relevant Network Operator will inform Demand Facility Owner or Distribution Asset Owner as soon as practicable but no later than 1 week of changes in the maximum short-circuit current that it must be able to withstand from its Network in Article 9 (1) (a).

## **Article 10**

### **REACTIVE POWER REQUIREMENTS**

1. Transmission Connected Demand Facilities and Transmission Connected Distribution Networks shall fulfil the following requirements referring to Reactive Power exchange and control:

a) With regard to Reactive Power capability ranges:

1) All Transmission Connected Distribution Networks and Demand Facilities will be capable to maintain their operation at their Connection Point as follows:

- For Demand Facilities without onsite generation, the actual Reactive Power range specified by the Relevant Network Operator will not be wider than 0.90 importing to unity power factor of their Maximum Import Capability, except in situations where either technical or financial system benefits (in particular through contractual arrangements) are demonstrated and accepted by the Relevant Network Operator in agreement with the Relevant TSO, while respecting the provisions of Article 4 (3);
- For Demand Facilities with onsite generation, the actual Reactive Power range specified by the Relevant Network Operator will not be wider than 0.9 importing power factor of the larger of their Maximum Import Capability or Maximum Export Capability to 0.9 exporting power factor of their Maximum Export Capability, except in situations where either technical or financial system benefits (in particular through contractual arrangements) are demonstrated and accepted by the Relevant Network Operator in agreement with the TSO, while respecting the provisions of Article 4(3);
- For Transmission Connected Distribution Networks, the actual Reactive Power range specified by the Relevant Network Operator will not be wider than 0.9 importing power factor of the larger of their Maximum Import Capability or Maximum Export Capability to 0.9 exporting power factor of their Maximum Export Capability;

Use of other methods than a power factor can be defined by each TSO in situation with either technical or financial system benefits while respecting the provisions of Article 4 (3).

The Reactive Power capability range requirement applies at the Connection Point.

- b) Transmission Connected Distribution Networks shall have the capability at the Connection Point to maintain 0Mvar exchange at nominal Voltage (with a deadband of 5% of Active Power of Maximum Import Capability) for a load exchange of no higher than 25% of the Maximum Import Capacity.
- c) The TSO shall have the right where justified to require from the Transmission Connected

Distribution Networks to actively control the exchange of Reactive Power at the Connection Point as part of a wider common concept for management of Reactive Power capabilities for the benefit of the entire Network while respecting the provisions of Article 4 (3). The method of this control should be agreed between the TSO and the Distribution Network to ensure the justified level of security of supply for both parties. The justification will include a roadmap in which the steps and the timeline for fulfilling the requirement are described.

## **Article 11**

### **PROTECTION AND CONTROL**

1. Demand Facilities and Transmission Connected Distribution Networks shall fulfil the following requirements referring to protection and control:
  - a) With regard to electrical protection schemes and settings:
    - 1) The Relevant Network Operator shall define the settings necessary to protect the Network taking into account the characteristics of the Demand Facility or Distribution Network. Protection schemes relevant for the Demand Facility or Transmission Connected Distribution Network and the Network and settings relevant for the Demand Facility or Transmission Connected Distribution Network shall be agreed between the Relevant Network Operator and the Demand Facility Operator or DNO while respecting the provisions of Article 4 (3).
    - 2) Electrical protection of the Demand Facility or Transmission Connected Distribution Network shall take precedence over operational controls taking into account system security, health and safety of staff and the public and mitigation of the damage to the Demand Facility or Transmission Connected Distribution Network.
  - b) Protection scheme devices can protect against the following aspects:
    - external and internal short circuit;
    - over- and undervoltage at the Connection Point;
    - over- and underfrequency;
    - demand circuit protection;
    - unit transformer protection; and
    - backup schemes against protection and switchgear malfunction.
  - c) Any changes to the protection schemes relevant for the Demand Facility or Transmission Connected Distribution Network and the Network and to the setting relevant for the Demand Facility or Transmission Connected Distribution Network shall be agreed between the Network Operator and the Demand Facility or Transmission Connected Distribution Network, while respecting the provisions of Article 4 (3).
2. With regard to control schemes and settings:
  - a) Schemes and settings of the different control devices of the Demand Facility or Transmission Connected Distribution Network relevant for system stability shall be agreed between the Relevant TSO, Network Operator and the Demand Facility or Transmission Connected Distribution Network, while respecting the provisions of Article 4 (3), especially in case of the following circumstances :

- isolated (Network) operation;
  - damping of oscillations; and
  - disturbances to the Network.
- b) Any changes to the schemes and settings of the different control devices of the Demand Facility or Transmission Connected Distribution Network, relevant for system stability, shall be agreed between the Relevant TSO, Network Operator and the Demand Facility or Transmission Connected Distribution Network, while respecting the provisions of Article 4 (3).
3. With regard to priority ranking of protection and control, the Demand Facility shall organize their protections and control devices in compliance with the following priority ranking, organized in decreasing order of importance:
- a) Network and Demand Facility or Distribution Network protection;
  - b) Frequency control (Active Power adjustment); and
  - c) Power Restriction

## **Article 12**

### **INFORMATION EXCHANGE**

1. With regard to information exchange:
- a) Demand Facilities shall be equipped according to the standard defined by the Relevant Network Operator, in co-ordination with the Relevant TSO, while respecting the provisions of Article 4 (3), to transfer information between the Relevant Network Operator and the Demand Facility with the defined time stamping.
  - b) Transmission Connected Distribution Networks shall be equipped according to the standard defined by the Relevant TSO while respecting the provisions of Article 4 (3) to transfer information between the Relevant TSO and the Transmission Connected Distribution Network with the defined time stamping.
  - c) The Relevant TSO in coordination with the Relevant Network Operator shall define the information exchange standards while respecting the provisions of Article 4 (3). The precise list of data required shall be made available by the Relevant Network Operator.

## **Article 13**

### **DEVELOPMENT, MODERNIZATION AND EQUIPMENT REPLACEMENT**

1. With regard to development of an existing Distribution Connection or Existing Demand Facility:
- a) Any Demand Facility Owner or Operator or Distribution Network Owner or Operator intending to increase the plant and equipment of the Demand Facility or Distribution



Network Connection respectively in a way that may have an impact on its performance and ability to meet this Network Code shall notify to the Relevant Network Operator in advance to agreed national timescales, while respecting the provisions of Article 4 (3). This plant and equipment may include high-voltage equipment, protection and control systems, including hardware and software.

- b) The newly installed equipment shall comply with the respective Network Code requirements which are relevant to the planned work.
2. With regard to changes to, modernization, or replacement of equipment in a Demand Facility or Transmission Connected Distribution Network:
    - a) Any Demand Facility Owner or Operator or Distribution Network Owner or Operator intending to change plant and equipment of the Demand Facility or Transmission Connected Distribution Network respectively in a way that may have an impact on its performance and ability to meet this Network Code shall notify to the Relevant Network Operator in advance to agreed national timescales, while respecting the provisions of Article 4 (3). This plant and equipment may include high-voltage equipment, protection and control systems, including hardware and software.
    - b) In situations where it is reasonable to foresee that these intended changes may be affected by the requirements of this Network Code they shall be agreed with the Relevant Network Operator in coordination with the Relevant TSO before the proposals are implemented, while respecting the provisions of Article 4 (3).
    - c) In case of modernisation or replacement of equipment in Existing Demand Facilities or Existing Connected Distribution Network the new installations shall comply with the respective requirements which are relevant to the planned work.

## **Article 14**

### **DEMAND DISCONNECTION FOR SYSTEM DEFENCE AND DEMAND RECONNECTION**

1. With regard to Low Frequency Demand Disconnection devices:
  - a) Each Distribution Network Operator and as specified by the TSO, Transmission Connected Demand Facilities, will make arrangements that will enable automatic low Frequency (or alternatively if specified by the TSO rate of change of Frequency) Disconnection of a percentage of demand to be specified by the TSO, in coordination with adjacent TSOs.
  - b) The Low Frequency Relays should be able to disconnect demand in stages for a range of frequencies. The number of stages and their respective operational frequencies shall be defined by the TSO while respecting the provisions of Article 4 (3).
  - c) The percentage of the demand disconnection at each Frequency shall be defined by the TSO while respecting the provisions of Article 4 (3).
  - d) The geographical distribution of this demand disconnection has to be acceptable to the TSO. In cases of nested DNO's the geographical distribution will be equitable to all the associated DNO's.
  - e) Each Distribution Network Operator and as applicable Transmission Connected Demand Facility, will notify the Transmission System Operator in writing each year of the details of

the automatic Low Frequency Disconnection on its Network. The information provided should identify, for each Connection Point to the Transmission Network the Frequency settings at which Demand Disconnection will be initiated and amount of demand disconnected at each such setting.

2. With regard to Low Frequency Demand schemes:

- a) The Low Frequency Demand Disconnection scheme shall have the following functional capability and be suitable for operation from a nominal AC input to be defined by the Relevant Network Operator while respecting the provisions of Article 4 (3).
  - Frequency Range: At least 47-50Hz in steps of 0.05Hz or better, preferably 0.01Hz;
  - Operating time: Scheme operating time shall not be more than 150 ms;
  - Voltage lock-out: Selectable within a range of 30 to 90% of nominal Voltage; and
  - Direction of Active Power flow.
- b) The Low Frequency Demand Disconnection scheme shall have the capability for the number of Low Frequency Demand Disconnection stages as defined by Relevant TSO

3. With regard to Low Frequency Demand Disconnection relays AC Voltage Supply:

- a) The supply to the low Frequency relays shall be derived from the Network at the Frequency signal measuring point concerned so that the Frequency of the low Frequency relays supply Voltage is the same as that of the Network.

4. With regard to Low Voltage Demand Disconnection devices:

- a) Low Voltage Demand Disconnection devices shall be defined by the Relevant TSO, while respecting the provisions of Article 4 (3) in coordination with DNOs for Transmission Connected Distribution Networks,
- b) Low Voltage Demand Disconnection devices for a Transmission Connected Demand Facility shall be determined by the Relevant TSO, while respecting the provisions of Article 4 (3) in coordination with Transmission Connected Demand Facility.
- c) Based on the TSO assessment and in compliance with the created standard the implementation of OLTC blocking and LVDD should be binding for DNOs.
- d) If the decision for the implementation is taken to install Low Voltage Demand Disconnection, both On Load Tap Changer blocking and Low Voltage Demand Disconnection will be fitted in a coordinated way led by the TSO.
- e) The method of Low Voltage Demand Disconnection shall be implemented in a single action either by relay or control room initiation.
- f) With regard to Low Voltage Demand Disconnection, relays shall have the following functional capability:
  - 1) Low Voltage Demand Disconnection relay shall monitor all three phase Voltages measuring the positive phase sequence component of the measured Voltage.
  - 2) Block relay action is based on direction of either Active or Reactive Power flow.

5. With regard to blocking of On Load Tap Changers (OLTC):
  - a) The relevant TSO shall define if automatic or manual OLTC Blocking on a transformer at the Distribution Network Connection Point to the Transmission Network is required, while respecting the provisions of Article 4 (3). The automatic OLTC Blocking scheme will be specified by the Relevant TSO.
6. Demand Facilities and Transmission Connected Distribution Networks shall fulfill the following requirement referring to disconnection or reconnection of a Demand Facility or Transmission Connected Distribution Network:
  - a) With regard to capability of reconnection after an incidental disconnection due to a Network disturbance, the TSO shall define, while respecting the provisions of Article 4 (3), the conditions under which a Demand Facility and Transmission Connected Distribution Network is entitled to reconnect to the Transmission Network. Installation of automatic reconnection systems shall be subject to prior authorization by the Relevant Network Operator.
  - b) With regard to synchronization where defined by the Network Operator as being justified and appropriate, the Demand Facility or Transmission Connected Distribution Network shall be equipped with the necessary synchronization facilities. Synchronisation of Demand Facility and Transmission Connected Distribution Network shall be possible for Frequencies within the ranges set out by table 2. The Relevant Network Operator and the Demand Facility Operator or Transmission Connected Distribution Network Operator shall agree on the settings of synchronization devices prior to connection of the Demand Facility or Transmission Connected Distribution Network, while respecting the provisions of Article 4 (3), including: Voltage, Frequency, phase angle range, deviation of Voltage and Frequency.
  - c) Each Transmission Connected Demand Facility must be capable of remote disconnection at the Connection Point[s] from the Transmission Network when required by the Relevant Network Operator. Where automated disconnection equipment is required (for reconfiguration of the Network in preparation for Block Loading) these will be defined by the Relevant Network Operator. The time taken for remote disconnection will be defined by the Relevant Network Operator.
  - d) Each Transmission Connected Distribution Network must be capable of remote disconnection at the Connection Point[s] from the Transmission Network when required by the Relevant TSO. Where automated disconnection equipment is required, for reconfiguration of the Network in preparation for Block Loading, this shall be defined by the Relevant Network Operator while respecting the provisions of Article 4 (3). The time taken for remote disconnection shall be determined by the Relevant Network Operator while respecting the provisions of Article 4 (3).

## **Article 15**

### **GENERAL DEMAND SIDE RESPONSE**

1. Demand Side Response is distinguished by different System Reserve categories to provide response to Frequency and Voltage fluctuations, namely:
  - a) Demand Side Response Active Power Control (DSR APC);
  - b) Demand Side Response Reactive Power Control (DSR RPC);
  - c) Demand side Response Transmission Constraint Management (DSR TCM); and

- d) Demand Side Response System Frequency Control (DSR SFC)
2. Once one of the DSR services set forth in Article 16(1) a) to c) is offered by a Demand Facility or Closed Distribution Network, these services shall be available for either or both Demand Side Response Low Frequency Demand Disconnection (DSR LFDD), and Demand Side Response Low Voltage Demand Disconnection (DSR LVDD).
3. With regard to voluntary and mandatory requirements for Demand Side Response:
- a) For Demand Side Response Active Power Control (DSR APC), Reactive Power Control (RPC), and Demand Side Response Transmission Constraint Management (DSR TCM), Demand Facilities and Closed Distribution Network Operator may voluntarily provide this service.
- b) Demand Side Response Active Power Control (DSR APC) capabilities, shall apply for devices identified as significant (Active Power Control devices) if this is decided in accordance with the procedure set forth below:
- 1) The TSOs shall jointly elaborate a proposal for the application of Demand Side Response Active Power Control (DSR APC) to demand devices identified as significant. This proposal shall aim at applying Demand Side Response Active Power Control (DSR APC) in a socio-economic efficient manner.
  - 2) Within a period not exceeding 6 months, the proposal shall be consulted upon by the TSOs with the relevant stakeholders including, but not limited to, Distribution Network Operators and the competent European standardisation bodies. The outcome of this consultation will be considered and submitted with the finalised proposal not less than two months as from the end of the consultation period.
  - 3) Each TSO shall submit the proposal to its respective National Regulatory Authority on a date jointly agreed between all the TSOs involved.
  - 4) The National Regulatory Authority shall review the proposal within three months as from its submission. No later than three months following the approval by the National Regulatory Authority, the relevant TSO shall, while respecting the provisions of Article 4 (3), implement the proposal and identify the relevant categories of Active Power Control devices in coordination with the relevant adjacent TSOs and DSOs
  - 5) The TSOs shall, pursuant to Article 4(3), review and update the application of Demand Side Response Active Power Control (DSR APC) to demand devices no more often than every three years. Paragraphs 4 and 5 shall apply to this review and updating process.
- c) Demand Side Response System Frequency Control (DSR SFC) shall apply to Temperature Controlled Devices identified as significant (Significant Temperature Controlled Devices) if this is decided in accordance with the procedure set forth below:
- 1) The TSOs shall jointly elaborate a proposal for the application of Demand Side Response System Frequency Control (DSR SFC) to significant Temperature Controlled Devices. This proposal shall aim at applying Demand Side Response System Frequency Control (DSR SFC) in a socio-economic efficient manner.

- 2) Within a period not exceeding 6 months, the proposal shall be consulted upon by the TSOs with the relevant stakeholders including, but not limited to, Distribution Network Operators and the competent European standardisation bodies. The outcome of this consultation will be considered and submitted with the finalised proposal not less than two months as from the end of the consultation period.
- 3) Each TSO shall submit the proposal to its respective National Regulatory Authority on a date jointly agreed between all the TSOs involved.
- 4) The National Regulatory Authority shall review the proposal within three months as from its submission. No later than three months following approval by the National Regulatory Authority, the relevant TSO shall, pursuant to Article 4(3), implement the proposal and identify the relevant categories of significant Temperature Controlled Devices in coordination with the relevant adjacent TSOs and DSOs
- 5) The TSOs shall, pursuant to Article 4(3), review and update the application of Demand Side Response System Frequency Control (DSR SFC) to Temperature Controlled Devices no more often than every three years. Paragraphs 4 and 5 shall apply to this review and updating process.

## **Article 16**

### **DEMAND SIDE RESPONSE ACTIVE AND REACTIVE POWER CONTROL AND TRANSMISSION CONSTRAINT MANAGEMENT**

1. With regard to either Demand Side Response Active Power Control (DSR APC), Reactive Power Control (DSR RPC), or Transmission Constraint Management (DSR TCM), Demand Facilities and Closed Distribution Networks may voluntarily offer this service. The requirements below are mandatory for Demand Facilities or Closed Distribution Networks whom offer these services, either individually or as part of aggregated facilities:
  - a) The Relevant TSO shall define , pursuant to Article 4 (3), the Network location, usage and/or scale of a Demand Facility, Closed Distribution Network or aggregated facilities (such as Demand Aggregation) to be eligible to provide DSR.
  - b) The Demand Facility or Closed Distribution Network shall not be involved in the above activities specified in point (a) in case when providing any type of DSR the security of persons or assets may be put at risk.
  - c) All demand providing DSR shall be capable of operating across the Frequency ranges specified in table 2, and extended range specified in Article 7 (2). A reduced Frequency range can be agreed between the Relevant Network Operator in coordination with the Relevant TSO while respecting the provisions of Article 4 (3).
  - d) Demand Facilities providing DSR with a Connection Point at or above 110kV shall be capable of operating across the Voltage ranges specified in table 3.1 and 3.2, and extended range specified in Article 8 (2) .
  - e) Demand Facilities providing DSR with a Connection Point below 110kV shall be capable of

operating across the normal operational Voltage range of the Network at the Connection Point, defined by the Relevant Network Operator, while respecting the provisions of Article 4 (3).

- f) The method of DSR LFDD or DSR LVDD, shall be agreed by the Relevant Network Operator in coordination with the Relevant TSO while respecting the provisions of Article 4 (3) and may result in:
- Decreasing demand usage by a command sent by the Relevant Network Operator or the Relevant TSO;
  - Decreasing demand usage with a pre-alert signal sent by the Relevant Network Operator or the Relevant TSO;
  - For Voltage control, disconnection or reconnection of static compensation facilities controlled by the Relevant Network Operator or the Relevant TSO.
- g) Where modification to demand usage ordered by command sent by the Relevant Network Operator or the Relevant TSO is specified, each Demand Facility or Closed Distribution Network concerned will make arrangements that will enable the modification of a part of its demand responding to an instruction by the Relevant Network Operator or the Relevant TSO. The demand modification should be net of embedded generation.
- h) Where modification to demand usage with Frequency and/or Voltage control and pre-alert signal sent by the Relevant Network Operator or the Relevant TSO is specified, each Demand Facility or Closed Distribution Network concerned shall be equipped to receive the orders from the Relevant Network Operator or the Relevant TSO, to measure the Frequency and/or Voltage value (for DSR LFDD and LVDD respectively), to command the demand trip and to transfer the information, according to the standards and settings defined by the Relevant Network Operator while respecting the provisions of Article 4 (3).
- i) For Voltage control with disconnection or reconnection of static compensation facilities, each Transmission Connected Demand Facility or Transmission Connected Closed Distribution Network concerned shall be able to connect or disconnect its static compensation facilities, responding to an order transmitted by the Relevant Network Operator or the Relevant TSO, or in the conditions set forth in the bilateral agreement between the relevant TSO and the Transmission Connected Demand Facility or Transmission Connected Closed Distribution Network.
- j) The Demand Facility or Closed Distribution Network shall be capable of controlling demand usage from the Network in a range equal or greater than as defined by the Relevant TSO, while respecting the provisions of Article 4 (3).
- k) Each Demand Facility or Closed Distribution Network concerned shall be equipped to receive the orders from the Relevant Network Operator or the Relevant TSO to modify its demand and to transfer the necessary information, according to the standards and settings defined by the Relevant Network Operator, while respecting the provisions of Article 4 (3).
- l) Each Demand Facility or Closed Distribution Network concerned shall be capable of adjusting its demand usage as expected within a time period defined by the relevant Network Operator, while respecting the provisions of Article 4 (3).
- m) A Demand Facility or Closed Distribution Network providing one or more type of DSR may

not, in any circumstance (with exception to a force majeure), ignore or interrupt the full execution of an order issued by the Relevant Network Operator to modify its demand usage with respect to that type of DSR. Once a modification to demand usage has taken place, Significant Demand Facilities or Closed Distribution Network concerned, will not modify their demand until the Relevant Network Operator requires them to do so, while respecting the provisions of Article 4 (3).

- n) Instructions for modification of demand usage may have immediate (i.e. less than 1 second) or delayed effects.
- o) Each Demand Facility or Closed Distribution Network concerned shall notify the Relevant Network Operator in writing each year the details of the modification of its demand capacity at its installation. Any modification of this capacity during the year shall be notified to the relevant Network Operator without any delay.
- p) With regard to the rate of change of Frequency withstand capability, the Demand Facility or Closed Distribution Network shall not disconnect from the Network due to rates of change of Frequency up to a value defined by the Relevant TSO while respecting the provisions of Article 4 (3) other than triggered by rate-of-change-of-Frequency-type of loss of mains protection. The Frequency shall be measured using 500 ms average.

## **Article 17**

### **DEMAND SIDE RESPONSE SYSTEM FREQUENCY CONTROL**

1. With Regard to Demand Side Response System Frequency Control (DSR SFC) on Temperature Controlled Devices:
  - a) At a deadband, to be defined by the Relevant TSO while respecting the provisions of Article 4 (3) in co-ordination with the TSOs in the synchronous area, around the nominal system Frequency (50.00Hz). The control system of the Demand Side Response System Frequency Control shall have no influence on the Target Temperature.
  - b) The built in hysteresis of the Temperature Controlled Device between its controllers on and off temperature range settings shall be designed to be utilised by the DSR SFC.
  - c) The Temperature Controlled Devices on and off temperature range settings shall not be exceeded by the DSR SFC when responding to Frequency deviations from the nominal Frequency.
  - d) The DSR SFC shall provide a response to deviations in Network Frequency across a Frequency range by corresponding changes to the Target Temperature in proportion of its maximum temperature range. The maximum change in Target Temperature shall be at the widest when the system Frequency is at the boundary of the system operating range defined by the Relevant TSO while respecting the provisions of Article 4 (3).
  - e) The maximum Frequency deviation shall be defined by the Relevant TSO in co-ordination with the other TSOs in the synchronous Network, while respecting the provisions of Article 4 (3).

- f) The temperature controller of the device shall measure the actual system Frequency. Measurements shall be updated at least every 0.2 seconds.
  - g) For system Frequency below the deadband of nominal (50.00Hz) the target temperature shall be lowered for a heating system and raised for a cooling system.
  - h) On return to Frequency within the deadband of nominal a random time delay of up to 5 minutes will be initiated before normal operation resumes.
2. With regard to DSR SFC sensitivity and accuracy of the Frequency measurement and the consequent movement of the temperature target:
- a) The system shall be able to detect a change in system Frequency of 0.01Hz, to give overall linear proportional system response. The important capability is rapid detection of and response to changes in system Frequency. An offset in the steady state measurement of Frequency is acceptable up to 0.05Hz.
3. Temperature Controlled Devices unable to deliver the turn on and off temperature range equal to or less than half the devices available temperature deviation range may be given a defined time limited dispensation for production and sale until it has to be compliant.

## **Article 18**

### **DEMAND SIDE RESPONSE VERY FAST ACTIVE POWER CONTROL**

1. With regard to Demand Side Response Very Fast Active Power Control:
- a) The Relevant Network Operator in coordination with the Relevant TSO might define, pursuant to Article 4 (3), to facilitate a Demand Facility or Closed Distribution Network that has volunteered to provide other DSR services in Article 16 for part or all of its demand to deliver Demand Side Response Very Fast Active Power Control by a change of Active Power related to the rate of change of Frequency for that portion of its demand.
  - b) The Relevant TSO can take measures to facilitate, while respecting the provisions of Article 4 (3), to require each Demand Facility or Closed Distribution Network which has to provide Demand Side Response Very Fast Active Power Control to install this feature in the control system which operates the Demand Facility so as to reduce and/or where possible increase Active Power from the Network in order to limit the rate of change of Frequency following a sudden generation-demand imbalance.
  - c) The operating principle of this control system and the associated performance parameters shall be defined by the Relevant TSO, while respecting the provisions of Article 4 (3).



**Article 19**  
**POWER QUALITY**

1. With regard to Power or Voltage Quality:

- a) Transmission Connected Demand Facilities and Transmission Connected Distribution Networks shall ensure that their connection to the Network does not result in a level of distortion or fluctuation of the supply Voltage on the Network, at the Connection Point, exceeding that allocated to them, while respecting the provisions of Article 4 (3).
- b) The Relevant Network Operator may specify the power quality requirements consistent with national and international technical rules in force.

**Article 20**  
**SIMULATION MODELS**

1. With regard to the simulation models:

- a) Each Network Operator in coordination with the Relevant TSO shall define, while respecting the provisions of Article 4 (3), to require simulation models that shall show the behaviour of the Demand Facility and/or Transmission Connected Distribution Network in both steady state and dynamic simulations, including 50 Hz component, and, where appropriate and justified, in electromagnetic transient simulations at the Connection Point. The requirement for simulations models shall include the format in which they shall be provided and the documentation of structure and block diagrams for the purpose of verification of the requirements of this Network Code and for the use in all types of studies for continuous evaluation in system planning and operation.
- b) For the purpose of dynamic simulations, the model provided shall contain the following sub-models as applicable:
  - Power control;
  - Voltage control;
  - Demand Facility and Transmission Connected Distribution Network protection models
  - The constituent demand types, i.e. electro technical characteristics of the demand; and
  - Converter models.
- c) The Relevant Network Operator or Relevant TSO shall define, while respecting the provisions of Article 4 (3) to require Demand Facility and/or Transmission Connected Distribution Network recordings in order to compare the response of the model with these recordings.

2. With regard to DSR SFC simulation models:

- a) As part of type registration, a mathematical description of a type of temperature controlled system shall be provided to an National Regulatory Authority appointed party in charge of verification. The model shall be accompanied by a report containing results from laboratory type testing, as well as by results from simulations using the model with the data from the test results.

## **Title 3**

### **OPERATIONAL NOTIFICATION PROCEDURE**

#### **Chapter 1**

#### **OPERATIONAL NOTIFICATION PROCEDURE FOR NEW DEMAND FACILITIES AND DISTRIBUTION NETWORKS**

##### **Article 21**

##### **GENERAL PROVISIONS**

Each Demand Facility Operator or Transmission Connected Distribution Network Operator shall confirm to the Relevant Network Operator its ability to satisfy the technical design and operational criteria as referred to in Title 2 of this Network Code.

##### **Article 22**

##### **PROVISIONS FOR DISTRIBUTED CONNECTED DSR AT OR BELOW 1kV**

1. The operational notification procedure for connection for each new distribution connected Demand Facility with DSR at or below 1000V shall comprise an Installation Document. Based on an Installation Document (data/tick sheet) obtained from the Relevant Network Operator, the Demand Facility Owner shall fill in the required information and submit it to the Relevant Network Operator. For subsequent Demand Units with DSR separate independent Installation Document shall be provided.
2. The content of the Installation Document shall be defined by the Relevant Network Operator, at least containing the following items:
  - the location at which the connection is made;
  - the date of the connection;
  - the Maximum Capacity of the DSR installation in kW;
  - the type of DSR services provided as defined in Article 16;
  - reference to Equipment Certificates used in the site installation;
  - for equipment used, which has not received an Equipment Certificate, information shall be provided as directed by the Relevant Network Operator; and
  - the contact details of the Demand Facility Owner and the installer and their signatures.
3. On permanent decommissioning of the DSR services in the Demand Unit the Demand Facility Owner shall notify the Relevant Network Operator in writing.

##### **Article 23**

##### **COMMON PROVISIONS FOR DISTRIBUTED CONNECTED DSR ABOVE 1kV and TRANSMISSION CONNECTED DEMAND FACILITIES AND DISTRIBUTION NETWORKS**

1. The operational notification procedure for connection for each DSR Demand Facility, Transmission Connected Distribution Network and Transmission Connected Demand Facility, allows for the use of the Manufacturer's Data and Performance Type Certificate (MD&PTC).

2. The MD&PTC process is intended to collate verified data and performance for a specific make and type of Demand Unit. The purpose of which is to repeatedly reuse this data, where relevant, to verify specific parts of data and performance in place of part of the Operational Notification Procedure.
3. The MD&PTC cannot indicate total compliance, but can be used as validated information about components of the Demand Facility. The Demand Facility Owner is advised to check with the Relevant Network Operator at an early stage of a project what parts, if any, are acceptable in lieu of the full compliance process and how to proceed to make use of this facility.

#### **Article 24**

##### **PROVISIONS FOR DEMAND UNITS WITH DSR WITHIN A DEMAND FACILITY CONNECTED ABOVE 1000V**

1. The operational notification procedure for connection for each new Demand Unit with DSR in a Demand Facility connected above 1000V, shall comprise a Demand Side Response Unit Document (DSRUD). The DSRUD provided by the Demand Facility Owner shall contain information as defined by the Relevant Network Operator, including a Statement of Compliance. The selection of the required content of the DSRUD shall be defined by the Relevant Network Operator according to Article 4 (3). Its content shall be informed by the information defined in Articles 35 to 44 for Transmission Connected Demand Facilities, but can be simplified through delivery in a single stage of operational notification as well as reduced requirements of details. The Demand Facility Owner shall provide the required information and submit it to the Relevant Network Operator. For subsequent Demand Units with DSR separate independent DSRUDs shall be provided.
2. The Relevant Network Operator on acceptance of a complete and adequate DSRUD shall issue a Final Operational Notification to the Demand Facility Owner.
3. On permanent decommissioning of the DSR within the Demand Unit the Demand Facility Owner shall notify the Relevant Network Operator in writing.

#### **Article 25**

##### **PROVISIONS FOR TRANSMISSION CONNECTED DISTRIBUTION NETWORKS AND DEMAND FACILITIES**

1. The operational notification procedure for connection for each new Transmission Connected Distribution Network and Transmission Connected Demand Facility shall comprise:
  - a. Energisation Operational Notification (EON);
  - b. Interim Operational Notification (ION);and
  - c. Final Operational Notification (FON).

#### **Article 26**

##### **ENERGISATION OPERATIONAL NOTIFICATION (EON) FOR TRANSMISSION CONNECTED DISTRIBUTION NETWORKS AND DEMAND FACILITIES**

1. Energisation Operational Notification (EON) shall entitle the Demand Facility Operator or DNO to energise its internal Network by using the Network connection.

2. An Energisation Operational Notification (EON) shall be issued by the Relevant Network Operator, subject to completion of preparation including agreement on the protection and control relevant to the Connection Point between the Relevant Network Operator and the Demand Facility Operator or DNO and the fulfilment of the requirements of the Relevant Network Operator in the relevant operational procedures.

## **Article 27**

### **INTERIM OPERATIONAL NOTIFICATION (ION) FOR TRANSMISSION CONNECTED DISTRIBUTION NETWORKS AND DEMAND FACILITIES**

1. Interim Operational Notification (ION) shall entitle the Demand Facility Operator or DNO to operate the Demand Facility, Transmission Connected Distribution Network, and/or Demand Unit by using the Network connection for a limited period of time.
2. An Interim Operational Notification (ION) shall be issued by the Relevant Network Operator subject to the completion of data and study review process as required by this Network Code
3. With respect to data and study review the Relevant Network Operator shall have the right to request the following from the Transmission Connected Distribution Network or Transmission Connected Demand Facility:
  - a) Itemized Statement of compliance in the conditions set forth in Title 4 Chapter 4, 5, 6 and 7 of this Network Code (Interim Compliance Statement);
  - b) Detailed technical data of the Demand Facility or Transmission Connected Distribution Network with relevance to the Network connection as specified by the Relevant Network Operator;
  - c) MD&PTCs of Demand Facilities and/or Distribution Networks where these are relied upon as part of the evidence of compliance;
  - d) Simulation models as specified by Article 20 and as required by the Relevant Network Operator while respecting the provisions of Article 4 (3) for its own steady-state and dynamic system studies;
  - e) Studies demonstrating expected steady-state and dynamic performance as required by Title 4 Chapter 4, 5, 6 and 7 of this Network Code; and
  - f) Details of intended practical compliance tests according to Title 4.
4. The maximum period for the Demand Facility Operator or DNO to remain in the Interim Operational Notification (ION) status shall not exceed twenty-four months. The Relevant Network Operator is entitled to specify a shorter ION validity period (e.g. six months) in accordance with Article 4 (2) with ION extensions granted only if the Demand Facility owner or DNO has made substantial progress towards full compliance. At the time of ION extension, the outstanding issues should be explicitly identified.
5. A prolongation of the maximum period for the Demand Facility Operator or DNO to remain in the Interim Operational Notification (ION) status (beyond a total of 24 months) may be granted upon request for Derogation made to the Relevant Network Operator, before the expiry of that period, in accordance with the Derogation procedure defined in the Code.

**Article 28**  
**FINAL OPERATIONAL NOTIFICATION (FON) FOR TRANSMISSION CONNECTED  
DISTRIBUTION NETWORKS AND DEMAND FACILITIES**

1. Final Operational Notification (FON) shall entitle the Demand Facility Operator or DNO to operate the Demand facility or Transmission Connected Distribution Network by using the Network connection.
2. A Final Operational Notification (FON) shall be issued by the Relevant Network Operator upon prior removal of all incompatibilities identified for the purpose of the Interim Operational Notification (ION) status and subject to the completion of data and study review process as required by this Network Code.
  - a) Confirmation of compliance in the conditions set forth in Title 4 Chapter 2, 3, 4, 5, 6 and 7 of this Network Code (Statement of Compliance); and
  - b) Update of applicable technical data, simulation models and studies as referred to in Article 27 (3) (b), (c), (d) and (e), including use of actual measured values during testing.
3. In case of incompatibility identified for the purpose of the granting of the Final Operational Notification (FON), Derogation may be granted upon request made to the Relevant Network Operator, in accordance with the Derogation procedure defined in this Network Code. The Final Operational Notification (FON) shall be issued by the Relevant Network Operator, if the request for Derogation addressed by Demand Facility Operator or DNO was approved. The Demand Facility Operator or DNO whose request for Derogation was rejected, shall not be connected, until a resolution removing the incompliance which is agreed (which will subsequently make them compliant) by the Demand Facility Operator or DNO, and the Relevant Network Operator. In case incompliance cannot be removed an ION (for a New Demand Facility or a New Distribution Connection Network) or a LON (for a failure in service or a change or modification) shall be issued.

**Article 29**  
**LIMITED OPERATIONAL NOTIFICATION (LON) FOR TRANSMISSION CONNECTED  
DISTRIBUTION NETWORKS AND DEMAND FACILITIES**

1. Demand Facility Operator or Distribution Network Operator to whom a Final Operational Notification (FON) has been granted shall inform the Relevant Network Operator in the following circumstances:
  - a) either the Demand Facility or Transmission Connected Distribution Network is temporarily subject to either a modification or loss of capability, due to implementation of one or more modifications of significance to its performance to meet the requirements in Title 2; or
  - b) in case of equipment failures leading to non compliance with some relevant requirements.
2. The Demand Facility Owner or Distribution Network Owner as applicable shall apply to the Relevant Network Operator for a Limited Operational Notification (LON), if the Demand Facility Owner or Distribution Network Owner expects the circumstances to be according to paragraph 1 to persist for more than three months.

3. Limited Operational Notification (LON) shall be issued by the Relevant Network Operator with a clear identification of:
  - a) the unresolved issues justifying the granting of the Limited Operational Notification (LON);
  - b) the responsibilities and timescales for expected solution; and
  - c) a maximum period of validity which shall not exceed twelve months. The initial period granted may be shorter, with possibility for extension if evidence to the satisfaction of the Relevant Network Operator has been made which demonstrates that substantial progress has been made in terms of achieving full compliance.
4. A further prolongation of the period of validity of the Limited Operational Notification (LON) may be granted upon request for Derogation made to the Relevant Network Operator, before the expiry of that period, in accordance with the Derogation procedure defined in the Network Code.
5. The Relevant Network Operator shall have the right to refuse the operation of the Demand Facility or Transmission Connected Distribution Network, if the Limited Operational Notification (LON) terminates without removal of the circumstances which caused its issuing. In such a case the Final Operational Notification (FON) shall automatically be invalid.

## **Chapter 2**

### **OPERATIONAL NOTIFICATION PROCEDURE FOR EXISTING DEMAND FACILITIES OR EXISTING CONNECTED DISTRIBUTION NETWORKS**

#### **Article 30 GENERAL PROVISIONS**

1. In order to assess the advantages of the applicability of any requirement set forth in this Network Code to Existing Demand Facilities or Distribution Networks, the Relevant TSO shall initiate the process referred to in Article 3(6) by a preparatory stage aimed at identifying cases of merit with the phases defined in paragraphs 2 through to 8 below. This preparatory stage shall consist of a qualitative comparison of costs and benefits related to the requirement under consideration for application to Existing Demand Facilities or Distribution Networks. If the Relevant TSO deems the cost of applying the requirement to be low and the benefit to be high then the case can proceed as defined below. If however, the cost is deemed high and or the benefit is deemed low then the Relevant TSO may not proceed further.
2. The TSO shall carry out a quantitative Cost-Benefit Analysis of a requirement under consideration for application to Existing Demand Facilities or Distribution Networks, which has demonstrated potential benefits as a result of the preparatory stage according to paragraph 1 above. This Cost Benefit Analysis shall be followed by a public consultation. The public consultation shall include, amongst others, a proposal for a transition period for implementing an application to Existing Demand Facilities or Distribution Networks. Such a transition period should not exceed two years from the decision of the National Regulatory Authority on the applicability.
3. Demand Facility Owners or Distribution Asset Owners shall assist and contribute to this Cost Benefit Analysis and provide the relevant data as requested by the Relevant TSO within three months after receipt of the request, unless agreed otherwise. As far as Distribution Networks are concerned DNOs will be fully integrated in the CBA.

4. The Cost Benefit Analysis shall be undertaken using one or more of the following calculating principles:

- Net Present Value;
- Return On Investment;
- Rate of Return; and
- Time to Break Even.

The quantified benefits shall include any marginal socio-economic benefits in terms of improvement of security of supply including, but not limited to:

- associated reduction in probability of loss of supply over the lifetime of the modification;
- the probable extent and duration of such loss of supply;
- the societal cost per hour of such loss of supply;

as well as benefits to the internal market in electricity, cross-border trade and integration of renewables including, but not limited to:

- Frequency response;
- reserve holding;
- Reactive Power provision;
- congestion management; and
- defence measures.

The quantified costs shall include as appropriate, but are not limited to:

- costs for implementing the requirement;
- any attributable loss of opportunity; and/or
- change in maintenance and operating costs.

5. If the socio-economic benefits outweigh the costs of applying the requirement under consideration to the Existing Demand facilities or Existing Connected Distribution Networks, the Relevant TSO shall summarise the analysis in a report which shall include a recommendation on how to proceed. This report shall be subject to public consultation. If taking account of the outcome of the public consultation the Relevant TSO decides to proceed with the issue, the report including such consultation outcome and a proposal on the applicability of the requirement under consideration to Existing Demand Facilities or Distribution Networks, shall be forwarded to the Relevant National Regulatory Authority within six months for decision.

6. The proposal by the Relevant TSO to the National Regulatory Authority on applicability of any requirement of this Network Code according to Article 3 (2) to Existing Demand facilities or Existing Connected Distribution Networks according to Title 1 Article 3 (6) shall include the following:

- a) an operational notification procedure in order to prove the implementation of the requirements by the Demand Facility Owner or Distribution Asset Owner; and
- b) an appropriate transition period for implementing the requirements. The determination of the transition period shall take into account the obstacles for efficient undertaking of the equipment modification/refitting.

The Relevant National Regulatory Authority shall decide on the case within three months after the reception of the report and the recommendation of the Relevant TSO. The decision of the

Relevant TSO on how to proceed with the issue and the decision of the National Regulatory Authority, if any, shall be published.

7. In case of positive decision by the National Regulatory Authority, all relevant clauses in contracts and/or relevant clauses in general terms and conditions relating to the Network connection of Existing Demand Facilities or Existing Connected Distribution Networks shall be amended to achieve compliance with the requirements of this Network Code that shall apply to them according to decision of the National Regulatory Authority. The relevant clauses shall be amended within three years after the decision of the National Regulatory Authority on the applicability according to Article 3 (3). This requirement for amendment shall apply regardless of whether the relevant contracts or general terms and conditions provide for such an amendment.

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## **Title 4 COMPLIANCE**

### **Chapter 1 COMPLIANCE MONITORING**

#### **Article 31**

##### **RESPONSIBILITY OF THE DEMAND FACILITY OPERATOR OR DNO**

1. The Demand Facility Operator or DNO shall ensure that the Demand Facility or the Transmission Connected Distribution Network is compliant with the requirements under this Network Code and national legislation. This compliance shall be maintained throughout the lifetime of the facility or the Transmission Connected Distribution Network.
2. The Demand Facility Operator or DNO may partially or totally delegate to third parties the task of gathering relevant documentation evidencing compliance.
3. Any intention to modify the technical capabilities of the Demand Facility or Transmission Connected Distribution Network with possible impact on its compliance to the requirements under this Network Code shall be subject to notification to the Relevant Network Operator in due time and prior to pursuing such modification.
4. Any operational incidents or failures of the Demand Facility or Transmission Connected Distribution Network that have impact on its compliance to the requirements of this Network Code shall be subject to notification to the Relevant Network Operator as soon as possible without any intentional delay after the occurrence of such an incident.
5. Any foreseen test schedules and procedures to verify compliance of the Demand Facility or Transmission Connected Distribution Network to the requirements of this Network Code shall be subject to notification and approval by the Relevant Network Operator in due time (as defined by the Relevant Network Operator) and prior to their commencement. The purpose of this is to allow the Relevant Network Operator to evaluate and mitigate where necessary the consequential risks to the Network and its Users.
6. The Relevant Network Operator shall be facilitated to participate to such test and may record the performance of the Demand Facility and Transmission Connected Distribution Networks.

#### **Article 32**

##### **TASKS OF THE NETWORK OPERATOR**

1. The Relevant Network Operator shall be allowed to monitor compliance of the Demand Facility or Transmission Connected Distribution Network to the requirements under this Network Code throughout the lifetime of the Demand Facility or Transmission Connected Distribution Network. The Demand Facility Owner or Distribution Asset Owner shall be informed of the outcome of this assessment.
2. The Relevant Network Operator shall have the right to request that the Demand Facility Owner or Distribution Asset Owner carries out compliance tests and simulation not only during the

operational notification procedures according to Title 3 but repeatedly throughout the lifetime of the facility or Network according to a plan or general scheme for repeated tests and simulations or after any failure, modification or replacement of any equipment with possible impact on its compliance to the requirements under this Network.

3. The Relevant Network Operator shall make publicly available the list of information and documents to be provided as well as the requirements to be fulfilled by the Demand Facility Operator or Distribution Network Operator in the frame of the compliance process. Such list shall, notably, cover the following information, documents and requirements:
  - a) All documentation and certificates to be provided by the Demand Facility Operator or DNO;
  - b) Details of the technical data required from the Demand Facility or Transmission Connected Distribution Network with relevance to the Network connection or operation;
  - c) Requirements for models for steady-state and dynamic system studies;
  - d) Timely provision of system data required to perform studies;
  - e) Studies by the Demand Facility Operator or DNO for demonstrating expected steady-state and dynamic performance referring to the requirements set forth in Title 4 Chapter 4 and 5 of this Network Code;
  - f) Conditions and procedures including scope for registering Manufacturer's Data and Performance Type Certificates; and
  - g) Conditions and procedures for use by the Demand Facility Operator or DNO of relevant Manufacturers' Data and Performance Type Certificates in lieu of part of the activity for compliance as described in this Network Code.
4. The Relevant Network Operator shall make publicly available the allocation of responsibilities to the Demand Facility Operator or DNO and to the Network Operator for compliance testing, certification and monitoring.
5. The Relevant Network Operator may, irrespective of its continued responsibility and under the conditions provided for by national legislation, partially or totally assign the performance of its Compliance Monitoring to third parties.
6. The Relevant Network Operator shall not withhold unreasonably any Operational Notification as per Article 26 to 28, if compliance tests or simulations cannot be performed as agreed between the Relevant Network Operator and the Demand Facility Operator or DNO due to reasons which are in the sole control of the Relevant Network Operator.

## Article 33

### COMMON PROVISIONS ON COMPLIANCE TESTING

1. The testing of the Demand Facility or Transmission Connected Distribution Network shall aim at demonstrating the fulfilment of the requirements of this Network Code.
2. Notwithstanding the minimum requirements relating to the compliance testing laid down by the provisions of this Network Code, the Relevant Network Operator is, while respecting the provisions of Article 4(3) entitled to:
  - a) allow the Demand Facility Operator or DNO to carry out an alternative set of tests, provided that those tests are efficient and sufficient to demonstrate compliance of the Demand Facility or Transmission Connected Distribution Network to the requirements under this Network Code or national legislation including national codes derived from this Network Code; and
  - b) require the Demand Facility Operator or DNO to carry out an additional or alternative set of tests in case information supplied to the Relevant Network Operator by the Demand Facility Operator or DNO in relation to compliance testing under the provisions of Title 4 Chapter 2 and 3 of this Network Code are not sufficient to demonstrate compliance to the requirements under this Network Code
3. The Demand Facility Operator or DNO is responsible for carrying out the tests in accordance with the conditions laid down in Title 4 of this Network Code. The Relevant Network Operator shall make its reasonable efforts to cooperate and not unduly delay the performance of the tests.
4. The Demand Facility Operator or DNO is responsible for the safety of the personnel and the plant during the tests.
5. The costs of the relevant tests including necessary deviation from the commercially preferred operating point in order to facilitate the tests shall be covered by the Demand Facility Operator or DNO.
6. The Relevant Network Operator shall be facilitated to participate to the test either on site or remotely from the Network Operator's Control Room. For that purpose, the Demand Facility Operator or DNO shall provide suitable monitoring equipment to record all relevant test signals and measurements as well as ensure that the relevant representatives from both the Demand Facility or Transmission Connected Distribution Network and the manufacturer (as applicable) are available on site for the entire testing period. Signals specified by the Relevant Network Operator shall be provided if the Relevant Network Operator wishes for selected tests to use their own equipment to record the performance during tests. The decision as regards the participation of the Relevant Network Operator to the test and the form of this participation remains at the sole and exclusive discretion of the Relevant Network Operator.
7. The TSO shall have the right to specify a method for testing the active control of Reactive Power where provided.

## **Article 34**

### **COMMON PROVISIONS ON COMPLIANCE SIMULATIONS**

1. The simulation of the Demand Facility or Transmission Connected Distribution Network shall aim at demonstrating the fulfilment of the requirements of this Network Code.
2. Notwithstanding the minimum requirements relating to the Compliance Simulations laid down by the provisions of this Network Code, the Relevant Network Operator is, while respecting the provisions of Article 4 (3), entitled to:
  - a) allow the Demand Facility Operator or DNO to carry out an alternative set of simulations, provided that those simulations are efficient and sufficient to demonstrate compliance of the Demand Facility or Transmission Connected Distribution Network to the requirements under this Network Code;
  - b) require the Demand Facility Operator or DNO to carry out an additional or alternative set of simulations in case information supplied to the Relevant Network Operator by the Demand Facility Operator or DNO in relation to Compliance Simulation under the provisions of Title 4 Chapter 5, 6 or 7 of this Network Code are not sufficient to demonstrate compliance to the requirements under this Network Code.
3. The Demand Facility Operator shall provide simulation results relevant to each and any individual Demand Units within the Demand Facility in a report form in order to demonstrate the fulfilment of the requirements of this Network Code.
4. The Demand Facility Operator or DNO shall produce and provide a validated simulation model. The coverage and the format of the Simulation Models are described in Article 20 (1) b).
5. The Relevant Network Operator shall have the right to check the compliance of the Demand Facility or Transmission Connected Distribution Network connection with the requirements of this Network Code by carrying out its own Compliance Simulations based on the provided simulation reports, Simulation Models and compliance test measurements.
6. The Relevant Network Operator shall provide to the Demand Facility Owner or Distribution Asset Owner the technical data and the simulation model of the Network, in the extent necessary for carrying out the requested simulations according to Title 4 Chapter 5, 6 or 7 of this Network Code.

## **Chapter 2**

### **COMPLIANCE TESTING FOR TRANSMISSION CONNECTED DISTRIBUTION NETWORK CONNECTIONS**

## **Article 35**

### **COMPLIANCE TESTS FOR DISCONNECTION FOR SYSTEM DEFENSE AND RECONNECTION**

1. The Transmission Connected Distribution Networks shall be compliant with the Relevant TSO requirements for system defence and reconnection referred to in Article 14 and shall be subject to the following compliance tests:

- a) With regard to capability of reconnection after an incidental disconnection due to a Network disturbance testing, reconnection shall be achieved through a reconnection procedure, preferably via automation, authorized by the Relevant TSO.
  - b) With regard to synchronization testing, if required by the Relevant TSO, the Transmission Connected Distribution Network shall demonstrate the synchronisation facilities. This test shall verify the settings of the synchronisation devices and cover the following matters: Voltage, Frequency, phase angle range, deviation of Voltage and Frequency.
  - c) With regard to remote disconnection testing, each Transmission Connected Distribution Network shall be capable of remote disconnection at the Connection Point[s] from the Transmission Network by the TSO within the time specified by the Relevant TSO.
  - d) With regard to Low Frequency Demand Disconnection testing, each Distribution Network Operator will be able to demonstrate the capability of automatic low Frequency disconnection of a percentage to be specified by the Relevant TSO, in coordination with adjacent TSOs, where applicable as defined in Article 14.
  - e) With regard to Low Frequency Demand relays testing, the Low Frequency relays shall demonstrate its functional capability in the requirements set forth in the Article 14 (3) are cumulatively fulfilled and that it is suitable for operation from a nominal AC input to be specified by the TSO.
  - f) With regard to Low Voltage Demand Disconnection relays testing, the Low Voltage relays shall demonstrate, in accordance with Article 14 (4) (c), that their operation can be performed in a single action.
2. The MD&PTC may be used in place of part or all of the tests above, provided that they are registered with the Relevant Network Operator.

### **Article 36**

#### **COMPLIANCE TESTS FOR INFORMATION EXCHANGE**

With regard to information transfer between the Relevant Network Operator and the Transmission Connected Distribution Networks in real time or periodically with time stamping, Distribution Networks shall demonstrate the technical capability to comply with the standard defined in Article 12 paragraph 1 (b) and (c), in real time or periodically with time stamping as specified, or by means of MD&PTC provided that they are registered within the Relevant Network Operator.

### **Chapter 3**

#### **COMPLIANCE TESTING FOR DEMAND FACILITIES**

### **Article 37**

#### **COMPLIANCE TESTS FOR SYSTEM DEFENSE AND RECONNECTION**

1. The Demand Facilities must be compliant with the Relevant Network Operator requirements for system restoration referred to in Article 14 and shall be subject to the following compliance tests:

- a) With regard to capability of reconnection after an incidental disconnection due to a Network disturbance testing, reconnection shall be achieved through a reconnection procedure, preferably via automation, authorized by the Relevant Network Operator.
- b) With regard to synchronization testing where required by the Network Operator, the Demand Facility shall be equipped with the necessary synchronisation facilities. This test shall cover the following matters: Voltage, Frequency, phase angle range, deviation of Voltage and Frequency.
- c) With regard to remote disconnection testing, each Demand Facility shall be capable of remote disconnection at the Connection Point[s] from the Transmission Network by the Relevant Network Operator.
- d) With regard to Low Frequency Demand relays, the Low Frequency relays shall have the following functional capability and be suitable for operation from a nominal AC input to be specified by the Relevant Network Operator.

The test is deemed passed, provided that the Article 14 (3) requirements are cumulatively fulfilled.

- e) With regard to Low Voltage Demand Disconnection relays, the low Voltage relays shall demonstrate Article 14 (4) c) that their operation can be performed in a single action.
2. The MD&PTC may be used to replace part or all of the tests below, provided that they are registered with the Relevant Network Operator.

### **Article 38**

#### **COMPLIANCE TESTING OF DEMAND SIDE RESPONSE FOR DEMAND FACILITIES OR CLOSED DISTRIBUTION NETWORKS**

1. With regard to the demand modification test:
- a) The MD&PTC may be used in lieu of part or all of the tests below, provided that they are registered with the Relevant Network Operator.
  - b) The Demand Facility (or aggregated facilities) or Closed Distribution Network shall demonstrate its technical capability to modify its demand consumption, after receiving an order from the Relevant Network Operator, within the range, duration and time frame previously agreed and expected.
  - c) The test shall be carried out preferably by an order or alternatively by simulating the receipt of an order from the Relevant Network Operator and adjusting the power demand of the Demand facility.
  - d) The test is deemed passed, provided that the conditions defined by the Relevant Network Operator pursuant Article 16 (1) (h;j-l;n;p) are cumulatively fulfilled:
2. With regard to the disconnection or reconnection of static compensation facilities test:
- a) The Demand Facility shall demonstrate its technical capability to disconnect and/or reconnect its static compensation facilities when receiving an order from the Relevant Network Operator, in the time frame expected;

- b) The test shall be carried out by simulating the receipt of an order from the Relevant Network Operator and disconnect the static compensation facilities and by simulating the receipt of an order from the Relevant Network Operator and reconnect these facilities;
- c) The test is deemed passed, provided that the conditions defined by the Relevant Network Operator pursuant Article 16 (1) (i-l;n) are cumulatively fulfilled

#### **Article 39**

### **COMPLIANCE TESTS FOR INFORMATION EXCHANGE**

1. With regard to information transfer between the Relevant Network Operator and the Demand facility in real time or periodically with time stamping, Demand Facilities shall demonstrate the technical capability to comply with the standard defined by the Relevant Network Operator as referred in Article 12 paragraph 1 (b) and (c), in real time or periodically with time stamping as specified, by means of MD&PTC, provided that they are registered with the Relevant Network Operator.

#### **Chapter 4**

### **COMPLIANCE SIMULATIONS FOR TRANSMISSION CONNECTED DISTRIBUTION NETWORK CONNECTIONS**

#### **Article 40**

### **COMPLIANCE SIMULATIONS FOR REACTIVE POWER RANGES OF TRANSMISSION CONNECTED DISTRIBUTION NETWORKS**

1. With regard to Transmission Connected Distribution Networks Reactive Power demand Compliance Simulations shall be carried out.
2. With regard to Transmission Connected Distribution Networks these Reactive Power demand Compliance Simulations:
  - a) A load flow simulation model of the Network of the Transmission Connected Distribution Network shall be used to calculate the Reactive Power demand under different load conditions and under different generation conditions. A combination of minimum and maximum load and generation conditions resulting in the lowest and highest Reactive Power demand shall be part of the simulations. Calculation of the Reactive Power demand during load exchange of no higher than 25% of the MW of the Maximum Import Capacity at the Connection Point shall be part of the simulations.
  - b) The simulation is deemed passed if the simulations demonstrate compliance with the requirements as described in Article 10 (2) (a) and (c).

**Chapter 5**  
**COMPLIANCE SIMULATIONS FOR DEMAND FACILITIES**

**Article 41**  
**COMPLIANCE SIMULATIONS FOR REACTIVE POWER RANGES OF DEMAND FACILITIES**

1. With regard to Demand Facilities without onsite generation Reactive Power demand compliance simulations shall be carried out:
  - a) Demand Facility without onsite generation shall demonstrate Reactive Power capability at the Connection Point;
  - b) A load flow simulation model of the Network of the Demand facility shall be used to calculate the Reactive Power demand under different load conditions. Minimum and maximum load conditions resulting in the lowest and highest Reactive Power demand at the Connection Point shall be simulated.
  - c) The simulation is deemed passed if the simulations demonstrate compliance with the requirements as described in Article 10 paragraph 1(a).
2. With regard to these Demand Facilities with onsite generation Reactive Power demand compliance simulations:
  - a. A load flow simulation model of the Network of the Demand facility shall be used to calculate the Reactive Power demand under different load conditions and under different generation conditions. A combination of minimum and maximum load and generation conditions resulting in the lowest and highest Reactive Power demand at the Connection Point shall be part of the simulations.
  - b. The simulation is deemed passed if the simulations demonstrate compliance with the requirements as described in Article 10 paragraph 1(b).
3. The TSO shall have the right to specify the method for compliance simulation of the active control of Reactive Power where provided.

**Article 42**  
**COMPLIANCE SIMULATIONS FOR VERY FAST ACTIVE POWER CONTROL OF DEMAND FACILITIES**

1. With regard to the Very Fast Active Power Control simulation:
  - a) The model of the Demand Facility shall demonstrate its capability to simulate Very Fast Active Power Control capability to a low Frequency event in the conditions as referred to in Article 18 (1).
  - b) The simulation is deemed passed, provided that the model demonstrates compliance with the conditions of Article 18 (1).



**Chapter 6**  
**COMPLIANCE MONITORING FOR TRANSMISSION CONNECTED DISTRIBUTION NETWORK CONNECTIONS**

**Article 43**  
**COMPLIANCE MONITORING FOR TRANSMISSION CONNECTED DISTRIBUTION NETWORKS**

1. With regard to compliance monitoring of the Reactive Power requirements of Transmission Connected Distribution Networks:
  - a) The Reactive Power shall be measured at the Connection Point.
  - b) The Connection Point of the Transmission Connected Distribution Network shall be equipped with necessary equipment to measure the power factor or the limit specified by the Relevant SO, in accordance with Article 10.
  - c) The Relevant Network Operator shall specify the time schedule for compliance monitoring.

**Chapter 7**  
**COMPLIANCE MONITORING FOR DEMAND FACILITIES**

**Article 44**  
**COMPLIANCE MONITORING FOR DEMAND FACILITIES**

1. With regard to compliance monitoring of the Reactive Power requirements of Demand Facilities:
  - a) The Reactive Power shall be measured at the Connection Point.
  - b) The Connection Point of the Demand Facility shall be equipped with necessary equipment to measure the power factor or the limit specified by the Relevant Network Operator, in accordance with Article 10.
  - c) The Relevant Network Operator shall specify the time schedule for compliance monitoring.

## **Title 5**

### **DEROGATIONS**

#### **Article 45**

#### **GENERAL PROVISIONS**

1. The procedure for Derogation defined in this Title applies to all Demand Facilities to which the code applies and DNOs connected to the Transmission Network to which the provisions of this Network Code are applicable pursuant to Article 3. Only the Demand Facility Owner or Distribution Asset Owner (or DSO on its behalf) shall have the right to apply for Derogations.
2. It shall apply as well Network Operators when applying for Derogations for classes of both existing and new Demand Facilities connected to their Network. Such application for Derogation may be appropriate to initiate following request by third parties including but not restricted to manufacturers. The Derogation process shall be transparent, non-discriminatory, non-biased, well documented and based in particular on the Cost Benefit Analysis performed in the conditions set forth by Article 30(4) and (5) by the Relevant TSO or by the Relevant Network Operator in coordination with the Relevant TSO. Cost Benefit analysis does not need to be performed by the Relevant Network Operator if, on its reasoned request, an individual exception is granted to the Relevant Network Operator by the National Regulatory Authority.
3. Criteria for assessing the request for Derogation shall be set by the Relevant National Regulatory Authority taking into account the recommendation of the Relevant Network Operator in co-ordination with the Relevant TSO. The criteria set by the Relevant National Regulatory Authority shall be non-discriminatory, objective and be published by the National Regulatory Authority.

#### **Article 46**

#### **REQUEST FOR DEROGATION**

1. Demand Facilities Operators which the code applies and DNOs connected to the Transmission Network may apply for Derogation to this Network Code by submitting a request to the Relevant Network Operator, according to the terms and conditions set in this Article.
2. The request for Derogation, submitted by the Demand Facility Owner or Distribution Asset Owner shall include all the information and documents which are required by the Relevant Network Operator in coordination with the Relevant TSO, including, inter alia, but not limited to:
  - a) identifying data of the applicant party, with reference contact person for any communications;
  - b) the specific plant or site to which the Derogation request is referred;
  - c) the provision of the Network Code for which a Derogation is requested, with the detailed description of the requested Derogation;
  - d) detailed reasoning accompanied with all relevant documents supporting the Derogation application.

3. A DNO in its capacity as a Network operator may apply for Derogation, in respect of one or more requirements of this Network Code by submitting a request to the National Regulatory Authority
4. The request for Derogation, submitted by the DNO shall include all the information and documents which are required by the Relevant TSO, including, inter alia, but not limited to:
  - a) identifying data of the DNO, with reference contact person for any communications;
  - b) the number of Demand Facilities affected and the total installed capacity to which the request is referred to;
  - c) the provision of the Network Code for which a Derogation is requested, with the detailed description of the requested Derogation;
  - d) detailed reasoning accompanied with all relevant documents supporting the Derogation application.
5. A TSO may apply for Derogation, in respect of one or more requirements of this Network Code by submitting a request to the National Regulatory Authority
6. The request for Derogation, submitted by the TSO shall include the following information:
  - a) identifying data of the TSO, with reference contact person for any communications;
  - b) the number of plant or sites affected and the total installed capacity to which the request is referred to;
  - c) the provision of the Network Code for which a Derogation is requested, with the detailed description of the requested Derogation;
  - d) detailed reasoning accompanied with all relevant documents supporting the Derogation application.

#### **Article 47**

#### **DECISION ON DEROGATION**

1. Further to the request for Derogation submitted by the Demand Facility Owner or Distribution Asset Owner, the Relevant Network Operator shall assess the request and related documentation. If the request or the related documentation is considered to be incomplete the Demand Facility Owner or Distribution Asset Owner shall submit the missing information as requested by the Relevant Network Operator. As from the day of the receipt of the complete request by the Relevant Network Operator until the issuance of the decision granting or refusing the Derogation by the National Regulatory Authority according to paragraph 2, the Demand Facility or Distribution Network to which the request is referred to is deemed as compliant.
2. No later than six months after the receipt of the complete request the Relevant Network Operator shall submit its assessment of the request, including a reasoned opinion, together with a request and related documentation and a Cost-Benefit Analysis to the National Regulatory Authority.

The above deadline shall be shortened to three months in case a request for exemption from Cost Benefit Analysis is submitted by the Relevant Network Operator to the National Regulatory Authority.

3. If the Relevant Network Operator has requested an exemption from cost-benefit analysis the National Regulatory Authority shall decide on granting or rejecting this request within one month after the receipt of this request. When the request is rejected, the Relevant Network Operator shall provide a Cost Benefit Analysis within three months following a decision of the National Regulatory Authority.
4. Further to the request for Derogation submitted by the DNO, the Relevant TSO shall assess the request and related documentation. If the request or the related documentation is considered to be incomplete the DNO shall submit the missing information as requested by the Relevant TSO. As from the day of the receipt of the complete request by the DNO until the issuance of the decision granting or refusing the Derogation by the National Regulatory Authority according to paragraph 8, the Demand Facilities to which the request is referred to are deemed as compliant.
5. No later than six months after the receipt of the complete request according to paragraph 4 the TSO shall submit its assessment of the request, including a reasoned opinion, together with a related documentation and a Cost Benefit Analysis performed by the DNO. The above deadline shall be shortened to three months in case a request for exemption from Cost Benefit Analysis is submitted by the DNO to the National Regulatory Authority. If the DNO has requested an exemption from Cost Benefit Analysis the National Regulatory Authority shall decide on granting or rejecting this request within one month after the receipt of this request. When the request is rejected, the DNO shall provide a Cost Benefit Analysis within three months following the decision of the National Regulatory Authority.
6. Further to the request for Derogation submitted by the TSO, the National Regulatory Authority shall assess the request and related documentation. If the request or the related documentation is considered to be incomplete the TSO shall submit the missing information as requested by the National Regulatory Authority. As from the day of the receipt of the complete request by the TSO until the issuance of the decision granting or refusing the Derogation by the National Regulatory Authority according to paragraph 8, the Demand Facilities to which the request is referred to are deemed as compliant.
7. Together with request according to paragraph 6 the TSO shall submit either a Cost Benefit Analysis or a request for exemption from Cost Benefit Analysis to the National Regulatory Authority. If the TSO has requested an exemption from Cost Benefit Analysis the National Regulatory Authority shall decide on granting or rejecting this request within one month after the receipt of this request. When the request is rejected, the TSO shall provide a Cost Benefit Analysis within three months following the decision of the National Regulatory Authority.
8. The National Regulatory Authority shall issue a motivated decision granting or rejecting the Derogation and specifying the duration of the Derogation, including a reasoned opinion, within a further 3 months after receipt of the complete documentation. The National Regulatory Authority shall communicate to the Relevant Network Operator, the Demand Facility Owner or Distribution Network Owner and the Agency the decision granting or rejecting the Derogation.

9. The Agency shall monitor the procedures of Derogation and the National Regulatory Authority shall cooperate with the Agency in this task and shall provide the Agency with all information necessary for this purpose.
10. The Agency may request the Relevant National Regulatory Authority to revoke any Derogation granted without due justification
11. The National Regulatory Authority shall have the right to issue a motivated decision revoking the granted Derogation under the conditions pursuant to the provisions of national law.

#### **Article 48**

### **COMPLIANCE OF EXISTING DEMAND FACILITY OR EXISTING DISTRIBUTION NETWORK**

1. An Existing Demand Facility or Existing Distribution Network which is not compliant with a requirement of the Network Code, that applies according to Article 3, shall apply for Derogation from this requirement according to Article 46, within twelve months from the day the requirement, of which it is not compliant with, becomes applicable.
2. The Relevant Network Operator will have the right to refuse the operation of the Existing Demand Facility or Existing Distribution Network, if a twelve month period terminates without an application for Derogation.

#### **Article 49**

### **REGISTER OF DEROGATIONS TO THE NETWORK CODE**

1. Each National Regulatory Authority shall maintain a register of all Derogations it has granted or rejected and shall provide to the Agency an updated and consolidated register at least every 6 months with a copy to ENTSO-E.
2. These registers shall contain in particular:
  - the requirement(s) for which the Derogation is granted;
  - content of the Derogation; and
  - reasons for granting or rejecting the Derogation.

## **Title 6 FINAL PROVISIONS**

### **Article 50**

#### **AMENDMENT OF CONTRACTS AND GENERAL TERMS AND CONDITIONS**

All relevant clauses in contracts and/or relevant clauses in general terms and conditions relating to the Network connection of New Demand Facilities or a New Distribution Connection shall be amended to achieve compliance with the requirements of this Network Code. The relevant clauses shall be amended within three years after the entry into force of this Network Code. This requirement for amendment shall apply regardless of whether the relevant contracts or general terms and conditions provide for such an amendment.

### **Article 51**

#### **ENTRY INTO FORCE**

This Network Code shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

With the exception of Article 3 (4), which shall apply months after the entry into force, all provisions of this Network Code shall apply as from the day of expiration of a 3 year period following its publication.

This Network Code shall be binding in its entirety and directly applicable in all member states.