



ERREG Public Consultation on Pilot Framework Guidelines on Electricity Grid Connection

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INFORMATION PAGE

Abstract

This document (Ref. E09-ENM-18-04) presents ERGEG's draft pilot framework guidelines on electricity grid connection for public consultation with stakeholders.

The final framework guidelines to be prepared following the consultation are intended as input to ACER, which becomes fully operational on 3 March 2011.

Related Documents

- “ERGEG Guidelines of Good Practice on Electricity Grid Connection and Access“, ERGEG, 10 December March 2009, Ref. E09-ENM-16-04, http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_CONSULT/CLOSED%20PUBLIC%20CONSULTATIONS/ELECTRICITY/GGP%20Electricity%20Grid%20connection%20%20Access/CD/E09-ENM-16-04_GGP-GridConnection_10-Dec-09.pdf
- “Implementing the 3rd Package: next steps“, CEER/ERGEG, 18 June 2009, Ref. C09-GA-52-06a, http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_ERGEG_PAPER_S/Cross-Sectoral/2009/C09-GA-52-06a_Implementing_3rdpackage_18-Jun-09.pdf
- 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. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0055:0093:EN:PDF>
- Regulation (EC) No 713/2009 of the European Parliament and of the Council of 13 July 2009 establishing an Agency for the Cooperation of Energy Regulators. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0001:0014:EN:PDF>
- Regulation (EC) No 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0015:0035:EN:PDF>

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Scope

These framework guidelines (FG) apply to grid connection of all kinds of grid users (generators, consumers and Distribution System Operators, DSOs) of the European electricity transmission grids.

The Guidelines were elaborated based on the related Initial Impact Assessment (IIA, Ref E09-ENM-18-03) and the selected preferred policy options identified in this IIA. The Initial Impact Assessment shall be read and considered in parallel to these framework guidelines. The Chapters of the framework guidelines are in line with the corresponding chapters of the initial impact assessment.

The network code(s) adopted according to these framework guidelines will be applied by electricity Transmission System Operators (TSOs), taking into account possible public service obligations and without prejudice to the regulatory regime for cross-border issues pursuant to Article 42 of Directive 2009/72/EC and of the responsibilities and powers of regulatory authorities established according to Article 41 paragraph 6 of Directive 2009/72/EC.

The network code(s) adopted according to these framework guidelines will be evaluated by the Agency, taking into account the degree of compliance with the guidelines and the fulfilment of the objectives: maintaining security of supply, supporting the completion and functioning of the internal market in electricity and cross-border trade including delivering benefits to the customers and facilitating the targets for penetration of renewable generation.

1 Objective #1: Standardised minimum requirements for connection for grid users

Minimum requirements

- 1.1 The network code(s) shall identify and consider appropriately those standard minimum requirements that must be complied with by all (also existing) grid users. A quantified analysis of the impacts (costs, organisation, etc.) of those requirements on the existing grid users shall be made beforehand. If the applicability to the existing grid users can only be achieved after some transitory period, the reasons for that, the consequences of doing so and the transition period itself need to be defined in a separate piece of “exceptions” documentation. This documentation, complementing the code(s), needs to be maintained and updated accordingly by the European Network of Transmission System Operators for Electricity (ENTSO-E). The timeline (i.e. expiration of the transition period) for achieving applicability to the existing grid users shall be a subject of regular compliance monitoring and enforcement.
- 1.2 The framework guidelines and the related code(s) shall not lift the obligations set forth by relevant international technical standards and regulations. The network code(s) shall define the requirements in relation to the relevant system parameters, for contribution to secure system operation of grid users including:
 - Frequency and voltage parameters;
 - Requirements for reactive power;
 - Load-frequency control related issues;
 - Fault ride through capability;
 - Balancing capabilities and provision of ancillary services; and
 - Minimum conditions for (re)connection to the grid in disturbed/critical operating state, according to technology and size of the connected unit.
- 1.3 The network code(s) must set all provisions necessary for generation units that are connected to the DSO but that also affect TSOs (e.g. feeding energy up to transmission grid, size (operation mode/fuel type) of unit influencing need for reserve capacity) that must be agreed upon with TSO and DSO.
- 1.4 The network code(s) must constitute the requirements for System Operators to define and agree specifications for protection devices for all grid users in an appropriate way, including considerations on backup equipment.
- 1.5 The network code(s) shall set out how the TSOs must define the technical requirements related to the contribution to frequency and active power control. Technical rules set at the synchronous system level for operational security shall be in line with these requirements.

Adaptation of existing arrangements to the network code

- 1.6 Transmission system operators shall amend all relevant clauses in contracts and/or relevant clauses in general terms and conditions relating to the connection of grid users to the electricity grid, in accordance with the terms of the network code. The relevant clauses

shall be amended by a fixed time limit after the entry into force of the network code. This requirement shall apply regardless of whether the relevant contracts or general terms and conditions provide for such an amendment.

Special requirements for critical grid situations

1.7 The network codes must define:

- Situations in general (e.g. which kinds of network faults, which distance) and
- Possible deviations of significant parameters (e.g. voltage, frequency) in detail

that generation units must withstand, while remaining connected to the grid, in terms of specificities of the generation unit.

1.8 The network code(s) shall set out how generation units shall be able to execute their control activities in normal and in alert (disturbed) operating states, and specific parameters for operation outside these operating states will be agreed individually between generation units and System Operators.

1.9 Coordination requirements and procedures for reconnection after tripping must be defined transparently in the network code(s) for the different parties involved including especially their different roles and responsibilities.

1.10 The network code(s) shall set out the requirements for:

- House load operation including the minimum duration of house load operation;
- Black start; and
- Island operation.

Testing and verification

1.11 The network code(s) shall set a responsibility for production units for testing their compliance with the requirements set for the connecting installation, including electrical safety.

1.12 The specifications and requirements for the new generation units must be verified at commissioning of grid connection. TSOs and DSOs must define transparently the contents of the verification within the appropriate scope.

1.13 The possibility for repeated verification by request from the TSO and/or DSO after commissioning must be fixed in the network code(s).

1.14 Revision of measurements from actual operation shall be specified in the network code(s), if appropriate, in order to prove compliance with the specifications set for the generation unit.

- 1.15 For achieving a common European approach, the network code(s) must define how a coherent and coordinated alignment between the EU and national grid codes can be ensured.

Compliance Monitoring and Enforcement

- 1.16 The network codes must define clear and transparent criteria and methods for compliance monitoring including e.g. the regularity of testing (one-time, periodic). Also the responsibilities for compliance monitoring and enforcement need to be well defined and the system operators entitled to impose the fulfilment of, and monitor the compliance with, the defined connection requirements.
- 1.17 Regular reviews shall be applied in order to prove compliance with the specifications set initially.

2 Objective #2: Promoting (real-time and other) exchange of information between parties and improved coordination

General information

2.1 The network code(s) shall set out the procedures and requirements to coordinate and ensure information sharing between:

- TSO and TSO;
- TSO and DSO; and
- TSO or DSO and significant generation and consumption units.

These procedures and requirements shall be in accordance with and the agreement of all affected parties.

2.2 The network code(s) shall define a harmonised standard on which information shall be provided for grid connection at the connection point by TSO and DSO and how this can be done. On the other hand, the network code(s) must also define which information and technical data every significant generation unit or consumption unit has to provide to the TSO or DSO it is connected to and how this data should be provided to ensure the operational security of the system.

2.3 Moreover, the TSOs and DSOs should be obliged in the grid connection code(s) to publish and transparently communicate the detailed procedure for the initiation of new connection including among others required documents, timing, methodologies, responsibilities, etc. This information shall also address the relevant grid access issues, which will be dealt with in more detail in the future grid access framework guidelines.

2.4 Information exchange between TSOs and DSOs about the commissioning of significant generation and consumption units has to be framed on a European basis. This implies that criteria (e.g. a power threshold) must be agreed by adjacent TSOs and DSOs for defining units as significant.

Real-time information sharing

2.5 Information exchange provisions must include specifications for an efficient co-ordinated system with access to real-time information. The network code(s) must define these provisions in a sufficient level of detail and must specify at which level more details shall be set (i.e. regional codes).

2.6 The network code(s) must set the requirement for every significant generation and consumption unit to be able and obliged to provide the necessary real-time operational information to the DSOs and TSOs affected (where it is connected (TSO) or where the DSO it is connected to is connected).

2.7 The network code(s) shall set the requirement for every significant generation unit or consumption unit to also be able to receive and to execute the instructions sent by the TSO and/or DSO, either on a contractual basis or in critical operating state.

3 Connection regime for specific grid users

3.1 Objective #3-1: Connection regime for large-scale intermittent generation

Requirements at EU level

- 3.1.1 The network code(s) must define requirements regarding protection devices. Those must be specified and agreed among System Operators with special regard to intermittent generation. The network code(s) shall set out the list of required equipment for these technologies, most notably depending on the off/on-shore connection, large-scale onshore installation and possible effects on congestions and / or network operation in disturbed conditions.
- 3.1.2 Reconnection requirements and procedures after tripping shall be coordinated with the TSO and (if applicable) with the DSO, under transparent procedures based on standardised minimum requirements that must be set in the network code(s).
- 3.1.3 The network code(s) shall clearly define situations especially regarding large-scale intermittent generation has to withstand remaining connected to the grid regarding the specificities of the generator and grid safety considerations.
- 3.1.4 Taking into account the future expected massive growth of intermittent generation which in turn leads to the growth of the needs for reserve capacity, the involvement and provisions of intermittent generation in balancing and load-frequency control shall be specified for in the network code(s).

Possible requirements at national level

- 3.1.5 The requirements above specify the content of codes addressing intermittent generation at European level. It is possible that due to geographical or “electrical” reasons additional requirements and provisions need to be specified at national or regional level. In this case, full compatibility of this national/regional rule(s) with the European framework and codes shall be ensured.
- 3.1.6 ENTSO-E shall foresee regular checks, monitoring and if necessary corrective measures in case of detected discrepancies between the national and European codes.

3.2 Objective #3-2: Connection regime for distributed generation

DSO requirements

- 3.2.1 The network code(s) shall set out necessary requirements and procedures to be followed by DSOs when connecting distributed generation to the grid.
- 3.2.2 The network code(s) shall set out that requirements and equipment for the connection point between networks of transmission and distribution system must be defined at the appropriate level.
- 3.2.3 The DSO should be assigned the responsibility for transposing the requirements set by the TSO (or DSO) and ensuring that generation and consumption units (and also others connected to distribution networks) within the distribution network meet these requirements.
- 3.2.4 The network code(s) shall set the requirement for DSOs to execute (manually or automatically, depending on the purpose) the instructions given by the TSO. The TSO and the DSO shall agree how these instructions are delivered in practice. This applies also for those DSOs connected to another DSO network.
- 3.2.5 The network code(s) shall define the requirements at the interface between TSOs and DSOs like
- Voltage parameters and
 - reactive power flow
- where applicable considering the situation with distributed generation.
- 3.2.6 The network code(s) shall set out that the TSOs of a synchronous area among themselves and with the DSOs shall exchange all necessary information and data relating to distributed generation. The necessary information shall be clearly and transparently defined and agreed with the DSOs.

Generation requirements

- 3.2.7 The network code(s) must define how information needed by the TSO can be exchanged with distributed generators.
- 3.2.8 The network code(s) shall set out necessary requirements for protection schemes and settings that shall aim at avoiding that a fault on the transmission grid or disturbed operating conditions lead to a sudden simultaneous tripping of distributed generation units.
- 3.2.9 The network code(s) must set out that coordination of protection schemes has to be agreed and implemented between affected TSOs. Coordinated protection schemes and settings shall be defined to prevent any fault on distribution networks from affecting the transmission network and allow distributed generation units to support the system.

3.2.10 The network code(s) shall define the necessity of island operation of distributed generation and the situations when it can occur and be required.

3.3 Objective #3-3: Connection regime for demand response

Requirements directly related to demand response

- 3.3.1 The network code(s) shall set out necessary requirements and procedures to be followed when connecting a consumption unit to the grid, to enable demand response. The responsibility for the compliance of the equipment with the requirements set by the TSO and/or DSO should lie clearly with the consumption unit.
- 3.3.2 The network code(s) shall set out that consumption units shall compensate as far as possible their need for reactive power, locally, within the defined range and in order to avoid reactive power transport in the grid. Reactive power generation and/or absorption by consumption units outside the range set by the TSO and DSO shall be accounted for by the consumption unit and may result in the application of economic sanctions. The limits for production and consumption of the reactive power and the economic sanctions shall be transparently communicated to grid users.
- 3.3.3 The network code(s) shall set out that mechanisms must be established to enable the participation of consumption units in grid services (e.g. voltage control)
- 3.3.4 Consumption units must comply with all maximum permitted values (e.g. electromagnetic perturbations, emission limits as for harmonics and/or interharmonics, voltage dips). The administration of these requirements shall occur in a non-discriminatory way. The corresponding thresholds – in compliance with harmonised standards, where applicable – shall be defined and published accordingly.
- 3.3.5 Consumption units shall be involved on a voluntary basis and the conditions and compensation for end-users participating in demand response shall be set, when ancillary services are designed and contracted with demand response, as far as this seems reasonably practicable and economically feasible. In that context, consumption units may contribute e.g. by decreasing consumption during peak load.
- 3.3.6 The responsibility for verifying all the requirements set in the terms and conditions for grid connection before the connection of a consumption unit to the network must lie with the TSO and/or DSO.

Additional provisions to be addressed within the scope of system operation (operational security)¹

- The network code(s) shall define the necessity of load shedding of distributed grid users and the situations when it can occur and be required.
- The consumption unit connected to the transmission network and where appropriate to the distribution network shall be equipped with an automatic load shedding system. If the power system is in danger and under transparent and by the NRA agreed conditions, System Operators shall be able to use this system.

¹ These provisions are only referred to here for completeness but since they are not directly related to demand response functionality but rather to forced disconnection (i.e. load shedding in critical situations) they will be treated in the related system operation framework guidelines and codes.

- Besides automatically-activated load shedding, there must be a possibility for the TSO and/or DSO to perform manual load shedding if operational security is endangered.
- Actions to be performed during critical operating states upon request by the TSO or DSO to restore the system to normal operating state may be agreed between consumption units and the System Operator responsible.