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**OPINION OF THE AGENCY FOR THE COOPERATION OF ENERGY  
REGULATORS No. 08/2012**

**of 13 October 2012**

**ON ENTSO-E'S NETWORK CODE FOR REQUIREMENTS FOR GRID  
CONNECTION APPLICABLE TO ALL GENERATORS**

THE AGENCY FOR THE COOPERATION OF ENERGY REGULATORS,

HAVING REGARD to 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<sup>1</sup>, and, in particular, Articles 6(4) and 17(3) thereof;

HAVING REGARD to 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<sup>2</sup>, and, in particular, Article 6(7) thereof;

HAVING REGARD to the favourable opinion of the Board of Regulators of 12 October 2012, issued pursuant to Article 15(1) of Regulation (EC) No 713/2009,

WHEREAS:

- (1) The Framework Guidelines on Electricity Grid Connections, FG-2011-E-001 (the "Framework Guidelines")<sup>3</sup>, were adopted by the Agency for the Cooperation of Energy Regulators (the "Agency") on 20 July 2011, pursuant to Article 17(3) of Regulation (EC) No 713/2009.
- (2) Following the adoption of these Framework Guidelines, the Commission invited the European Network of Transmission System Operators for Electricity ("ENTSO-E"), by letter of 29 July 2011, to start the drafting of a network code related to the grid connection of generators and to submit it to the Agency, pursuant to Article 6(6) of Regulation (EC) No 714/2009, by 31 March 2012. This deadline was subsequently

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<sup>1</sup>OJ L 211, 14.8.2009, p. 1.

<sup>2</sup>OJ L 211, 14.8.2009, p. 15.

<sup>3</sup>[http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Framework\\_Guidelines/FG%20on%20Electricity%20Grid%20Connections/110720%20FGC%202011E001%20FG%20Elec%20GrConn%20FINAL.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Framework_Guidelines/FG%20on%20Electricity%20Grid%20Connections/110720%20FGC%202011E001%20FG%20Elec%20GrConn%20FINAL.pdf)

extended by the letter of the Commission of 20 December 2011 till 30 June 2012 in order to allow ENTSO-E to ensure better consultation with stakeholders and to provide proper impact assessment addressing the costs and benefits of the main policy options adopted in the network code. The deadline was further extended to 14 July by the letter of the Commission of 29 June 2012.

- (3) On 13 July 2012, ENTSO-E submitted to the Agency, pursuant to Article 6(6) of Regulation (EC) No 714/2009, the Network Code for Requirements for Grid Connection Applicable to all Generators (the “Network Code”), accompanied by the following supporting documents (the “supporting documents”)<sup>4</sup>:
- Network Code “Requirements for Generators” in view of the future European electricity system and the Third Package network codes;
  - Requirements in the context of current practices;
  - Justification outlines;
  - Frequently asked questions;
  - Evaluation of comments;
  - 3<sup>rd</sup> User Group meeting on “Network Code for Requirements for Grid Connection applicable to all Generators” (NC RfG), Final Minutes.
- (4) For the assessment of the Network Code’s content in this opinion, the supporting documents were also taken into account.
- (5) The Agency acknowledges the importance of the Network Code for the security of supply, as well as the completion and well-functioning of the internal market in electricity and cross-border trade, including the delivery of benefits to customers and the facilitation of the European Union’s targets for the penetration of renewable energy sources.
- (6) Some stakeholders raised concerns about the sequence of the network codes to be developed pursuant to Article 6 of Regulation (EC) No 714/2009 and about ENTSO-E’s role, and called for a delay in adoption of this Network Code. In these respects, the Agency notes that the priority for the development of framework guidelines and network codes has been determined by the European Commission and ENTSO-E’s role is set out in Regulation (EC) No 714/2009. The Agency sees benefit in the Network Code being adopted rapidly, and this opinion is aimed at promoting a rapid enhancement of the Network Code and/or the supporting documents to facilitate the subsequent process.

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<sup>4</sup><https://www.entsoe.eu/resources/network-codes/requirements-for-generators/>



- (7) In drafting the Network Code, ENTSO-E endeavoured to involve stakeholders by holding bilateral meetings, conducting public consultations and constituting a user group opened to European-wide associations representing members who have a direct stake in the Network Code. Recognising that this was the first Network Code developed by ENTSO-E, there were aspects of this consultation process that did not work as effectively as possible, particularly due to the non-availability of the supporting documents in time for the public, web-based consultation. However, the improvements ENTSO-E made during the process, such as the involvement of distribution system operator representatives, are welcomed. The importance of stakeholder feedback on justifications and on a near-final version of the Network Code is to be emphasised.
- (8) However, there are also lessons to be learned in respect to stakeholder engagement in the process, as the input that they provided during meetings, public consultations and the user group has typically not been substantiated by quantitative data on the cost of alternative solutions on the generators' side, making ENTSO-E's task more difficult.
- (9) The Network Code is interrelated with network codes that are being developed in other areas pursuant to Article 6 of Regulation (EC) No 714/2009. It is essential that those network codes are consistent and coherent with the Network Code. In particular, the other network codes to be developed by ENTSO-E in the area of system operation pursuant to Article 8(6)(a), (d), (e) and (f) of Regulation (EC) No 714/2009 and the Framework Guidelines on Electricity System Operation (as adopted by the Agency on 2 December 2011 (FG-2011-E-0035)<sup>6</sup> should provide for efficiency and optimisation, including market-based procedures, in the use of the capabilities required from power generating facilities owners pursuant to the Network Code. Further, clear responsibilities for transmission system operators with regard to the maintaining of a stable and secure system operation in line with the Framework Guidelines on Electricity System Operation, should be defined in a measurable way.

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<sup>5</sup>[http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Framework\\_Guidelines/Framework%20Guidelines/FG-2011-E-003\\_02122011\\_Electricity%20System%20Operation.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Framework_Guidelines/Framework%20Guidelines/FG-2011-E-003_02122011_Electricity%20System%20Operation.pdf)

<sup>6</sup>[http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Framework\\_Guidelines/Framework%20Guidelines/FG-2011-E-003\\_02122011\\_Electricity%20System%20Operation.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Framework_Guidelines/Framework%20Guidelines/FG-2011-E-003_02122011_Electricity%20System%20Operation.pdf)

**HAS ADOPTED THIS OPINION:**

The Network Code submitted by ENTSO-E to the Agency on 13 July 2012 is broadly in line with the Framework Guidelines and the objectives stated therein.

The Agency commends ENTSO-E's effort to align the Network Code to the Framework Guidelines and acknowledges that the exhaustive requirements introduced by the Network Code shall help facilitate achieving the targets of the European Union on renewable energy sources and distributed generation penetration, as well as market integration, while ensuring security of supply. The non-exhaustive requirements aim at striking a balance between the principle of subsidiarity and the harmonisation objective of the network codes to be adopted pursuant to Article 6 of Regulation (EC) No 714/2009.

One of the main concerns expressed by stakeholders has been the potential for the requirements to apply to existing power generating modules. In this respect, the Agency finds that the Network Code is in line with the Framework Guidelines, and notes that the Network Code presents the clear principle that existing grid users are included only when the benefits of adopting new requirements outweigh the costs of retrospective application, and that this assessment is subject to approval by the relevant national regulatory authority.

The Agency notes that the Network Code requirements have been designed to tackle problems that are widely accepted as challenging to system operation and a potential impediment to future penetration of high levels of renewable generation. In particular, the Agency, considering the issue of high penetration of distributed power generating modules, welcomes the effort to design requirements for new grid users to address the common mode effect of these power generating modules in response to frequency related problems.

The Agency appreciates ENTSO-E's efforts to consider proportionality of requirements on grid users by classifying grid users into several types (A to D), whereby requirements get increasingly onerous for each type, means that smaller power generating modules with limited individual impact have responsibilities that are broadly commensurate with that impact. With adjustment of the boundaries between the A to D typing, it also allows for incremental tightening of the requirements over time as and when it can be demonstrated that the benefits of further responsibilities being given to new users outweigh the costs of reengineering to accommodate new capabilities. The fact that this is possible at the Member State level will allow the Network Code to be flexible to the changing demands of system operation as penetration of renewable generation increases.

Nevertheless, the Agency recognises that there is room for improvement with respect to the justifications provided in the supporting documents for the requirements introduced in the Network Code. In particular, deviations from current standards and requirements should be properly identified and assessed, as required in the Framework Guidelines, so that adequate justifications are provided when such deviations are significant.



Considering the importance of the timely adoption of the Network Code for the security of supply, as well as the completion and well-functioning of the internal market in electricity and cross-border trade, including the delivery of benefits to customers and the facilitation of the European Union's targets for the penetration of renewable energy sources, the Agency focuses its concerns in this opinion on the major issues. Improvements in these areas are required before the Agency can be satisfied that the Network Code is fully in line with the Framework Guidelines and can recommend its adoption to the European Commission. The Agency believes that the issues identified in what follows can be addressed within a few months through targeted amendments to the Network Code, by increasing the flexibility of the Network Code provisions or, where relevant, amending supporting documents, but without reopening the overall structure of the Network Code.

The Agency emphasises that the contribution of data and information from stakeholders could facilitate and speed this process up significantly and calls on stakeholders to enhance the way in which they engage in this process.

### **1. Significance test to identify “significant grid users”**

The Framework Guidelines state (section 2.1) that the network code(s) “*shall define appropriate minimum standards and requirements applicable to all significant grid users*” and that “[t]he minimum standards and requirements shall be defined for each type of significant grid user and shall take into account the voltage level at the grid user's connection point. The network code(s) shall specify the criteria and methodology for the definition of significant grid users. These shall be based on a predefined set of parameters which measure the degree of their impact on cross-border system performance via influence on control area's security of supply, including provision of ancillary services (“significance test”)”.

Article 3 of the Network Code specifies criteria and proposes a methodology for the identification of significant grid users. All grid users with a capacity of 800 W and more are considered as significant in the Network Code, with a classification into four types of power generating modules (A-D), on the basis of the capacity and the connection voltage level (above and below 110 kV). The Network Code requirements are structured along the four identified types of power generating modules, following a graded approach taking into account the cross-border impact of the significant users.

ENTSO-E has reasoned that large numbers of small power generating modules can have the same impact as one large power generating module. This point is thus used as justification for the applicability of basic level requirements to all power generating modules with a capacity of 800 W and more.

The Agency finds the technology-neutral approach adopted by ENTSO-E appropriate and acknowledges the importance of the uniform application of the requirements regardless of the generation technology. The Agency also welcomes the approach taken by ENTSO-E to differentiate the requirements dependent on size of power generating modules (type A-D). Nonetheless, the “significance test” conducted in the Network Code does not justify application to all power generating modules with capacity of 800 W and more. In particular, the justification depends on there being a material penetration of generation capacity reacting to network conditions in the same way so that the aggregate impact is significant. While this is true for some types of generation and may in the future be true for others, not all types of generation currently available to the market have high penetration levels. So, the cost implications of broader application may be important, in particular, the implications for new technologies including those at small scale. These technologies may become important for the transition to a low carbon energy sector; however at present the Network Code risks stifling innovation by imposing onerous requirements before they are justified, and potentially preventing emerging technologies from entering the market in time to contribute to the 2020 targets. However, the Agency agrees with ENTSO-E on the fact that the same requirements should generally be envisaged for all types of power generating modules as and when their penetration and aggregate reactions to network conditions in a given synchronous area become significant and that this should be set out in the Network Code so as to be predictable in advance.

The Agency therefore expects an appropriate enhancement of the significance test approach with the development of a credible methodology to take account of the identified user-significance issues. Potential solutions could encompass (but are not limited to) the extension of the already introduced de minimis principle, i.e. 800 W for type A power generating modules, to limit the Network Code application on the basis of the aggregated capacity of the generation type in a synchronous area, or through amendments – or at least further explanations - to the derogation process – e.g. open to equipment manufacturers for consideration at a coordinated pan-European level rather than limited to requests from individual power generating modules which is clearly not feasible for type A power generating modules.

## **2. Justification of the significant deviations from existing standards and requirements**

The Framework Guidelines require (section 2.1) that “[w]here the minimum standards and requirements introduced by the network code(s) deviate significantly from the current standards and requirements, there should be a cost-benefit analysis performed by ENTSO-E that justifies this deviation and demonstrates additional benefits from requiring the higher standard”.



The Network Code defines minimum standards and requirements applicable to all significant grid users, differentiated by size between types A to D. The requirements for power generating modules are categorised as:

1. Exhaustive requirements: This category comprises those requirements, which define capabilities of power generating modules by principle/methodology and by specified values of parameters. They do not require any specifications to be defined at national level.
2. Non-exhaustive requirements: This category comprises those requirements which define capabilities of power generating modules by principle/methodology only. They intentionally require further specifications to be made at national or synchronous area level, predominantly to enable the consideration of regional/national system characteristics properly.

The supporting documents provide an analysis, for the exhaustive requirements, of the present practices across Europe. This analysis aims to set a baseline (i.e. an overview of the current standards and requirements) against which the deviations of the Network Code requirements can be assessed.

The Agency acknowledges that, given the volume of requirements proposed in the Network Code, a detailed analysis of current practices across all Member States to assess deviations and then, where deviations are significant, a fully-fledged cost-benefit analysis of the impacts is a massive task. In addressing this issue, ENTSO-E has therefore taken a more general approach and in particular, has provided less detail on the requirements applying to type A and B power generating modules and for non-exhaustive requirements.

Regarding non-exhaustive requirements, whilst the Agency accepts that it is not straightforward to undertake a cost-benefit analysis to justify such requirements, it is still reasonable to expect a justification where a non-exhaustive requirement is applied to a grid user for the first time. For example, for type B power generating modules that currently have no obligation for fault ride through capability, a justification that these users should be mandated to have this new capability should be provided, in line with the respective Framework Guidelines text and regardless of the final set point that is assigned to the requirement at national level.

A certain level of deviation from current standards and requirements is an inevitable outcome of the Network Code. However, without adequate baseline and/or appropriate justifications, it is not possible to assess whether these deviations are proportionate and efficient. The Agency recognises that a comprehensive analysis would require significant time and, in the interests of minimising the delay in the adoption of the Network Code, it suggests that further analysis is restricted to the following areas of specific concern:



- 1) Requirements relating to voltage related issues at distribution level. Frequency related issues can be propagated across the entire system instantaneously regardless of voltage level, and, as such, can be seen as having cross border impact. Therefore, requirements to manage frequency issues are a legitimate candidate for this Network Code. However, the case is less clear for voltage related issues occurring at lower voltages in the distribution networks. In particular because: a) the impact is less likely to be propagated directly up to transmission level/cross border, unless many small power generating modules of the same type are affected by the regional voltage profile significantly, and b) economic and efficient actions to correct voltage related issues are likely to vary significantly between distribution system operator areas, reflecting differences in topology, local generation and demand, and approaches to network management. Given this, justification should be provided for mandating particular solutions with relation to voltage imposed directly on grid users, versus the alternative approach of mandating voltage related requirements at the transmission/distribution boundary. This justification should be provided at least for one such requirement, in Article 9(3)(a): requirement for power generating modules relating to fault ride through capability. Categorised as a non-exhaustive requirement and thus subject to national choices, it has only little justification in ENTSO-E's supporting documents. This is questionable since the requirement is not justified based on system studies and it is introduced for power generating modules of capacity that currently may not have fault ride through capability obligations.

In justifying the requirement, the first step is to establish a baseline of current requirements. Thereafter, justification should be provided confirming the cross-border character of this requirement at this voltage level and demonstrating that addressing this issue at the power generating modules' connection points (i.e. with grid users) is more cost-effective than at a network level (i.e. through the transmission/distribution interface, leaving the distribution system operator to balance the means by which stable operation is achieved). Where this assessment shows that more cost-effective solutions exist, the requirement shall be adjusted accordingly.

- 2) Article 3(6)(h), on exemption of Combined Heat Power units on industrial sites. This Article makes provision for the exemption of Combined Heat Power units whose primary purpose is to produce steam for the production processes of the industrial site. The Agency notes that there may also be industrial processes, whose output is also tightly coupled to the production of heat, and through limitation of this exemption provision to only those requiring steam, there is potential for discrimination and a lack of proportionality in the requirements. The Agency understands the need to ensure that heat-coupled processes, where the quality of heat provision is not critical (e.g. district heating requirements), are not excluded from the requirements of the Network Code. But, sufficient justification to qualify this requirement as it stands has not been provided.

The Agency suggests that ENTSO-E provides further justification for this requirement and, if needed, adjust it to address the potential for undue discrimination as described above.

### **3. National scrutiny of the Network Code's requirements to be implemented at the national level**

The Framework Guidelines require (section 1.1) that the network code(s) “*will be applied by electricity system operators and significant grid users, taking into account possible public service obligations and without prejudice to the regulatory regime for cross-border issues pursuant to Article 38 of Directive 2009/72/EC and of the responsibilities and powers of regulatory authorities established according to Article 37(6) of Directive 2009/72/EC*”.

Article 4(3), first paragraph, of the Network Code makes the determination of certain requirements under the Network Code (“terms and conditions for connection and access to networks or the methodologies to establish them”) subject to the “rules of national law implementing Article 37(6)(a), (7) and (10) of Directive 2009/72/EC”. Article 4(3), second paragraph, of the Network Code allows the establishment of terms and conditions, or their methodologies pursuant to the Network Code, by entities other than the ones specifically designated in the Network Code, in case such entities are so appointed on the basis of existing national laws on the day of entry into force of the Network Code. The Agency raises two concerns in relation to this paragraph:

- First, that it is unclear or could be unduly restrictive, particularly in relation to Article 5 of Directive 2009/72/EC;
- Second, that it does not apply to all requirements of the Network Code, giving thereby national transmission system operators the mandate to fix terms and conditions and methodologies without approval from any Member State appointed entity, or any regard to the overarching principles of transparency, proportionality and non-discrimination and without further justification<sup>7</sup>.

To address the first concern, Article 4(3) should be amended to clarify that “the rules of national law implementing Article 37(6)(a), (7) and (10) of Directive 2009/72/EC” are to be understood as the competences of national regulatory authorities to approve or fix the terms and conditions for connection and access to networks or the methodologies to establish them and, if necessary, to require amendments of these terms and conditions or their methodologies.

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<sup>7</sup> References to Article 4(3) are missing or lack clarity in the following articles of the Network Code: Articles 8(1)(b), 8(1)(c)(1), 8(1)(e), 9(3)(a)(2), 10(2)(a), 10(2)(b)(1), 10(2)(c)(1), 10(2)(c)(4), 10(2)(c)(5), 11(3)(a)(1), 15(2)(b)(1)(a), 15(2)(b)(1)(b), 15(2)(b)(2), 30(4) and Title 4.



Article 4(3) should furthermore be amended, or a separate provision be included, to the effect that, where the relevant requirements are technical, the designation of national regulatory authorities under this Network Code is without prejudice to the right of Member States to designate another national entity to be competent, pursuant Article 5 of Directive 2009/72/EC, even after the entry into force of the Network Code. Therefore, Article 4(3), second paragraph, should be deleted.

To address the second concern, it is suggested that Article 4(3) is amended so that it has overall applicability to the entire Network Code, to ensure that all instances of national transmission system operators undertaking the fixing of terms, methodologies etc. are covered by this requirement.

Finally, regarding the monitoring of the definition of the exact requirements and/or criteria which will be determined at the national level based on all non-exhaustive requirements falling within the monitoring tasks of ENTSO-E pursuant to Article 8(8) of Regulation (EC) No 714/2009, the Agency suggests that such requirements/criteria for all EU countries are published on the ENTSO-E website and requests that this is clarified, either in the Network Code or otherwise by ENTSO-E.

#### **4. Recovery of Costs incurred by TSOs and DSOs**


The Framework Guidelines state that national regulatory authorities shall ensure, that, whatever the cost-sharing scheme is, the cost split follows the principles of non-discrimination, maximum transparency and assignment to the real originator of the costs.

Article 5 of the Network Code states that 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.

The Agency considers that this Article goes beyond the scope envisaged in the Framework Guidelines for treatment of costs by any parties. Considering the subsidiarity principle, the deletion of this Article from the Network Code is accordingly suggested.

Done at Ljubljana on 13 October 2012.

For the Agency:

  
Alberto Pototschnig  
Director



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