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**OPINION OF THE AGENCY FOR THE COOPERATION OF ENERGY  
REGULATORS No 07/2017**

**of 20 March 2017**

**ON THE ENTSOS' DRAFT CONSISTENT AND INTERLINKED  
ELECTRICITY AND GAS MARKET AND NETWORK MODEL**

THE AGENCY FOR THE COOPERATION OF ENERGY REGULATORS,

HAVING REGARD to Regulation (EU) No 347/2013 of the European Parliament and of the Council of 17 April 2013 on guidelines for trans-European energy infrastructure and repealing Decision No 1364/2006/EC and amending Regulations (EC) No 713/2009, (EC) No 714/2009 and (EC) No 715/2009<sup>1</sup>, and, in particular, Article 11(8) thereof,

WHEREAS:

- (1) On 21 December 2016, the European Network of Transmission System Operators for Electricity (hereinafter referred to as “ENTSO-E”) and the European Network of Transmission System Operators for Gas (“ENTSOG”) jointly submitted to the Agency for the Cooperation of Energy Regulators (“the Agency”) a proposal for a consistent and interlinked electricity and gas market and network model (the “Submitted Model”) pursuant to Article 11(8) of Regulation (EU) No 347/2013.
- (2) The Submitted Model shall be drawn up in line with the principles laid down in Annex V to Regulation (EU) No 347/2013 and shall include both electricity and gas transmission infrastructure, as well as gas storage and liquefied natural gas (LNG) facilities, covering the energy infrastructure priority corridors and areas.
- (3) The Submitted Model, as a future part of ENTSO-E’s and ENTSOG’s cost-benefit analysis (CBA) methodologies, shall allow the application of CBA and its verification by various parties, including ENTSO-E, ENTSOG, electricity and gas project promoters, the Agency, National Regulatory Authorities and the European Commission<sup>2</sup>.

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<sup>1</sup> OJ L 115, 25.4.2013, p. 39.

<sup>2</sup> The CBA methodologies, and therefore the Submitted Model to be included in the methodologies, must be applied at least in the following instances:

- Pursuant to Article 11(1) and Article (21)(1)(b) of Regulation (EU) No 347/2013, to the Ten-year Network Development Plan for electricity (TYNDP-E);
- Pursuant to Article 11(1) and Article(22)(1)(a) of Regulation (EU) No 347/2013, to the Ten-year Network Development Plan for gas (TYNDP-G);
- Pursuant to Annex III(2)(1) of Regulation (EU) No 347/2013, to candidate projects of common interest (PCI) having reached a sufficient degree of maturity;
- Pursuant to Article 12(3) of Regulation (EU) No 347/2013, to PCIs for which at least one project promoter requests the relevant national authorities to apply Article 12;

(4) The Agency expressed its views in its communication to the ENTSOs of 7 June 2016<sup>3</sup>. In particular:

- the Submitted Model, as part of the CBA methodologies, shall be used, once available, for the preparation of the electricity and gas Ten-Year Network Development Plans (TYNDPs);
- pursuant to Article 11(6) of Regulation (EU) No 347/2013, the CBA methodologies shall be updated and improved regularly. As the Submitted Model will, once approved, be a part of the CBA methodologies, the Agency understands that the Submitted Model shall also be updated and improved regularly;
- as the TYNDPs shall be adopted every two years, the Agency understands that the inputs and the modelling for the TYNDPs will be updated and improved by the ENTSOs as part of this process;
- the Agency does not see benefits in a single electricity and gas network representation, joining electrical grids and gas transmission grids, storage and regasification facilities, since these grids and facilities operate on different physical laws and thus have low interdependence. Therefore, the networks could be modelled separately by relevant specific representations as applicable to electrical grids and gas facilities;
- the modelling of electricity and gas markets, on the other side, is characterised by a higher interdependence, particularly due to the interaction between the price formation processes for gas and electricity<sup>4</sup>, as well as to the interaction of electricity and gas infrastructure developments;
- Annex V to Regulation (EU) No 347/2013 lays down the principles for the Submitted Model and identifies some specific features. More generally, the Agency noted that a model is not only a mathematical description of the system in order to analyse its behaviour, including exogenous (model input) and endogenous (model output) variables, constants, equality and inequality constraints and, for optimisation problems, an objective function, but also requires a full formal description of the model in a proper document;
- therefore, the Agency considered as basic elements of the model the precise specification of the input data set necessary to run the model and of the output data set generated by the model, duly accompanied by the formal description of the

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- Pursuant to Article 13(2) of Regulation (EU) No 347/2013, to PCIs to which incentives referred to in Article 13(1) are granted.

<sup>3</sup> Cf. “ACER views on a consistent and interlinked electricity and gas market and network model: An opportunity to improve the Ten Year Network Development Plans beyond 2017”.

[http://www.acer.europa.eu/Official\\_documents/Other%20documents/ACER%20views%20on%20a%20consistent%20and%20interlinked%20electricity%20and%20gas%20market%20and%20network%20model.pdf](http://www.acer.europa.eu/Official_documents/Other%20documents/ACER%20views%20on%20a%20consistent%20and%20interlinked%20electricity%20and%20gas%20market%20and%20network%20model.pdf).

<sup>4</sup> For example, due to the presence of price and demand cross-elasticity effects, as well as to direct price formation effects in instances where a fuel is used to generate or produce another fuel or electricity (for example, the direct effect of an increase of the price of gas on the cost - and eventually on the offering price - of electricity produced at gas-fired power plants).

- algorithms which allow the processing of the input data and the generation of the output data;
- the cross-sectoral influence of gas and electricity projects should be modelled adequately, as well as the mutual effects;
  - a consistent set of input data and model outputs should be defined where applicable (e.g. volumes of gas consumption due to electricity generation per country, power-to-gas installations if applicable), together with a proper communication between the two ENTSOs of all relevant information (thus ensuring consistency and interlinks between their modelling activities);
  - regarding the transparency and description of the basic elements of the Submitted Model, the Agency stated its expectations regarding:
    - the full availability and transparency of ENTSOs' data sets, namely specifying all input variables needed to run the Submitted Model and the output variables generated by the Submitted Model, further expanding existing ENTSOs' practices where applicable. The delivered data sets shall be comprehensive, so that interested parties are enabled to build up and run similar studies for themselves;
    - a comprehensive description of the assumptions, documentation of input data sources, input data acquisition and processing algorithms. The description should include the necessary information about the chosen parameters and algorithms and, in particular, the reasons for such choices,

HAS ADOPTED THIS OPINION:

1. The Agency emphasises that the Submitted Model should have been properly described, including in formal mathematical terms where applicable, documented and made available in full to the interested stakeholders. Therefore, as a first step towards transparently available documentation, the Agency intends to publish the Submitted Model once it has ensured that there are no legal obstacles to its publication.
2. The Submitted Model (page 4) indicates that "*the Model, once approved by the European Commission, will be included in the CBA Methodologies which shall be applied for the preparation of each subsequent TYNDPs to be developed by the ENTSOs*". The overview of the Submitted Model (pages 5-6) is similarly limited to the framework of the TYNDP processes. However, the Submitted Model (page 12) also indicates that "*Application of the CBA Methodologies including the Model benefits the PCI process*" and "*(...) can benefit the Investment Requests, performed for mature projects under Art 12 of Regulation 347/2013*". The Agency considers that this reference to the PCI selection and investment request processes should be added to the legal requirements and the overview of the Submitted Model before its approval and making it part of ENTSO-E's and ENT SOG's CBA methodologies as referred to in recital (3) of this Opinion.

3. The Agency appreciates the “Overview of the electricity and gas input data” provided in the Submitted Model (page 10), the description of the scenario development process (pages 6-8) and the steps intended to assure the consistency of the scenario data.
4. Section 3.4.2 aims at explaining the interlinkage in the Submitted Model. According to the ENTSOs, “*the gas and electricity sectors interact in (...) three ways*” which are “*part of the scenarios developed for the TYNDPs*” and represent: a) the electricity generation from gas, b) the split of gas and electricity consumption for a number of usages where both are substitutable for each other, and c) power-to-gas, i.e. the conversion of electrical power into gas.

The Agency is of the view that this level of interlinkage between the modelling of the electricity and gas sectors is insufficient, and that - before the approval of the Submitted Model – consideration should be given as to whether the following interlinkages are relevant and should be included:

- the interaction of the price formation process for the gas and electricity sectors;
- the interaction (potential competition and synergies) of electricity and gas infrastructure developments;
- the cross-sectoral influence of gas and electricity projects<sup>5</sup>.

If certain interlinkages are deemed relevant but not feasible for inclusion within an interlinked model by the ENTSOs, a pattern for future improvements should be presented in the amended version of the Submitted Model, so that such interlinkages could also be captured.

5. Narrative descriptions of the basic features of the ENTSOG and ENTSO-E network and market tools are provided in the Annexes to the Submitted Model. According to the ENTSOs, the Submitted Model (page 11) “*does not cover the actual tools that are used in the sector-specific assessments, as the tools can be improved for each new TYNDP edition, without affecting the CBA methodologies or the Model applied when developing the TYNDP. The ENTSOs recognise the importance of these tools for the project assessments. ENTSOs commit to be transparent on the tools used within the TYNDPs*”. The Agency appreciates ENTSOs’ commitment to transparency, but notes with disappointment that the tools are only described in principle. The Submitted Model (or its Annexes) - before its approval - should be expanded to provide due details, including a formal description of the objective functions, constraints and other elements, of the tools, as already indicated in the Agency’s letter of June 2016, and also in view of the non-TYNDP applications of the CBA methodology by various parties, including ENTSO-E, ENTSOG, electricity and gas project promoters, the Agency, National Regulatory Authorities and the European Commission as indicated in recital (3) of this Opinion.
6. According to the Submitted Model (page 11), “*the CBA assessments build on the following tools: i) a gas market and network simulation tool, ii) an electricity market simulation tool and iii) an electricity network simulation tool*”. The Agency is of the view that the

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<sup>5</sup> For example, the influence of the location of gas-fired power plants on the location and the sizing of gas infrastructure elements (pipelines, compressor stations, UGS, LNG facilities), and vice versa.

envisaged “gas market and network simulation tool” is only a gas market tool, as it does not foresee a relevant physical representation of the gas network. Separate gas network simulation tool and gas market simulation tool should be clearly defined in the Submitted Model, before its approval. Although both networks would be modelled separately in such an interlinked model, it should contain relevant network interlinks in order to guarantee consistent model-run outcomes, such as, for example, the location of gas-fired power plants.

7. In the light of the above, the Agency finds that the Submitted Model:
  - (a) is largely inadequate, especially due to the missing fundamental elements, namely the specifications of the input data set to run the Model, the endogenous variables, and the output data set generated by the Submitted Model, duly accompanied by the algorithms of the Submitted Model and their formal description;
  - (b) is limited in its ability to capture interlinkages, as just 3 elements are interlinked.
8. For the above reasons, the Agency advises the Commission not to approve the Submitted Model, nor to include it in the CBA methodologies, until such time when the ENTSOs make available the respective lacking elements and interlinkages.
9. The Agency invites ENTSO-G and ENTSO-E to take due account of the above recommendations before providing a complete<sup>6</sup> and amended<sup>7</sup> Model for approval to the Commission.
10. This Opinion is addressed to Member States and the European Commission.

Done at Ljubljana on 20 March 2017.

For the Agency:

  
Alberto Pototschnig  
Director

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<sup>6</sup> According to points 4, 5 and 7 of this Opinion.

<sup>7</sup> According to points 2 and 6 of this Opinion.



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