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**OPINION OF THE AGENCY FOR THE COOPERATION OF ENERGY
REGULATORS No 11/2015**

of 20 October 2015

**ON THE DRAFT TEN-YEAR NETWORK DEVELOPMENT PLAN 2015
SUBMITTED BY ENTSOG**

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 Regulators¹ (hereinafter referred to as “the Agency”), and, in particular, Article 6(3)(b) thereof,

HAVING REGARD to Regulation (EC) No 715/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the natural gas transmission networks and repealing Regulation (EC) No 1775/2005² and, in particular, Articles 8(3)(b) and (10) and 9(2) thereof,

HAVING REGARD to the favourable opinion of the Board of Regulators of 13 October 2015, delivered pursuant to Article 15(1) of Regulation (EC) No 713/2009,

WHEREAS:

- (1) Pursuant to Article 8(3)(b) of Regulation (EC) No 715/2009, the European Network of Transmission System Operators for Gas (hereinafter referred to as “ENTSOG”) shall adopt a non-binding Community-wide ten-year network development plan (hereinafter referred to as the “TYNDP”), including a European supply adequacy outlook, every two years;
- (2) Pursuant to Article 9(2) of Regulation (EC) No 715/2009, ENTSOG shall submit the draft TYNDP, including the information regarding the consultation process, to the Agency for its opinion;
- (3) On 23 July 2015, ENTSOG submitted the draft TYNDP 2015 to the Agency for its opinion;
- (4) On 27 July 2015, the Agency received a Corrigendum of the draft TYNDP 2015 dated 17 July 2015 and applicable to the printed copy of the TYNDP 2015;
- (5) The Agency assessed the draft TYNDP 2015 on the basis of the following main criteria:
 - (i) the TYNDP's essentials specified in Article 8(10) of Regulation (EC) No 715/2009,

¹ OJ L 211, 14.8.2009, p. 1.

² OJ L 231, 28.8.2009, p. 16.

as amended by Article 22 of Regulation (EU) No 347/2013 and (ii) the objectives set out in Article 6(3)(b) of Regulation (EC) No 713/2009 and Article 9(2) of Regulation (EC) No 715/2009,

HAS ADOPTED the present Opinion on ENTSOG's draft TYNDP 2015, with the following comments and guidance, in particular regarding:

- i) The important role of the TYNDP as reinforced by Regulation (EU) 347/2013;
- ii) The improvements of the draft TYNDP 2015 compared to the TYNDP 2013-2022;
- iii) The identification of the main areas where improvements may still be due or advantageous.

1. The process of establishing the TYNDP 2015 in consultation with stakeholders

The Agency appreciates the consultations and stakeholder interactions which took place during the preparation of the TYNDP through a series of workshops and working sessions organised by ENTSOG:

- Kick-off Stakeholder Joint Working Session (SJWS) on TYNDP and cost-benefit analysis (CBA) methodology on 22 January 2014;
- 2nd SJWS on TYNDP and CBA methodology on 18 February 2014;
- 3rd SJWS for the development of TYNDP and CBA methodology on 5 March 2014;
- 4th SJWS for the development of TYNDP and CBA methodology on 27 March 2014;
- 5th SJWS for the development of TYNDP and CBA methodology on 30 April 2014;
- Final SJWS for the development of TYNDP and CBA methodology on 13 May 2014;
- 9th TYNDP/CBA Workshop 26 June 2014;
- 10th TYNDP/CBA Workshop in Athens on 19-20 May 2015³.

The TYNDP for public consultation and its accompanying Annexes were released by ENTSOG on 16 March 2015. The release was followed by the following documents:

- TYNDP 2015 Consultation Document (31 March 2015);
- European Commission request to consider new projects in South-East Europe, further mitigating the withdrawal of South Stream (1 April 2015);
- Addendum to Annex A – infrastructure projects (29 June 2015);
- Corrigendum of TYNDP 2015 (17 July 2015);

³ The workshop numbering is ENTSOG's.

- TYNDP 2015 Consultation Analysis, accompanied by responses received during the consultation (23 July 2015, the day on which the draft TYNDP was submitted to the Agency).

The Agency notes that the preparation of the draft TYNDP 2015 was affected by circumstances beyond ENTSOG's control, which necessitated an unplanned round of additional work and corrections of the draft TYNDP.

Following the publication of the TYNDP 2015 for consultation on 16 March 2015, ENTSOG conducted a public consultation from 31 March to 5 June 2015, during which nine responses were received. ENTSOG provided an analysis of the responses to the public consultation in a separate document, which was posted on ENTSOG's web site. The Agency concurs with the views expressed in the analysis that stakeholders see the need for a clearer expression of the objectives of the TYNDP, as well as a simplification and improvement of the assessment methodology, which, even though comprehensive, is seen as too complex. The Agency notes that stakeholders who participated in the consultation have disparate views regarding the definition of supply scenarios and that the improvement of scenarios is one of the key directions for the enhancement of the next TYNDP (*cf.* Section 2.5).

The Agency appreciates that ENTSOG conducted a public consultation on the TYNDP and that it provides an analysis of the responses to the public consultation. However, the Agency questions ENTSOG's approach, whereby it analyses the received responses in a separate document without modifying the draft TYNDP itself. This approach may also be a reason for the absence of significant interest in providing views during the public stakeholder consultation, as stakeholders know that their views will not be reflected in the current TYNDP.

The Agency therefore invites ENTSOG to properly consider all comments received via all channels, including through workshops, mail, and other means, as well as the public consultation online forms and tools, in order to increase public interest in the development of the TYNDP. In this respect, the Agency suggests that ENTSOG publishes the minutes of the various TYNDP preparation workshops on a regular basis to facilitate a continuous involvement of stakeholders.

Furthermore, the Agency notes that NRAs should have the opportunity to support the process by preventing the use of any potentially incorrect or misleading information in the TYNDP. In particular, the Agency notes that potential barriers to investment are only assessed from the viewpoint of the TSOs, which may raise concerns about the objectivity of the assessments⁴.

The Agency considers it essential that ENTSOG releases the final version of the TYNDP with the views, advice and guidance of the Agency and other stakeholders taken into account, rather

⁴ *Cf.* ERU comments on the issue sent by email to ENTSOG on 5 June 2015, concerning Annex A, barriers to investment regarding projects TRA-N133, TRA-N-135, TRA-N-136. ENTSOG published and assessed only responses received via the online consultation form, which ERU could not use due to technical issues with downloading the form. In the Analysis of the responses to the public consultation (p. 1), ENTSOG points out that a response has been received from ERU, that nine responses have been received, and that one of them is explicitly dedicated to a statement made by a project promoter in Annex A and not answering directly to the consultation questionnaire.

than pursuing the current approach in which the TYNDP is considered a *fait accompli* even before the Agency provides an opinion on it.

The Agency urges ENTSOG to release the final TYNDP only after duly considering stakeholder feedback and the Agency's Opinion on the TYNDP.

2. Criteria and methodology for establishing the TYNDP 2015

In the view of the Agency, an appropriate cost-benefit analysis (CBA) methodology is of the utmost importance for the selection of PCIs and therefore also for the TYNDP. In the following sections the Agency presents its detailed opinion on different aspects regarding the applied methodology.

2.1. Missing cost dimension

The Agency notes that ENTSOG had adopted a methodology according to which the Energy System-Wide Cost-Benefit Analysis (ESW-CBA) focuses on quantifying merely project benefits and not project costs⁵. Furthermore, according to ENTSOG, "*investment costs are in many cases commercially sensitive, which is the reason why this information is not mandatory for inclusion within the TYNDP. The number of projects for which this information is available in Annex A is too low to draw any conclusion on the overall value of investment projects proposed by promoters*"⁶.

The Agency is of the view that carrying out any kind of CBA, be it energy system-wide or project-specific, without cost information is a *contradictio in terminis* and is not in line with the TYNDP essentials defined in Regulation (EC) 715/2009⁷. The Agency draws the attention of ENTSOG to the fact that the *TYNDP 2014 prepared by ENTSO-E does take into consideration cost information and considers cost as a minimum requirement for including the project in the TYNDP*. The Agency notes that the present modality of the CBA applied by ENTSOG, whereby ENTSOG provides details on the benefits of the projects and allows for costs to be taken into consideration at a later stage, leaves the door open to potential inconsistencies due to the provision of costs information for PCI candidates only, the different timing of the provision of the information about the benefits and the costs, and the completion of the CBA for the various projects at a different moment in time by different entities under different processes. The Agency encourages ENTSOG to follow ENTSO-E's example and work more closely with project promoters and other stakeholders to resolve any issues regarding cost information which may arise because of commercial sensitivities.

Moreover, the Agency is of the view that cost data are essential for assessing the projects at the different implementation stages (initial consideration, pre-feasibility and feasibility studies, network planning, submission of investment request, etc.), and that credible indicative cost information for mature technologies, such as the ones deployed in the assets of the majority of gas infrastructure projects, is readily available from a number of open sources. The Agency recalls that Point 5 of Annex V of Regulation (EU) 347/2013 requires to at least take into

⁵ TYNDP 2015, p. 133.

⁶ *Ibid.*, p. 26.

⁷ Article 8(10)(a), as amended by Article 22 of Regulation (EU) No 347/2013 : "*[...]; it shall be the subject to a cost-benefit analysis using the methodology established as set out in Article 11 of that Regulation*".

account in the CBA the following costs: capital expenditure, operational and maintenance expenditure over the technical lifecycle of the project, and decommissioning and waste management costs, where relevant.

Furthermore, the Agency questions the consistency of the approach used by ENTSOG not to determine the expected duration of the technical lifecycle of assets in the CBA methodology. It therefore calls on ENTSOG to provide guidelines in order to avoid using divergent and non-justified technical lifecycle durations for comparable assets, an approach which may lead to an incorrect assessment of the cost and the cost-benefit ratio of projects⁸.

The Agency notes that ENTSOG may use, for the future TYNDPs, the unit investment cost indicators and the corresponding reference values⁹ developed by NRAs cooperating in the framework of the Agency in compliance with Article 11(7) of Regulation (EU) 347/2013,¹⁰ to complement the primary cost information provided by project promoters.

The Agency recommends to ENTSOG and all stakeholders to make sure that cost information for each project is submitted to ENTSOG and included in future TYNDPs on a project-per-project basis, similar to what is already done in the electricity TYNDP. The Agency also suggests that for each TYNDP project, relevant reference cost value(s) be published by ENTSOG alongside the project promoter's actual cost estimate.

2.2. Economic evaluation of benefits

The Agency notes that ENTSOG's assessment methodology uses monetised indicators¹¹ for the benefits associated with the expected scenarios for developments, but that not all benefits are always duly considered¹².

The Agency is of the view that the insufficient monetisation of the expected benefits (coupled with the lack of cost data) makes it impossible to assess whether the benefits of a system development scenario or of a certain project exceed its cost, an outcome which may render the entire CBA largely inconsequential.

The Agency considers that project benefits and risks related to short-term scarcity of gas due to peaks in gas demand under uninterrupted supply and the ones related to curtailed gas consumption due to a longer-term disrupted gas supply are of a completely different nature. Therefore, they should be treated separately in the next TYNDP, so that the relevant infrastructure gaps can be properly identified according to the nature of the risk.

⁸ E.g., a twelve-year re-investment cycle for compressor stations, which is not in line with the applied regulatory praxis, leads to higher expected costs and thus to a less favourable cost-benefit ratio.

⁹ I.e. at least average and median, without excluding ranges and other indicators, where available.

¹⁰ http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/UIC%20Report%20-%20Gas%20infrastructure.pdf

¹¹ For example, the EU gas bill, the Gas Price Index (GPI) calculated as a proxy for the gas bill per unit of gas demand, and a discounted indigenous gas production price reflecting the producers' benefits materialised within Europe.

¹² For example, the benefits of market integration and of security of supply (avoided cost of gas disruption) appear to be missing from the TYNDP's CBA.

Furthermore, the Agency notes that ENTSOG evaluates the benefits of a project in terms of social-economic welfare, such as the reduction of the total EU gas, coal and CO₂ bill. The Agency recommends that ENTSOG develop this approach by also reflecting on the distinction between the notions of producers' surplus and consumers' surplus, which are of particular relevance given that most of the EU gas supplies are imported from outside the EU.

The Agency strongly recommends to ENTSOG to introduce the necessary amendments to its work procedures and analytical methods as applied to the TYNDP and CBA at all levels, in order to improve the monetisation of benefits and to enable the proper comparison of costs and benefits ascribed to a system development pathway or to a particular project.

The Agency urges ENTSOG to develop a robust methodology for the sufficient monetisation of all benefits expected to be realised by the projects, in line with Regulation (EU) No 347/2013 and in a manner consistent with the CBA of PCIs¹³, and recalls the Agency's Opinion No. 04/2014 on ENTSOG's draft CBA methodology.

2.3. Ways to improve the coordinated delivery of the TYNDP and PCI-related work, including CBA

The Agency welcomes ENTSOG's intention announced in its draft Annual Work Programme 2016 for the integrated delivery of the next draft TYNDP and the CBA methodology in the third quarter of 2016. The Agency stresses the need to improve the entire TYNDP as outlined in this Opinion, as well as the CBA methodology as described in the Agency's Opinion No. 04/2014.

The Agency notes that such anticipatory delivery of the next TYNDP and improved CBA methodology will contribute to the streamlining of the third PCI list process foreseen in 2017, given that the PCI candidates have to be included in the latest TYNDP.

Furthermore, the Agency repeats its readiness to contribute to a revision of the overall TYNDP process which also leads to the union list of PCIs, by taking into account the lessons learnt since the adoption of Regulation (EU) 347/2013.

2.4. Utility delivered by the TYNDP to stakeholders: identification of infrastructure gaps

The Agency notes that the TYNDP has to meet in a balanced way the expectations of the TSOs and of the other stakeholders participating in or affected by various aspects of the gas network planning, such as policy makers, NRAs, market participants. In particular, the TYNDP should ensure greater transparency regarding the development of the gas transmission network in the European Union. In this respect, the Agency recalls the increasing importance of the TYNDP in the PCI selection process since 2013, as inclusion in the TYNDP is a prerequisite for gas projects to be considered for subsequent PCI lists.

The Agency notes that in the view of ENTSOG the main analytical task of the TYNDP is "identifying a potential future range of scenarios", without, however, ascribing any practical meaning to the indicator values used for the purpose, but their "*evolution over time and from one infrastructure scenario compared to another*"¹⁴. ENTSOG explicitly states that "*there is no*

¹³ Cf. Regulation (EU) No 347/2013, Recital (36) and Article 4(1)(b).

¹⁴ TYNDP 2015, p. 133.

threshold defined for most indicators and this prevents the absolute definition of infrastructure gaps” since it believes that “defining a threshold level for triggering investment is beyond the remit of TSOs and ENTSOG”¹⁵. According to this approach, ENTSOG provides results (the TYNDP, in essence), as illustrations of the main trends in the evolution of the European network, with information on possible future projects in Annex A, a description of the modelling approach in Annex E and indicators and a financial analysis in Annex F to the TYNDP.

The Agency concurs with ENTSOG’s view that defining a level of investment need for triggering an investment is beyond the remit of TSOs and ENTSOG. Investment decisions should, in the view of the Agency, be left to investors and, where part of the costs are expected to be socialised, to the authorities deciding on investments. However, the Agency disagrees with ENTSOG’s view that it is not ENTSOG’s task to identify infrastructure gaps and recalls that under Article 8(10)(c) of Regulation (EU) 715/2009 ENTSOG’s tasks include, *inter alia*, that the Community-wide TYNDP shall identify infrastructure gaps, notably with respect to cross-border capacities. Moreover, the TYNDP 2015 can be seen as a “bottom-up” collection of projects which may or may not deal with investment needs, rather than a “top-down” network plan which would first identify bottlenecks and infrastructure gaps and subsequently link the gaps to the relevant projects. In fact, a combination of both approaches is needed.

The Agency is of the view that in its current form the draft TYNDP 2015 is too complex, i.e. provides a large volume of data without allowing stakeholders to clearly understand the needs that can be addressed by each given project, especially due to the absence of an analysis of the necessity of a project with respect to solving identified bottlenecks. Also, an analysis of the projects regarding their feasibility, maturity or ability to meet the basic criteria of Regulation (EU) 347/2013 is missing. In line with the essentials of Regulation (EU) 347/2013 as well as Regulation (EC) 715/2009, the Agency recommends that ENTSOG in the next TYNDP:

- Depending on the scenarios, identifies and quantifies the bottlenecks and infrastructure gaps which are barriers to market integration, security of supply, competition and sustainability, in particular at cross-border points between Member States; or in terms of additional entry capacities from gas storage and LNG facilities;
- Determines to what extent the TYNDP projects contribute to alleviate and remove those infrastructure gaps.

The Agency urges ENTSOG to fully complete the task of identifying infrastructure gaps in the next TYNDP, especially with respect to cross-border capacities. It should use the infrastructure gap indicators to assess the urgency of the investment in the practical rather than the abstract setting of the development of the European gas transmission system, i.e. to what extent the infrastructure gap is a barrier to market integration, security of supply, competition or sustainability. The Agency recommends that once the infrastructure gaps are identified and their urgency is described, ENTSOG should evaluate the degree to which the TYNDP projects serve the goal of closing the identified infrastructure gaps at the European level.

¹⁵ Ibid.

2.5. Data and treatment of uncertainty

2.5.1. Data collection and assessments

The Agency acknowledges the need for accurate, complete and up-to date information as a prerequisite for the preparation of the TYNDP and the assurance of its relevance and trustworthiness. The Agency welcomes ENTSOG's endeavours to improve the data collection process and to seek stakeholder feedback.

The Agency finds ENTSOG's approach appropriate, whereby it includes in the TYNDP only projects for which data has been actively submitted by project promoters via ENTSOG's Data Portal, on a non-discriminatory basis given that the Portal is permanently open to all project promoters. However, the Agency notes that, for the sake of enabling consistent and fair treatment of all submissions by project promoters, ENTSOG should clearly define a "gate closure" date for the data to be used in the development of the TYNDP.

The Agency recommends that future TYNDPs include a cross-reference map of the investment codes in the TYNDP and in the relevant national development plans (NDPs). In case a TSO or project promoter submits projects to ENTSOG which are not part of the relevant NDPs, that TSO or project promoter shall provide a well-founded reasoning, keeping in mind the provisions of Article 8 of Regulation (EC) No 715/2009, pursuant to which "the Community-wide network development plan shall [...] build on national investment plans". The cross-referenced codes would enable the Agency to examine without doubt to which extent the TYNDP is built on NDPs as required by Article 8(10)(a) of Regulation (EC) 715/2009, without prejudice to other Community aspects of the network planning at the European level.

ENTSOG collected project information from project promoters for the purpose of the TYNDP by using standard data items as specified in Annex A to the TYNDP. The Agency notes that several important data categories are missing, notably: data about the cost of the projects; the investment needs, notably with respect to cross-border capacities, the stakeholders potentially concerned by the project during consultations under Article 10(1) of Regulation (EC) No 715/2009, and the presence of the identification code of the project or investment in the national development plan. The Agency invites ENTSOG to take these categories of data into account for the purpose of the next TYNDP.

On the other hand, the different tabs in the Annexes contain several duplications of information, which results in a voluminous Annex where it is difficult to get an overview of the information. Therefore, further streamlining of data collection is appropriate. In this respect, for the purpose of the PCI selection, it is necessary that ENTSOG foresees a verification of consistency (e.g. whether the information on two sections of one interconnector located in two different countries is consistent) and include highlights on how the verification in the TYNDP background information was performed.

Furthermore, ENTSOG used, for the purpose of modelling and analyses, information grouped under the heading of "country profiles" obtained from various sources. The information is available in Annex B of the TYNDP. The Agency invites ENTSOG to explore the usefulness of also collecting and using data about the sub-sector breakdown of gas demand at country level (such as industry, residential and commercial), as well as the absolute (own) and relative (vs.

other fuels) price of gas, and to assess whether such information could be used for the development of better informed gas demand scenarios and in assessments of security of gas supply.

Annex C1 contains the aggregated results of gas demand analyses on Member State level, and is in this sense “derived data” which is dependent on the information in Annexes C2 through C4 and the models adopted for the analyses. The Agency notes that there is no indication about the factors to which the reported levels of gas demand are sensitive and invites ENTSOG to assess and report on the respective sensitivities.

Regarding the gas demand outlook, ENTSOG uses demand in the residential, commercial and industrial sectors as provided by TSOs under two scenarios, differentiating favourable and non-favourable economic and financial conditions. Gas demand scenarios for power generation are based on data sourced from ENTSO-E’s TYNDP 2014, Vision 1 “Slow Progress” and Vision 3 “Green Transition”. ENTSOG has considered other demand scenarios using data from the European Commission, Eurogas, the International Energy Agency (IEA) and others, as reported in Annex C2 of the TYNDP. The Agency notes that gas demand data collected by ENTSOG from TSOs for the purpose of preparing the TYNDP should be consistent with the gas demand outlook used for preparing national development plans. The Agency finds the information contained in Annex C2 adequate for the purposes of the TYNDP, but notes that the data set could benefit from a list of factors to which future gas demand is particularly sensitive.

Annex C3 dwells specifically on historic and projected gas demand for power generation, on a per-Member State basis and by taking into account a number of assumptions, such as the energy mix in power generation, daily power demand on a seasonal basis, load factors, thermal efficiency of gas use in power generation, etc. The Agency finds that the data used in Annex C3 is sufficiently detailed and credible and that the data contains relevant links to ENTSO-E data.

Gas supply data (2014-2035) is provided by ENTSOG in Annex C4 of the TYNDP on per-source basis (imports and domestic production), whereby LNG is considered as “one” source despite the diversification which LNG provides. No distinction is made in the data by entry point from a given source (all gas from a source is considered as imports / available to all of Europe regardless of the actual route of supply). The information originates from a variety of sources, such as Ministries, LNG terminal operators, research institutes and individual researchers.

The Agency invites ENTSOG to provide a more detailed breakdown of the expected future sources by origin and entry point (i.e., by existing and proposed route) in the future TYNDPs, together with historical information from recent years.

Annex D contains gas supply infrastructure data, namely the capacities of existing and planned interconnection points and other facilities, with a breakdown by year based on the actual or expected year of commissioning, which constitutes, in the view of the Agency, part of the core of a network development plan. The Agency notes that data about projects expected to be commissioned in the future should be used along with other data about the same project, such as its degree of maturity, the permitting status, etc., to allow for a more detailed, robust and realistic analysis of the future scenarios of available capacities in comparison with the currently

used one, which makes a distinction only between FID and non-FID projects and “high” and “low” infrastructure scenarios.

2.5.2. Definition and use of scenarios

The Agency notes that the primary way of dealing with uncertainty in the TYNDP, especially regarding prices, demand, and supply, is the use of scenarios. Uncertainty is accounted for by ENTSOG in the context of the current energy policies, especially regarding the environmental benefits of gas as the cleanest fossil fuel and the parallel development of coal and renewable power production, a situation that results in a significant uncertainty about the future role of gas in Europe. Specifically regarding gas demand, the Agency notes that in order to assess a wide range of uncertainties, ENTSOG has considered different settings for each of the main parameters influencing gas demand, but that ultimately only two of the possible combinations of the parameters have been chosen, resulting in only two scenarios being considered: the “green” and the “grey” scenario.

The Agency appreciates ENTSOG’s efforts in contemplating a wide range of parameters. However, the Agency recommends ENTSOG to consider public workshops, also involving upstream and downstream industry, research and academia experts, well in advance of the determination of the scenarios in the next TYNDP.

The Agency recommends ENTSOG to consider the use of scenarios which would be based firstly on physical flow patterns hypotheses. In order to assess the monetised benefits of a project, price spread hypotheses could then be used. In this respect, the Agency recommends that greater attention is paid to the way in which the price scenarios are defined, notably by taking into account the fundamental differences in the price formation processes between gas supply sources (e.g., long-term contracts and spot markets, oil-indexed and hub-indexed contracts, etc.).

ENTSOG should also strive to provide in the TYNDP guidelines regarding those price scenarios in the TYNDP which are most relevant for the assessment, i.e. would be most relevant for the identification and quantification of infrastructure gaps and the valuation of projects.

Regarding infrastructure development scenarios, the Agency finds that the main way in which the uncertainties related to the implementation schedule of the projects are tackled is the determination of different scenarios based on the FID and non-FID and the PCI and non-PCI status of the projects. The Agency welcomes the use of infrastructure scenarios, but recommends the consideration in such scenarios of the maturity of the projects, considering the main milestones of project development (e.g. pre-feasibility studies, feasibility studies, permitting, etc. - *cf.* Section 2.6).

The Agency recommends that ENTSOG carry out a robust determination of scenarios, in line with scenarios used in the preparation of gas infrastructure national development plans and with electricity sector scenarios. This task must be completed sufficiently in advance of the development of the next TYNDP by ENTSOG, which is currently expected, according to ENTSOG’s draft Annual Work Programme 2016, by the end of 2016.

The Agency also invites ENTSOG to consider the merits of a regional approach towards the definition of the most relevant scenarios for the assessment of a given project, both in terms of flow patterns and infrastructure scenarios.

2.5.3. Reality check of assumptions

The Agency notes that a number of assumptions have been made by ENTSOG for the ranges and the values of the critically important parameters used in the system and CBA models that underpin the TYNDP, and in particular the following:

- Over the next two decades the evolution of gas demand is likely to be driven mostly by the use of gas in the power generation sector, and therefore most gas demand outlooks evolve in a narrow range which depends on the equilibrium between gas, coal and CO₂ prices. On this premise, ENTSOG's assumption for gas demand is on the moderately optimistic side (demand growing by 0.4% p.a. over the next 21 years), derived by using the level of gas demand for power generation based on ENTSO-E and price data.
- The seasonal gas demand swing is modelled through the use of summer and winter cases. ENTSOG has kept the 1-day Design Case and the 2-week Uniform Risk Case representing the extreme situation to be covered by the European gas system, including the 100% simultaneity planning assumption.
- Specifically for demand scenarios, ENTSOG pins the long-term evolution of gas demand on several factors, including demography, macroeconomic parameters, energy and emissions prices, as well as targets set by energy and environmental policies. In order to assess the wide range of uncertainties related to these factors, ENTSOG has considered different settings ("scenarios") for each of the main parameters influencing gas demand, each one of them in turn dependent on various assumptions. Examples of such assumptions are, in the case of gas-based power generation, electricity generation from alternative sources and limitations in the utilisation of coal and gas, complemented by further assumptions based on the actual electricity mix, and also using the feedback from stakeholders and inputs from TSOs to reflect the specific factors for each country.

The Agency strongly advises ENTSOG to use in future TYNDP-related work a more structured and internally consistent approach for the adoption of assumptions, including via the provision of a full formal description of the used models, a listing of all variables and constants and their ranges / values, and the results of a proper sensitivity analysis revealing the most critical factors and assumptions on which the results of the analysis depend.

The Agency finds that the major sources of possible inconsistencies and lack of realism in the TYNDP assumptions and models are the following:

- The assumption of a well-functioning market already at this time does not necessarily reflect the reality of gas markets in Europe, in the sense that the market still presents imperfections and that gas from the same source may be priced differently by the same supplier depending on the market in which it is sold. The assumption that there is a single gas price per source of gas runs contrary to current observations. This is linked to the fact that there are significant physical, contractual and possibly other barriers

between the markets, i.e. that the existing market is imperfect rather than perfect. In a perfect market scenario and with sufficient interconnection capacity, price differentials between markets should be reduced down to the level of the cost of transportation, by increased supply from lower-priced markets to higher-priced ones in pursuit of price arbitrage by gas suppliers.

The Agency recommends that ENTSOG consider using a network model which recognises the existing barriers, especially between markets where gas price differentials persist even though capacity is available (i.e., barriers to market integration exist as revealed by the lack of price arbitrage), as the starting point for the modelling ("year zero" or "status quo").

- The inclusion in the modelling of the very unlikely "high infrastructure" project implementation scenario, along with only one other scenario for infrastructure development (the "low infrastructure" scenario). This high infrastructure scenario is not only unlikely but also not desirable as it includes competing projects as well as projects which are still under consideration and may not be realised at all due to negative feasibility assessments or other valid reasons. This perception of unlikeliness of the "high infrastructure" scenario is corroborated by the fact that only 3% of the non-FID projects included in both the TYNDP 2013 and TYNDP 2015 have changed their status to FID during this 2-year period.¹⁶

The Agency recommends the use of a more realistic "expected project progress scenario" instead of the "high infrastructure scenario".

- The Agency notes that that ENTSOG considers LNG as a source for diversification of gas supply in a way analogous to that of piped gas, even though LNG supply to Europe may (and as a rule does) have different origins at each entry point, while piped gas often only comes from a single source at each entry point, at least in the cases of imports from the Russian Federation and Algeria. The approach under which ENTSOG considers LNG as "one source" of gas supply¹⁷, contrary to the fact that LNG supply is *eo ipso* diversified by origin, route and contractual arrangements, leads to the TYNDP showing some countries with good access to LNG markets as not enjoying sufficiently diversified gas supply, even though these countries receive gas from a variety of sources via LNG supply of different origin, by different suppliers, and often by different entry points as well.

The Agency welcomes the distinction introduced by ENTSOG between "price diversification" and "source diversification", but recommends that ENTSOG investigates ways in which LNG supply could be better considered in the TYNDP. ENTSOG should consider how to include in the network model the existing and planned LNG supply routes from the point of origin to the point of delivery (as observed historically and as expected by LNG terminal operators and project promoters).

¹⁶ TYNDP 2015, p. 27, Figure 2.8.

¹⁷ Ibid. 2015, p. 75

- The Agency sees the need for a “reality check” by comparing past assumptions and projections to actual developments, for the sake of not only improving the quality of next TYNDPs, but also for enhancing the transparency, robustness and credibility of the work undertaken by ENTSOG. In particular, the Agency recommends that ENTSOG compares the TYNDP demand and supply estimates for previous TYNDP editions with the actual data as reported since their adoption.

The Agency recommends the inclusion in future TYNDPs of a review section containing a “reality check” and lessons learned, in particular via the comparison of actual data for the past period(s) with the estimated (assumed) data used for the preparation of the previous TNYDPs.

2.5.4. On the need for sensitivity analysis

The Agency points out that, while the assumptions used by ENTSOG for the development of the TYNDP are not necessarily unreasonable or inconsistent, the lack of a sensitivity analysis as defined in Regulation (EU) No. 347/2013, Annex V, Point 11, second sentence, does not allow the proper identification of those assumptions (parameters) which are of critical importance for the outcome of the analysis, or the identification of the scenarios that are particularly dependent on specific assumptions. The Agency considers that scenario-based analysis should not be a substitute to sensitivity analysis, since the scenarios (or combinations thereof) only provide a possible pathway for a variable (parameter) over time, without, however, revealing the degree to which that variable or the scenario(s) associated with it are important in the context of the adopted model for the analysis and its results regarding gas demand and other modelled outcomes. The Agency finds that the approach adopted by ENTSOG regarding the assumptions and the resulting choice of scenarios leads to an analysis which describes a possible outcome, but does not satisfactorily reveal the main factors on which the outcome depends.

The Agency overall finds that, although improved in terms of handling uncertainty, ENTSOG’s methodology for the preparation of the TYNDP still falls short of fully meeting the requirements of Regulation (EU) 347/2013 regarding analyses concerning uncertainty, and in particular those of Point 11 of Annex V of the Regulation, which clearly require that each cost-benefit analysis shall include sensitivity analyses concerning the input data set, the commissioning date of different projects in the same area of analysis and other relevant parameters.

The Agency points out that the lack of sensitivity analysis of the scenarios to various assumptions (rather than a large number of scenarios) for the analysis does not allow the identification of the factors to which the results of the analyses are particularly sensitive, i.e. the critically important factors, along with their possible ranges and the impact which they may have on the TYNDP as a whole. The Agency notes that the use of numerous scenarios without proper sensitivity analyses creates ambiguities and information clutter which may be a contributing factor to the apparent sense among stakeholders that the results of the analyses are difficult to understand, as well as to the disparate views which stakeholders have regarding the scenarios themselves.

The Agency recommends that instead of using a great number of scenarios, a smaller but more rigorously selected range of scenarios should be considered.

The Agency points out that any cost-benefit analysis shall include sensitivity analyses concerning the input data set, the commissioning date of different projects in the same area of analysis and other relevant parameters.

2.6. Maturity of projects

The Agency notes that ENTSOG uses the term “maturity” in the TYNDP 2015 in the context of “market maturity” only¹⁸, rather than “project maturity”. The Agency remarks that in Regulation (EU) 347/2013 “maturity” is a concept applicable to projects rather than to markets and has different levels: first, a basic degree of maturity suitable for filing an application for the PCI status; next, improved maturity suitable for the project to apply for permits; and finally, sufficient maturity for the submission of an investment request for a project by the project promoter(s), including CBA and a business plan¹⁹, where a large and reasonably accurate body of information about the project is contained.

For these reasons, the Agency is of the view that the level of maturity of a project can be determined by the extent of information available regarding the project and the robustness of the information, as well as the project's phase/status/stage. In the draft TYNDP 2015 projects are only classified as “FID” and “non-FID” and the level of their maturity remains unclear. Consequently, it is also difficult to understand how and when the assessed project benefits will be delivered and project costs incurred, and whether the projects would be consistent with the goal of closing any infrastructure gap, notably with respect to cross-border capacities.

The Agency invites ENTSOG to reflect on the different types of information that are needed to define a project to a reasonable extent, including, but not limited to, technical characteristics, costs, status, implementation plan and other important features, as well as on the ways to assess the robustness of the information (e.g., by identifying the potential range of cost variations, the likelihood of commissioning the project within a year and other ways to identify the ranges of uncertainty), and on how improved maturity categories could be derived about the projects.

The Agency recommends including in future TYNDPs a grouping of projects by maturity level in the sense of Regulation (EU) 347/2013, i.e. depending on the extent and the accuracy of the information available regarding the project, as well as on the stage of the project.

2.7. Grouping and clustering of projects

The TYNDP 2015 development process was carried out via project candidate submission by project promoters. Subsequent analysis of the projects included in the TYNDP which become PCI candidates involves project grouping initiated by the TSOs. In the PCI selection round in 2015, this grouping took place outside the Regional Group meetings and without other stakeholder involvement. The Agency notes that each TSO could propose new groups without proper reconciliation of the proposed group configuration with other potentially affected TSOs, NRAs or Member States. As a result, it is difficult to judge whether a group comprises all

¹⁸ Cf. TYNDP 2015, pp. 30, 32, 50, 117.

¹⁹ Cf. Article 12(3) of Regulation (EU) 347/2013.

projects which should be in the group (and only those projects) and which group configuration should be preferred to another, even though ENTSOG did perform an analysis of all possible project configurations with the purpose of identifying those combinations (groups) of projects which deliver the maximum benefits.

The Agency notes that the very notion of “groups” or “clusters” of projects could be better defined and there should be stricter criteria according to which a given project should be “grouped” or “clustered” with other project(s), groups already set should be merged with other groups, or projects listed in a group also listed in another group (with double or multiple listing avoided whenever possible and the project’s cost included in the proper group). The Agency invites the Commission and ENTSOG to consider defining the terms for forming project “groups and “clusters” for the purposes of both the TYNDP and the subsequent selection of PCIs, and draws their attention to the views expressed by the Agency and NRAs during the meetings of the Regional Groups about the possible modality of the grouping of interdependent projects (for example, projects twinned in an “enabler-dependent” or “mutually enhancing” relationship) and the specific features of CBA as applicable to such twinned projects, and to account for these views in the future.

The Agency strongly recommends that in future TYNDPs clear guidance be provided *a priori* on how the grouping of projects is carried out, both in terms of substance and procedure, and urges ENTSOG to suggest such guidance in a timely manner to stakeholders for their consideration before finalising the guidance.

2.8. Cross-regional consistency

The Agency appreciates ENTSOG’s approach to achieve cross-regional consistency by assessing the gas supply adequacy at the European level by enlarging the geographical scope of the study, which now covers all Member States, Switzerland, Bosnia and Herzegovina, Serbia, the Former Yugoslav Republic of Macedonia, as well as Ukraine, Turkey and the Kaliningrad Region of the Russian Federation.

3. Conclusions

The Agency notes that the fourth draft TYNDP (draft TYNDP 2015) is the first one developed with the application of the CBA under the CBA methodology developed by ENTSOG, covering an extended period of time (20 years), and including all projects of common interest (PCIs) from the first PCI selection in 2013. The Agency appreciates the improvements achieved in the process, methodology and outcome of the development of the draft TYNDP 2015 in comparison to previous TYNDPs and acknowledges ENTSOG's efforts in pursuit of the objectives of Regulation (EC) No 713/2009 and Regulation (EC) No 715/2009.

The Agency notes that the present practice of considering the draft TYNDP as identical to the adopted TYNDP allows for possible corrections of the TYNDP only after the end of the process (with a corrigendum release), if ever, and highlights that this approach is not in the spirit of the relevant Regulations. The Agency urges ENTSOG to properly consider stakeholder views already at an early stage of the development process of the TYNDP. The Agency urges ENTSOG to release the final TYNDP only after duly considering stakeholder feedback and the Agency’s Opinion on the TYNDP.

The Agency finds necessary that, for the future TYNDPs, ENTSOG:

- Revisits the CBA methodology, in particular regarding the collection and usage of cost data and improves the real value monetisation of the benefits of the projects;
- Reassesses the data set in the context of the TYNDP;
- Reassesses the models used for the TYNDP, and other tasks performed by ENTSOG, in pursuit of greater consistency and full compliance with Regulation (EU) 347/2013;
- Directly identifies infrastructure gaps needed to further improve the future TYNDPs.

The Agency strongly urges ENTSOG to implement the Agency's Recommendation No. 04/2014 on the CBA Methodology.

The Agency recommends to ENTSOG and to all stakeholders to make sure that the cost information is duly submitted to ENTSOG on a project-by-project basis and included in future TYNDPs, as already done in the electricity TYNDP. ENTSOG provided in the draft TYNDP only the expected benefits of projects, but not their costs. The Agency notes that in the absence of cost data it is impossible to base the TYNDP on a CBA as explicitly required by Regulation (EC) 715/2009, as amended by Regulation (EU) 347/2013. The lack of cost information is a major flaw of the draft TYNDP 2015.

Non-mature projects are considered by ENTSOG in the TYNDP in instances where one type of the following essential modelling data types is missing: commissioning date, transmission capacity at an interconnection point, and FID status. The Agency notes that clearer criteria for the identification of mature projects and for the treatment of projects in the analyses (i.e. their inclusion/exclusion from the baseline) will be helpful in terms of identifying infrastructure gaps.

The Agency recommends to ENTSOG to define adequate eligibility criteria to filter out from the future TYNDPs those projects which are not robust. The presence of such projects in the TYNDP poses a considerable risk for the national plans, which must be consistent with the TYNDP. ENTSOG should prepare guidelines for project promoters of candidate projects for the next TYNDPs, similarly to the guidelines prepared by ENTSO-E in 2011, 2013 and 2015, and taking into consideration the draft guidelines prepared by the European Commission on equal treatment and transparency criteria to be applied by ENTSO-E when developing its TYNDP²⁰, in those aspects which by analogy could also be applicable to the gas TYNDP.

The Agency recommends that future TYNDPs include a cross-reference map of the investment codes and statuses assigned to each project in the TYNDP and in the relevant gas infrastructure national development plans. Furthermore, taking into account the importance of already existing framework documents for the development of some gas infrastructure projects, promoters should communicate to ENTSOG the existence of regulatory decisions, or similar material conditions applicable to their projects.

The Agency recommends to ENTSOG to implement a robust determination of scenarios, in line with the electricity sector scenarios and with the scenarios used for the gas infrastructure national development plans. This task must be completed sufficiently in advance of the development of the next TYNDP, which is currently expected by the end of 2016.

²⁰https://www.entsoe.eu/Documents/TYNDP%20documents/TYNDP%202016/20150217_Guidelines_Update_EN_ER_TC_24.02.2015_1st%20draft.pdf

The Agency invites ENTSOG to provide a more detailed breakdown of the expected future sources of gas by origin and entry point (i.e., by existing and proposed route) in forthcoming TYNDPs, together with historical information about such gas flows from recent years.

The Agency urges ENTSOG to fully complete the task of identifying infrastructure gaps in the next TYNDP, especially with respect to cross-border capacities, and to use the gap indicators for assessing to what extent the infrastructure gap is a barrier to market integration, security of supply, competition or sustainability. The Agency recommends that once the infrastructure gaps are identified and their urgency is described, ENTSOG should evaluate the degree to which the TYNDP projects serve the goal of closing the identified infrastructure gaps at the European level.


The Agency notes that the anticipatory delivery of the next TYNDP in 2016 will contribute to the streamlining of the third PCI list process foreseen in 2017, given that the PCI candidates have to be included in the latest TYNDP.

The Agency finds that the draft TYNDP 2015, while being an important step in pursuit of the objectives of Regulation (EC) No 713/2009 and Regulation (EC) No 715/2009 in terms of contributing to non-discrimination, effective competition, and the efficient and secure functioning of the internal natural gas market, is not free from significant shortcomings, and reiterates the need for further improvements, especially regarding the missing cost dimension, the limited analysis of benefits, the identification of infrastructure gaps, and the treatment of project maturity and uncertainties associated with the projects and their driving forces.

This Opinion is addressed to ENTSOG.

Done at Ljubljana on 20 October 2015.

For the Agency:


Alberto Pototschnig
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