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ACER
Agency for the Cooperation of Energy Regulators

OPINION OF THE AGENCY FOR THE COOPERATION OF ENERGY REGULATORS No 21/2014

of 19 December 2014

ON THE DRAFT ENTSO-E SCENARIO OUTLOOK AND ADEQUACY FORECAST 2014-2030

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[1] (hereinafter referred to as "the Agency"), and, in particular, Article 6(3)(b) 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[2], and, in particular, Article 9(2) thereof,

HAVING REGARD to the favourable opinion of the Board of Regulators of 17 December 2014, delivered pursuant to Article 15(1) of Regulation (EC) No 713/2009,

WHEREAS:

(1) Pursuant to Article 6(3)(b) of Regulation (EC) No 713/2009 the Agency shall provide an opinion to the European Network of Transmission System Operators for Electricity ("ENTSO-E") in accordance with the first subparagraph of Article 9(2) of Regulation (EC) No 714/2009 on relevant documents referred to in Article 8(3) of Regulation (EC) No 714/2009. Point (b) of Article 8(3) of Regulation (EC) No 714/2009 requires ENTSO-E to adopt a non-binding Community-wide ten-year network development plan ("TYNDP"), including a European generation adequacy outlook, every two years. Pursuant to Article 8(10) of Regulation (EC) No 714/2009, the TYNDP shall include, among other features, scenario development and a European generation adequacy outlook.

(2) On 31 October 2014, ENTSO-E submitted the final draft Ten-Year Network Development Plan 2014 (draft TYNDP 2014) package to the Agency for its opinion[3]. The submission included the final draft Scenario Outlook and Adequacy Forecast 2014-2030 ('draft SOAF 2014').

(3) Scenario development and generation adequacy outlook are fundamental prerequisites for the analysis of the TYNDP and, with regard to the TYNDP 2014, have been published as a separate report. The Agency considers it important to assess the draft

[1] OJ L 211, 14.8.2009, p.1
[2] OJ L 211, 14.8.2009, p.15
[3] https://www.entsoe.eu/major-projects/ten-year-network-development-plan/tyndp-2014/Pages/default.aspx

SOAF 2014 as a stand-alone document and separately from its forthcoming Opinion on the draft TYNDP 2014,

HAS ADOPTED THIS OPINION:

1. General remarks

The ENTSO-E scenario outlook and adequacy forecast (SOAF) aims at providing stakeholders in the European electricity market with a pan-European overview of generation, demand and system adequacy using different scenarios for the future ENTSO-E power system[4]. In addition, the draft SOAF 2014 provides a description of the scenarios used as background assumptions for carrying out the market and network studies within the TYNDP framework[5].

The Agency deems that the draft SOAF 2014 meets the objectives of non-discrimination, effective competition and efficient and secure functioning of the internal market in electricity, according to Article 6(3)(b) of Regulation (EC) No 713/2009. More specifically, the non-discrimination objective is covered adequately by the information and consultation process used for forming the draft SOAF 2014. The objective of effective competition and long term efficient functioning of the market is covered through the fact that potential investors in generation and transmission sectors are provided with a wealth of information concerning the future scenarios and adequacy needs of the European power systems, thus allowing them to compete in covering such needs on a timely and informed manner. The objective of secure functioning of the internal market is covered by the fact that the draft SOAF 2014 provides comprehensive analyses and information with respect to the expected growth in demand for electricity in the EU and generation capacities required to cover this demand, also including a high-demand scenario. Since ENTSO-E is in the process of improving the consideration of interconnection capacities in adequacy assessment, the coverage of the objective of efficient functioning of the internal market is expected to improve over the next years.

Furthermore, in relation to the draft SOAF 2014, the Agency positively acknowledges:

a) An extensive engagement of the relevant stakeholders during the development process of the draft SOAF,

b) ENTSO-E's effort to prepare and present longer-term outlooks compared to the SOAF 2012 report, and

c) ENTSO-E's publication of a summary report[6], as well as of the detailed comments received during the public consultation held from 10 July to 20 September 2014 in relation to the draft SOAF 2014.

[4] SOAF 2014, p. 9
[5] SOAF 2014, p. 10
[6] https://www.entsoe.eu/major-projects/ten-year-network-development-plan/tyndp-2014/Pages/default.aspx

The Agency has already suggested[7] that ENTSO-E adopts a two-year period for issuing the reports relevant to scenario development and adequacy assessment. The activities could be scheduled as follows:

1st year:

- ENTSO-E publishes feedback (own and from stakeholders) about the SOAF-TYNDP process of the previous time period;
- ENTSO-E develops scenarios to be used for adequacy assessment and for the next TYNDP (resulting document: Scenario Development report);
- ENTSO-E consults (and updates accordingly) the Scenario Development report;
- The Agency provides an Opinion on the Scenario Development report;
- ENTSO-E finalises and publishes the Scenario Development report.

2nd year:

- ENTSO-E uses the scenarios of the Scenario Development report for the TYNDP studies (network planning and adequacy assessment);
- ENTSO-E publishes the Adequacy Assessment together with the TYNDP.

Biennial edition of Scenario Development reports would reduce the effort compared to an annual publication and would allow more time to assess potential factors which may lead to different assumptions and estimations and updated methodologies between successive reports.

The Agency therefore reiterates its request to ENTSO-E to adopt the above described approach.

2. Remarks on the involvement of stakeholders

2.1 Overall engagement of stakeholders

The Agency appreciates ENTSO-E's efforts to engage with stakeholders, including three public workshops, one call for inputs and one public consultation[8]. However, the public consultation did not cover the whole scenario and Visions development approach and methodologies used[9]. The Agency notes ENTSO-E's statement that "*the next move is to ensure active participation in the framework of the Long-term network development stakeholders group [...] Most important is actual contribution from stakeholders with respect to scenario inputs or modelling activities and acknowledgement for our joint works*"[10].

[7] http://www.acer.europa.eu/official_documents/lists/other%20documents/attachments/1/letter%20konstantin%20staschus_entsoe_soaf_130718.pdf

[8] Public workshops on 2030 Visions: the first on 17 April 2012 presenting the Visions story lines including an ad-hoc questionnaire on demand and generation development issues for bottom-up Visions 1 and 3, the second on 22 November 2012 focusing on top-down Visions 2 and 4 and the third on 2 July 2013 on input data and market studies results. A call for inputs was launched in December 2012. The last workshop was followed by a public consultation (during summer 2013).

[9] The consultation on the TYNDP 2014-2030 Visions (19 July-20 Sept. 2013) dealt with the 2030 Visions data rather than with the four Visions approach.

[10]

Furthermore, although some hints on accepted stakeholder inputs can be found in presentations for the third workshop on the 2030 Visions[11], it remains largely unclear which input from the 2030 Visions questionnaire and from the 2030 Visions data consultation has been taken into account by ENTSO-E.

Finally, the Agency notes that the minutes from the workshop of 17 April 2012 are not published on ENTSO-E's web site.

In view of the above, the Agency considers that the process of scenario development (and thus of definition of TYNDP assumptions) can be improved significantly and recommends that ENTSO-E undertakes, consults and publishes a thorough review of the current scenario and Visions methodology as part of the TYNDP 2016 development process.

2.2 The consultation on the draft SOAF 2014

Pursuant to Article 10(1) of Regulation (EC) No 714/2009, the consultation process on preparing the draft TYNDP (and therefore also on scenario development and adequacy) shall aim at identifying the views and proposals of all relevant parties. The Agency positively acknowledges the fact that ENTSO-E published[12] a summary report as well as the detailed comments received during the public consultation held from 10 July to 20 September 2014 in relation to the draft SOAF 2014. However, the Agency believes that the quality of some of ENTSO-E's responses to the stakeholders' comments can be improved both in terms of clarity as well as in terms of quality. For example, the Agency deems that the reaction to the comment by the Czech Ministry for Industry and Trade - that one scenario should include a so-called 'best estimate' -, deserves a broader discussion, especially since the four-Vision approach was not formally consulted.

2.3 The ENTSO-E Long Term Network Development Stakeholder Group report

The Agency supports the following suggestions stemming from the ENTSO-E Long Term Network Development Stakeholder Group report[13] (p.6) to the degree they are related to the SOAF process:

> *ENTSO-E could issue an explanatory document at the beginning of the TYNDP building process containing:*
> - *A timeline of the different TYNDP building steps and of the different consultation periods and workshops on specific building steps;*
> - *An explanation of the procedures between one step and the following one;*

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https://www.entsoe.eu/Documents/TYNDP%20documents/TYNDP%202014/141030_TYNDP%20package%20-%20Report%20on%20comments_%20FINAL.pdf (p.10)

[11] https://www.entsoe.eu/fileadmin/user_upload/_library/events/Workshops/2030_Visions/130702_ENTSO-E_3rd_Workshop_on_2030_visions_presentations.zip

[12] https://www.entsoe.eu/major-projects/ten-year-network-development-plan/tyndp-2014/Pages/default.aspx

[13] Recommendations on scenario building and stakeholders involvement: Increasing acceptability of the Ten Years Network Development Plan - A document prepared by the Long-Term Network Development Stakeholders Group
https://www.entsoe.eu/Documents/TYNDP%20documents/Long-Term%20Development%20Group/140424_Recommendations%20on%20scenario%20development_FINAL.pdf

- *An explanation of the decision-making process for each building step; clarifying to what extent and when stakeholders will be able to influence (weight of stakeholders' vs. ENTSO-E members' input) what elements and how their input will be used;*
- *An explanation of what data will be shared with stakeholders and what data will remain confidential and why; providing a preliminary set of all public data referencing their source and justifying their selection.*

The Agency is of the opinion that the whole aforementioned report produced by the ENTSO-E Long Term Network Development Stakeholder Group should be better identified by ENTSO-E as proposal by a group of stakeholders[14] and commented accordingly at the time of preparing the scenarios 2015. Furthermore, ENTSO-E should set out a plan for practical implementation of any suggestions of this report which are deemed useful by ENTSO-E.

3. Remarks on Scenarios

3.1 Medium-term scenarios and adequacy assessment

The draft SOAF 2014 contains quantitative data on three scenarios: Scenarios 'A' and 'B' with a horizon up to 2025, and Scenario 'EU-2020' with a horizon up to 2020. According to the draft SOAF 2014[15], Scenarios A and B are 'bottom-up', in the sense that they represent the Transmission System Operators (TSOs) best estimates for the period of analysis. Scenario A is more conservative than Scenario B in the sense that it takes into account the commissioning and decommissioning of power plants considered as sure. Scenario B takes into account the generation capacity evolution described in Scenario A as well as future power plants whose commissioning can be considered as reasonably credible according to the information available to the TSOs. The Scenario EU-2020 is derived from the EU policies on climate change and is based on national targets set in the National Renewable Energy Action Plans.

Adequacy assessment is carried out using the aforementioned three Scenarios for the period up to 2025 (up to 2020 for Scenario EU-2020). However, Article 8(4) of Regulation (EC) No 714/2009 requires adequacy assessment for a 5-15 years horizon from the date of the assessment. The Agency notes this deviation from Regulation (EC) No 714/2009[16] and calls upon ENTSO-E to incorporate this requirement in the adequacy methodology which is currently under development. A first step towards this direction would be the identification of load forecasts for the purpose of adequacy assessment for a 15-year horizon.

The Agency positively acknowledges that ENTSO-E modified the draft SOAF 2014 (compared to the draft version for public consultation) to clarify that Scenarios 'A', 'B' and 'EU-2020' are not related to the draft TYNDP 2014. However, one sentence on p. 129 of the draft SOAF 2014 mentions Scenario 'EU-2020' as "*an important assumption to further*

[14] According to Article 10 of Regulation (EC) No 714/2009.
[15] Draft SOAF 2014, p.128
[16] The issue has also been noted in the Agency's letter to ENTSO-E (July 2013, http://www.acer.europa.eu/Official_documents/Lists/Other%20documents/Attachments/1/Letter%20Konstantin%20Staschus_ENTSOE_SOAF_130718.pdf)

specify grid development in the Ten Year Network Development Plan". The Agency expects ENTSO-E's clarification in the final edition of the SOAF 2014.

3.2 Long term scenarios

For the purposes of the TYNDP 2014, the draft SOAF 2014 contains four distinctively different scenarios ('Visions') for year 2030. According to ENTSO-E[17], *the basic assumption concerning the Visions is that they differ enough so that the actual future evolution of the assessed parameters shall safely lie between the pathways of these four Visions. Two Visions (Visions 1 and 3) are created according to a 'bottom-up' approach while two Visions (Visions 2 and 4), are developed through a 'top-down' approach. The Visions are not forecasts and there is no probability attached to them. There is also no adequacy assessment associated with them as the Visions are created so as to be 'adequate' for the purposes of the TYNDP process. The Visions are based on previous ENTSO-E and regional market studies, public economic analyses and existing European documents.*

The Visions are constructed as four quadrants of a coordinate system with the following two axes:

- the EU commitment to reduce greenhouse gas emissions to 80-95% below 1990 levels by 2050, according to the Energy roadmap 2050 (on track vs. serious delay),
- the degree of European integration (presence or absence of a strong European framework),

thus reflecting the uncertainty about two main parameters affecting network expansion for the horizon to 2030, namely market integration and decarbonisation (apart from the fundamental underlying requirement for security of supply).

The Agency commends ENTSO-E's effort to prepare and present longer-term outlooks compared to the SOAF 2012 report. However, the Agency deems that a single comprehensive description of the process and of the methodologies used is indispensable. ENTSO-E should aim at producing a comprehensive report (to complement the next edition of the Scenario Development report), taking also into account the detailed comments in the rest of the present Section. ENTSO-E should also pay more attention to the interrelationship between assumptions for previous years (e.g. year 2020 and year 2025) and the long-term scenarios.

ENTSO-E presents, in section 7 of the draft SOAF 2014, a methodology for Scenario Outlook and Adequacy Forecast. In particular, subsection 7.5 of the draft SOAF 2014 deals with the "Scenario Outlook Methodology". The Agency notes that the content of this section differs significantly from the content of subsections 2.1, 2.2 and 2.3 of the ENTSO-E cost-benefit analysis (CBA) guidelines, dealing with scope of scenarios, content of scenarios and technical and economic key parameters. The Agency therefore recommends ENTSO-E to keep the CBA methodology[18] up to date taking into account possible developments in the field of scenario development and to align the methodology description in forthcoming Scenario Development reports to the CBA methodology.

[17] Draft SOAF 2014 p.128
[18] https://www.entsoe.eu/major-projects/ten-year-network-development-plan/CBA-Methodology/Pages/default.aspx

3.3 On the two-axis approach for development of the Visions for 2030

As in general there is no single theoretical and methodological framework for scenario-based analysis in the energy sector, ENTSO-E should describe possible alternative approaches and their advantages and drawbacks, so as to favour a better understanding of the selected approach.

Furthermore, the Agency is of the opinion that the following activities would contribute to improving and making the methodology more robust:

- a review from selected experts;
- a specific workshop, where invited speakers (e.g. researchers, academics) would exchange views on the various scenario approaches and methodologies practiced today and the advantages and drawbacks of each approach.

The Agency notes that the latter option is already suggested by ENTSO-E in its 'TYNDP Public Consultation Report on Received Comments'[19].

3.4 Clarity of assumptions and transparency of data sources

Currently, in order to understand the Visions' development process, interested stakeholders have to read several workshop presentations and minutes. For example, the Agency notes that country-specific load and generation capacity data for the target years are available in the draft SOAF 2014 dataset[20]. Sources of information on hourly load curves in the reference year and on changes due to demand response, heat pumps and electric vehicles are provided in the draft TYNDP 2014 (p.38), however not in a comprehensive manner and sometimes in a vague way (e.g. peak load and load curves for Visions 2 and 4 are calculated 'according to the consulted methodology'). Per-country average load growth is only given in a clustered way in the draft SOAF 2014[21]. Data on fuel prices and CO_2 prices are available in the draft TYNDP 2014 (p.38), whereas data on hourly load curves and generation availability are not provided.

The Agency deems it as essential that ENTSO-E provides stakeholders with a comprehensive description of assumptions, documentation of data sources, data acquisition and processing methods as well as data values. In particular, the Agency expects ENTSO-E to provide assumptions on hourly load, hourly generating available capacity, available interconnection capacities, fuel prices and CO_2 prices in a transparent way in the future Scenario Development reports. Information about the assumptions relevant to non-ENTSO-E countries (or exchanges with them) should also be provided.

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[19] '*Non-industry experts such as universities can already now be invited to present issues on their expertise to the stakeholder group meetings*', at p.10 of https://www.entsoe.eu/Documents/TYNDP%20documents/TYNDP%202014/141030_TYNDP%20package%20-%20Report%20on%20comments_%20FINAL.pdf

[20] https://www.entsoe.eu/Documents/SDC%20documents/SOAF/140602_SOAF%202014_dataset.zip

[21] Draft SOAF 2014, p. 14

In several cases ENTSO-E mentions in the draft SOAF 2014 that Guidelines have been used[22]. ENTSO-E should describe what guidelines are used and confidentiality issues - if any - should be explained.

The Agency highlights the importance of completeness and accuracy of data used for SOAF and TYNDP purposes, in view of the requirements of Article 11(8) of Regulation (EU) No 347/2013 regarding a consistent and interlinked electricity and gas market and network model. Furthermore, pursuant to Annex V of Regulation (EU) No 347/2013, the methodology for a harmonised energy system-wide cost-benefit analysis for TYNDP (and for projects of common interest) should be based on input data set for years n+5, n+10, n+15 and n+20. The Agency stresses the importance of input data sets in particular in the short term (5-10 years).

3.5 Approach for constructing the 'top-down' scenarios

ENTSO-E characterises Visions 2 and 4 as 'top-down' stemming from top-down modifications of the 'bottom-up' Visions 1 and 3[23]. The Agency deems that more information and clarity should be provided on the methodology used for the development of Visions 2 and 4, and on the reasons why these two Visions are characterised as 'top-down'[24].

Furthermore, the rules for grouping the assumed values of the various parameters in order to form a scenario are not described. For example, the minutes of the workshop of 2 July 2013[25] state that 'The expert team considers the CAPEX [Capital Expenditures] when creating the top down Visions', but do not describe how this is performed. The Agency expects ENTSO-E to provide appropriate descriptions in the final edition of the SOAF 2014.

3.6 On the 'distance' between Visions

According to ENTSO-E's documents, the Visions are designed to estimate the extreme values between which the evolution of parameters is expected to occur[26]; in addition, Visions differ enough from each other[27].

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[22] Draft SOAF 2014, see for example pp. 21,50,63,99,100,115

[23] As noted in the draft TYNDP 2014 (p.36): '*Visions 2 and 4 assume a top-down approach, with a more harmonised European integration*'.

[24] It is common that in a scenario developed with a top-down approach, some basic values of parameters are defined (thus forming the basis for a 'scenario'). Then, an electricity-energy model (usually optimization, clearing at both national and EU-levels) might be used to calculate the values of the remaining parameters. Such a model would allow to determine the 'optimal' levels of investments in all generation and demand-side technologies (while incorporating country constraints and specificities such as potential for penetration of technologies and ensuring overall consistency). In addition, a top-down approach would imply harmonized assumptions about future costs and efficiencies of energy technologies, international fuel prices, CO_2 prices etc. for all MSs. The Agency notes that the approach taken in all Visions is not based on some optimization (e.g. cost minimization). Visions 2 and 4 are rather 'derived from Visions 1 and 3, in view of greater harmonisation of the data from all countries' (p. 37 of draft TYNDP 2014). However, such an approach (optimization) has been mentioned during the Workshop on Visions for the TYNDP 2016 (16 September 2014).

[25] https://www.entsoe.eu/fileadmin/user_upload/_library/events/Workshops/2030_Visions/130702_3rd_2030workshop_minute_FINAL.pdf

[26] Draft TYNDP 2014, p.36

[27] 3rd Workshop on the 2030 Visions, 2nd July, 2013 (presentation by J. Mendiola)

The Agency notes that the 'distance' between Visions in terms of installed renewable energy sources (RES) capacity or load[28] is rather straightforward to assess. However, the 'distance' between other parameters of the Visions is not clearly identified. This is especially true for market integration, which is one of the Visions' main parameters concerning the target network expansion. An explanation of how different market integration levels lead to the assumptions incorporated in the Visions is missing in the draft SOAF 2014.

The Agency deems it useful to increase the level of clarity provided on the above issues in future Scenario Development reports.

3.7 Feasibility and 'filtering' of Visions

According to the draft SOAF 2014 (p.9), '*The SO&AF is not assessing the economic aspects (e.g. feasibility) of generation assets per investigated scenario. Such aspects are investigated and analysed within the market studies performed in the framework of the TYNDP*'.

The Agency believes that extreme but realistic Visions have to be defined. Thus the (economic) feasibility of generation in each Vision should be assessed, and then (if deemed feasible) the Vision should be considered as (one of) the basis for the TYNDP analysis[29].

The Agency remarks that Section 4.2 of the Continental South West (CSW) Regional Investment Plan[30] provides market study results, including graphs for energy and capacity from all technologies, from which a capacity factor may be estimated (however, the CSW Plan does not particularly discuss the fact that gas generation in Spain is expected to run about 750-1500 hours in every of the four Visions).

Generalising the above remark, the Agency deems that criteria for 'acceptance' of the Visions should be established. This is especially important for the 'top-down' Visions (Visions 2 and 4), since they should exhibit certain commonly accepted properties. According to ENTSO-E, the Visions are 'by definition' adequate[31]. However, there is no information or a criterion about 'how much' adequate they should be. Furthermore, assessment (or at least quantification) of two more parameters would add to the quality of the constructed Visions. These parameters are:

- The flexibility which should be available in a vision in which the assumptions lead to high penetration of intermittent RES (e.g. wind or solar photovoltaic); as there is already a remark on flexibility in the draft SOAF 2014[32] which shows that ENTSO-E

[28] For the case of load forecast, the use of historical data and statistical properties of the parameter might be considered as one possible way to depict the 'distance' among the various values of this parameter in different Visions.
[29] Already a process of initially creating a variety of scenarios and then eliminating the more 'spurious' of them is applied in the e-HIGHWAY 2050 project (http://www.e-highway2050.eu/uploads/media/The_selection_of_energy_scenarios_for_e-Highway2050.pdf) .
[30] https://www.entsoe.eu/Documents/TYNDP%20documents/TYNDP%202014/141031%20RgIP%20CSW.pdf
[31] Draft SOAF 2014, p.129: *'There is also no adequacy analysis associated with [the Visions]'.* In addition, the ENTSO-E answer to a comment by ENDESA indicates that 'the Visions are in essence adequate with respect to generation…'.
[32] Draft SOAF 2014, p.50: *'The absolute hydro-values remain nearly stable, however when compared to the fast growing RES-sector, their relative share is decreasing. This might be a warning for the operation of the power*

already recognises the potential problem, the Agency considers that a more in depth treatment of the concept of 'flexibility' is necessary.

- The dependence on gas for a vision in which the assumptions lead to the 'gas-replacing-coal' phenomenon. In this respect, cooperation with the European Network of Transmission System Operators for Gas (ENTSO-G) and consistency with gas scenarios should be considered by ENTSO-E.

In conclusion, the Agency suggests that ENTSO-E considers the possibility of adopting criteria in order to assess the scenarios in next editions of SOAF, including the following:

i. Adequacy of the generating capacity mix (e.g. using deterministic or probabilistic indicator);
ii. Economic feasibility of generation, in terms of equivalent full-load hours (capacity factors) of conventional (at least) generating units;
iii. Flexibility, so that the system is able to cope with intermittent RES;
iv. Dependence on gas-fueled generation.

3.8 Evolution of Technologies

The assumptions regarding the evolution of the basic characteristics (e.g. specific capital cost, efficiency, equivalent full load hours for intermittent RES) of the various technologies are not explicitly provided. Such assumptions might be used as a cross-check of the validity and quality of the scenarios. This is more important for technologies such as solar photovoltaics, with significant potential for further reduction of cost in the forthcoming years.

The Agency suggests the development of 'technology datasheets', in which the important expectations for the main technologies used in the scenarios would be registered (e.g. evolution of capital costs and efficiency factors for each relevant technology and equivalent full load hours for intermittent RES). For example, the values of equivalent full load hours for 2030 wind power are around 2000 hours per year in SOAF 2013[33] (which is very close to historically observed values) and therefore may lead to underestimation of the future contribution of wind power plants[34], which may in turn lead to overestimation of the necessary wind power capacity to reach the targets envisaged, leading possibly to an oversized target network.

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systems, as wind and solar units do not have the flexibility for balancing the power system which some hydro units are able to provide'

[33] SOAF 2013 table 7.6.1

[34] This assumes that the effects of future installations placed in more remote and windy sites, in particular offshore, and of technological development of wind power plants, potentially leading to higher production, will be greater than the effects of saturation of windy onshore sites and of curtailments due to network congestion, potentially leading to lower production. See: (a) "Wind Power Capacity Factors", Chabot 2014 http://cf01.erneuerbareenergien.schluetersche.de/files/smfiledata/3/1/7/2/7/1/V2BC37NhCFWindDK.pdf ; (b) "Entwicklung der Windenergie in Deutschland", Fraunhofer IWES 2013 http://www.agora-energiewende.de/fileadmin/downloads/publikationen/Agora_Kurzstudie_Entwicklung_der_Windenergie_in_Deutschland_web.pdf ; (c) "Past and future Cost of Wind Power", IEA/NREL 2012 (https://www.ieawind.org/index_page_postings/WP2_task26.pdf)

3.9 On values of specific parameters

3.9.1 The interaction between the assumptions about generation capacities and the level of future interconnection capacities calculated in the network planning phase is essential. The level of interconnection has an impact on the degree of optimality of the generating capacity in terms of meeting EU targets and guaranteeing security of supply in each country. The level of generating capacity in each country will naturally depend on the level of assumed interconnection capacities. The method used by ENTSO-E to deal with this recursive process is not adequately explained in the draft SOAF 2014 and should be further developed by ENTSO-E in the future Scenario Development reports.

3.9.2 Both Visions 3 and 4, i.e. the visions assuming Europe is on track to achieve RES targets, assume low primary energy prices[35]. The Agency deems that the case of high energy prices and high RES development is also worth considering in the future Scenario Development reports, as high prices of conventional fuels are considered to be one of the main drivers for fostering RES deployment.

3.9.3 The application of load management for adequacy assessment[36] is documented in the draft SOAF 2014. Load management values have been reported by only half of the countries and vary across visions between 2.3% and 3.14% of the aggregate ENTSO-E load at the January 2030 reference point. The Agency suggests that more consistent and widespread application of load management is considered in the future Scenario Development reports.

4. Remarks on Adequacy Assessment

Adequacy is assessed for each country, for regional blocks identified within the ENTSO-E system and for the whole ENTSO-E area[37]. The methodology used is deterministic, and assesses the capability of the generation fleet to cover the assumed (forecasted) load demand during two reference points (January and July) of the target years (2020, 2025).

The Agency notes that the draft SOAF 2014 does not include adequacy assessment based on market studies (which was presented in Section 2.2 and quantified in Section 7.3 of SOAF 2012[38]). An explanation about the reasons for this change of approach should be provided in the final edition of the SOAF 2014.

The Agency acknowledges the fact that ENTSO-E is in the process of re-designing the methodology for the adequacy assessment published in the SOAF reports[39]. In this respect, the Agency expects ENTSO-E to present an integrated methodology, comprehensively

[35] Energy prices are assumed according to the '450' Scenario which is analyzed in the World Energy Outlook 2010 of the International Energy Agency.
[36] SOAF 2014, p. 20 and p. 137
[37] SOAF 2014, p.139
[38] https://www.entsoe.eu/publications/system-development-reports/adequacy-forecasts/soaf-2012-2030/Pages/default.aspx
[39] Consultation during summer 2014, at: https://www.entsoe.eu/Documents/SDC%20documents/SOAF/Scenario_Outlook_and_Adequacy_Forecast%20Evolutions.pdf

described in terms of inputs – processing – outputs, with references to bibliography and to existing applications of the proposed methodology and with a clear definition and consistent use of key terms, in line with the ENTSO-E draft network codes. ENTSO-E should consult on it, finalise it and then implement it. The Agency will provide further views on the new adequacy methodology when the methodology is applied in the adequacy reports.

Done at Ljubljana on 19 December 2014.

For the Agency:

Alberto Pototschnig
Director

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