

Framework Guidelines for the joint TYNDP scenarios to be developed by ENTSO for Electricity and ENTSO for Gas

“TYNDP Scenarios Guidelines”

25 January 2023

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This Document contains the Framework Guidelines on the joint TYNDP scenarios to be developed by ENTSO for Electricity and ENTSO for Gas, which the European Union Agency for the Cooperation of Energy Regulators (ACER) has prepared pursuant to Article 12(1) of Regulation (EU) 2022/869

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Reference documents

- Regulation (EU) 2022/869 of the European Parliament and of the Council of 30 May 2022 on guidelines for trans-European energy infrastructure, amending Regulations (EC) No 715/2009, (EU) 2019/942 and (EU) 2019/943 and Directives 2009/73/EC and (EU) 2019/944, and repealing Regulation (EU) No 347/2013;
- 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 1775/2005;
- Regulation (EU) 2019/942 of 5 June 2019 establishing a European Union Agency for the Cooperation of Energy Regulators;
- Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (recast);
- ACER recommendation 05/2015 on Good Practices for the Treatment of the Investment Requests, for Electricity and Gas Projects of Common Interest;
- ACER Opinion 21/2014 on the Draft ENTSO-E Scenario Outlook & Adequacy Forecast 2014-2030;
- ACER Opinion 12/2016 on the ENTSO-E Draft TYNDP 2016 Scenario Development Report;
- ACER Opinion 10/2018 on the ENTSO-E and ENTSOG Draft TYNDP 2018 Scenario Report;
- ACER Opinion 06/2020 on the ENTSO-E and ENTSOG Draft TYNDP 2020 Scenario Report;
- ACER Opinion 06/2022 on the key elements of the ENTSO-E and ENTSOG draft TYNDP 2022 Scenario Report;
- ACER-CEER position paper on TEN-E (March 2021)
- Regulation (EU) 2021/1119 of 30 June 2021 establishing the framework for achieving climate neutrality;
- Regulation (EU) 2018/1999 of 11 December 2018 on the Governance of the Energy Union and Climate Action;
- Commission Recommendation (EU) 2021/1749 of 28 September 2021 on Energy Efficiency First: from principles to practice – Guidelines and examples for its implementation in decision-making in the energy sector and beyond;
- Communication from the Commission on The European Green Deal, Brussels, 11.12.2019. COM(2019) 640 final;

- Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency;
- EU Fit for 55 Package, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en;
- REPowerEU Package, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/repowerEU-affordable-secure-and-sustainable-energy-europe_en.

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1. Introduction

- (1) In these Framework Guidelines for the joint scenarios for the Ten-Year Network Development Plans (hereafter “TYNDP Scenarios Guidelines” or “Guidelines”) to be developed by ENTSO-E and ENTSOG (hereafter “ENTSOs”), the European Union Agency for the Cooperation of Energy Regulators (“the Agency”) establishes criteria for a transparent, non-discriminatory and robust development of scenarios in the context of energy networks development.
- (2) Besides establishing the aforementioned criteria, the guidelines shall also aim to ensure that the ENTSOs’ TYNDP scenarios are fully in line with the energy efficiency first principle and with the Union’s 2030 targets for energy and climate and its 2050 climate neutrality objective.

1.1 Legal basis, objective and scope of the TYNDP Scenarios Guidelines

- (3) The Agency develops the TYNDP Scenarios Guidelines pursuant to Article 12(1) of the TEN-E Regulation¹.
- (4) The Guidelines focus on streamlining the scenario-development process, taking into consideration that:
 - Stakeholders must have an opportunity to engage meaningfully through effective consultations and have access to underlying documents and information. The inputs, assumptions and models that underpin the scenarios must be disclosed, respecting the duty to protect confidential information in line with the relevant legal requirements ;
 - Scenarios must be based on comprehensive information and be prepared in an unbiased manner;
 - Scenarios must be informative and understandable to decision makers, stakeholders and the public.
- (5) These Guidelines have a particular focus on the scenarios to be used in the TYNDP assessment, for identifying long-term infrastructure gaps and assessing individual projects (as per recital (24) of the TEN-E Regulation). In ACER’s understanding, the TYNDP scenarios are also to support the selection of PCIs and enable the achievement of the Union’s energy and climate objectives for 2030 and 2050.
- (6) In addition, as defined by Article 16 of the TEN-E Regulation, the TYNDP scenarios are to be used for the project-specific cost benefit analysis accompanying individual investment requests.²
- (7) The TEN-E Regulation also sets out that the ENTSO for Electricity shall consider the non-binding agreements³ referred to in Article 14 for the development of the TYNDP scenarios.

¹ Regulation (EU) 2022/869 of the European Parliament and of the Council of 30 May 2022 on guidelines for trans-European energy infrastructure, amending Regulations (EC) No 715/2009, (EU) 2019/942 and (EU) 2019/943 and Directives 2009/73/EC and (EU) 2019/944, and repealing Regulation (EU) No 347/2013, OJ L 152, 3.6.2022.

² Any additional scenarios used for the process under Article 16 of the TEN-E Regulation shall also be in line with the most recent policy objectives and be subject to the same level of consultation and scrutiny as the process provided for in Article 12 of the same Regulation (as per the requirements laid out in Article 16).

³ On cooperating on goals for offshore renewable generation to be deployed within each sea basin by 2050, with intermediate steps in 2030 and 2040, in line with individual national energy and climate plans, and the offshore renewable potential of each sea basin.

- (8) The Agency can review the effectiveness of its Guidelines based on the information it may gather when carrying out its tasks, and, upon its own initiative and/or taking into account stakeholders' requests, may initiate an update of the TYNDP Scenarios Guidelines.

1.2 Development process

- (9) The Agency launched a proceeding on 8 July 2022 by public notice to adopt TYNDP Scenarios Guidelines pursuant to Article 12 of the TEN-E Regulation.
- (10) The Agency complied with the requirements laid out in Article 12(1) regarding the development process of the Guideline, in particular by including :
- A targeted consultation of the representative industry associations and civil society organisations, the European Commission and the ENTSOs in the format of (online) workshops held on 20, 26 and 29 July 2022 and 2 and 5 August 2022;⁴
 - A targeted consultation of Member States between 11 October 2022 and 14 November 2022;
 - A public consultation between 6 October 2022 and 14 November 2022.
- (11) The Agency also took into account the guidance on scenarios in Annex I of its Recommendation 05/2015 and the Opinions it issued since 2014 covering TYNDP scenarios.
- ACER Opinion⁵ 21/2014 on the Draft ENTSO-E Scenario Outlook & Adequacy Forecast 2014-2030;
 - ACER Opinion⁶ 12/2016 on the ENTSO-E Draft TYNDP 2016 Scenario Development Report;
 - ACER Opinion⁷ 10/2018 on the ENTSO-E and ENTSG Draft TYNDP 2018 Scenario Report;
 - ACER Opinion⁸ 06/2020 on the ENTSO-E and ENTSG Draft TYNDP 2020 Scenario Report;

⁴ Summary notes and presentations of the workshops can be accessed at: <https://www.acer.europa.eu/events-and-engagement/new-s/acer-will-adopt-new-framework-guidelines-scenarios-network-development>.

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https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Opinions/Opinions/ACER%20Opinion%2021-2014.pdf .

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https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Opinions/Opinions/ACER%20Opinion%2012-2016.pdf .

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https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Opinions/Opinions/ACER%20Opinion%2010-2018%20on%20the%20ENTSO-E%20and%20ENTSG%20draft%20TYNDP%202018%20Scenario%20Report.pdf .

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https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Opinions/Opinions/ACER%20Opinion%2006-2020%20on%20ENTSO-E%20and%20ENTSG%20draft%20TYNDP%202020%20Scenario%20Report.pdf .

- ACER Opinion⁹ 06/2022 on the key elements of the ENTSO-E and ENTSOG draft TYNDP 2022 Scenario Report.
- (12) The Agency reviewed scenario and network planning practices, including via reviews carried out in the context of its Opinions on national network development plans.

1.3 Organisation of the Guidelines

- (13) These Guidelines put forward criteria and guidance on:
- A timely scenario preparation process;
 - Robust “objective-driven” scenarios;¹⁰
 - Transparent, inclusive and streamlined development;
 - A process for stakeholder scrutiny;
 - A quick-update process.
- (14) The Guidelines furthermore cover how the ENTSOs shall report on how they implemented the Guidelines.
- (15) These topics have been identified based on the targeted-consultation workshop discussions and past ACER Opinions.

2. Criteria for a timely scenario preparation process

- (16) The TEN-E Regulation sets out (albeit not explicitly) a two-year frequency for the network development scenarios, as the TYNDP is developed with a two-year frequency. The current practice foresees the TYNDPs by the end of even-numbered years.
- (17) The TEN-E provisions do not explicitly define the timing and deadlines of scenario preparation. However, the TEN-E Regulation allows six months for the scrutiny of scenarios pursuant to articles 12(5) and 12(6), ending with the European Commission’s approval, plus six months for the ENTSOs to prepare the infrastructure gaps reports after the Commission’s approval, pursuant to Article 13(1). Given that the infrastructure gaps reports are prepared within the framework of the Union-wide ten-year network development plans, their preparation is expected by the end of the even-numbered years, coinciding with the current practice of the comprehensive TYNDPs per (16).
- (18) Based on the above, the Agency expects the draft TYNDP joint scenarios report to be published and submitted to the Agency, the Member States and the Commission by 31 December of the odd-numbered years (12 months before the infrastructure gaps reports and the TYNDPs). This expectation is in line with a long-standing ACER recommendation on TYNDP scenarios (cf. ACER opinion 21/2014 and other opinions on TYNDP scenarios).
- (19) In its opinions on the draft TYNDP Scenario Reports, and in the ACER-CEER Position Paper on TEN-E of March 2021¹¹, the Agency repeatedly called for a process allowing a timely preparation of scenarios, using assumptions as updated as possible. To ensure a timely development of the

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https://www.acer.europa.eu/sites/default/files/documents/Official_documents/Acts_of_the_Agency/Opinions/Opinions/ACER%20Opinion%2006-2022%20on%20draft%20TYNDP%202022%20Scenario%20Report.pdf .

¹⁰ Objective-driven scenarios are scenarios focused around the policy objective of achieving the Union’s energy and climate objectives for 2030 and 2050.

¹¹ https://www.acer.europa.eu/sites/default/files/documents/Position%20Papers/ACER_CEER_TEN_E_2021.pdf .

scenarios, ACER recommends the ENTSOs to identify and propose, together with the Stakeholder Reference Group ('SRG'), whose role and composition are described in section 4, a cut-off date, until when adopted energy and climate policies should be taken into account by the ENTSOs. The date shall be agreed with the Commission and ACER and shall be specified in the process timeline (of which further requirements are laid out in Section 4) developed at the start of each scenarios building cycle. Changes after this date shall remain possible through the quick-update process that shall be established according to the specifications presented in Section 6 of these Guidelines.

- (20) For the first edition of the TYNDP scenarios pursuant to these guidelines (TYNDP 2024 scenarios), it appears essential that the draft National Energy and Climate Plans (NECPs), which are due by 30 June 2023, are taken into account in the scenario preparation to the extent possible. This calls for a streamlined scenario preparation process.
- (21) To facilitate a timely process and delivery, the Agency recommends that the storylines process¹² is carried out before and separately from the scenario preparation process and remains applicable for more editions of the TYNDP scenarios (see Section 3), without restricting the possibility for storylines to evolve.
- (22) The Agency also recommends the ENTSOs to prepare a living roadmap document detailing planned changes and larger innovations to be implemented for future scenarios cycles, and that such changes take place, to the extent possible, outside of the scenario preparation process. At the time of the TYNDP consultation, the ENTSOs shall invite feedback from stakeholders on potential innovation to be included in the roadmap. At the start of each scenario cycle, the ENTSOs shall clearly communicate on the innovations that will be implemented in that cycle.

3. Criteria for robust objective-driven scenarios

- (23) The TEN-E Regulation requires that scenarios must be on-target, meaning that the decided energy and climate objectives are to be achieved in each scenario developed.¹³ Furthermore, the scenarios shall be in line with the energy-efficiency-first principle (EE1st principle). These targets are regularly shaped by the developments and the ambition of EU energy and climate policies. The EU policies thus form boundary conditions for the scenarios and the ENTSOs are expected not to deviate from those politically agreed policies, targets and objectives.¹⁴ The scenarios shall comply with the Union's 2030 targets for energy and climate and its 2050 climate neutrality objective, and any adopted updates of the Union's concerned policies.¹⁵ The scenarios shall also consider, where relevant, the national energy and climate plans (NECPs) and shall take into account the latest Commission scenarios.
- (24) To ensure the alignment of scenarios with the Union's energy and climate policies, the ENTSOs must detail how specific assumptions are included in each of the time horizons for each of the constructed scenarios, covering, amongst other:

¹² i.e. development of qualitative storylines as concepts of potential futures, which are later used to develop quantitative scenarios matching those storylines. A storylines thus provides the coherent narrative that ties together the main assumptions of its corresponding scenario.

¹³ Article 12(1), second paragraph: The guidelines shall also aim to ensure that the underlying ENTSO for Electricity and ENTSO for Gas scenarios are fully in line with the energy efficiency first principle and with the Union's 2030 targets for energy and climate and its 2050 climate neutrality objective and shall take into account the latest available Commission scenarios, as well as, when relevant, the national energy and climate plans.

¹⁴ As it may be difficult to develop scenarios which are exactly on target, ENTSOs are allowed to deviate from these targets up to a reasonable, pragmatically agreed amount. The deviation should be explained in the report accompanying the submission of draft scenarios for the Agency's opinion.

¹⁵ Such updates should be linked to the cut-off date. When the status of possible upcoming Union policies is unclear, the ENTSOs shall seek clarification from the European Commission and clearly state the assumptions taken, with due justification.

- The inclusion of the EE1st principle on the supply side and on the demand side of the energy system, as well as on the networks;¹⁶
 - The level of flexibility, such as demand-side response;
 - The development of generation, in particular offshore wind generation, and energy storage;
 - How sector' integration is considered: e.g. electrification (e.g. transport and heating), (non-electrified) heating, hydrogen and industry decarbonisation, interactions between energy carriers and carbon dioxide removal (CDR); and
 - How regional differences are taken into account (e.g. in technology cost-efficiency of wind and solar between North and South (due to different productivity potentials) of Europe or in commodity prices).
- (25) The scenarios shall also include a detailed analysis on how the considered EU targets are achieved, including sufficient information about greenhouse gas emissions from the energy sector and carbon budgets (which go beyond the energy sector) to allow the evaluation of TYNDP scenarios with regards to climate targets.
- (26) To the extent possible, ENTSOs scenarios shall take into account up-to-date information on observed changes in the energy sector due to (regional) climate change and on projected future climate change impacts on the energy system.¹⁷ This could be done for example through a regular revision of the assumptions, based on the most relevant (and recent) historic climate data.
- (27) The ENTSOs shall provide a qualitative assessment of how the scenarios would be impacted by the uncertainty around the main selected assumptions and drivers. This (simplified) risk assessment shall be done for each scenario, highlighting the drivers of uncertainty and the main risk factors that could seriously alter the envisaged scenario. Such factors could include, e.g., lack of raw materials, energy price fluctuations, technology immaturity, etc.
- (28) Scenarios and scenario development must be robust, which is achievable through a combination of stability and agility. Stability contributes to robustness by ensuring that the choice of storylines do not unnecessarily deviate from one TYNDP cycle to the other. Agility, on the other hand, ensures that the most up-to-date assumptions and data are used for constructing the scenarios that correspond to the storylines. Scenario development should thus be agile in terms of adapting to changes while stable in terms of its direction.
- (29) Agility also comes into play when unexpected events happen, which have a significant impact on inputs and assumptions used throughout the scenario development process. To ensure that scenarios remain meaningful despite an unpredictable alteration of assumptions, a quick-update process shall be established; this is dealt with in Section 6.
- (30) Scenarios shall build on feasible and broadly supported assumptions about the evolution of energy supply and demand. Such broad support in principle exists more for scenarios that are developed through bottom-up processes where the inputs have already gone through a process of consultation and validation at the national level.

¹⁶ DIRECTIVE (EU) 2018/2002 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2018 amending Directive 2012/27/EU on energy efficiency.

COMMISSION RECOMMENDATION (EU) 2021/1749 of 28 September 2021 on Energy Efficiency First: from principles to practice — Guidelines and examples for its implementation in decision-making in the energy sector and beyond.

¹⁷ Such as vulnerability to high temperatures, floods and other extreme weather events, as well as water scarcity, etc.

- (31) The ENTSOs shall consider the NECPs, if up to date, as the basis for developing scenarios. NECPs underwent local scrutiny and cover in principle the energy and climate actions planned at national level. As NECPs follow their own updating cycle (indicatively every five years), they may be out of sync with the Union's policies, targets and objectives in force at the moment of developing the scenarios. If they are outdated, the ENTSOs shall extend the NECP inputs and bring them in line with the latest policies and technology cost developments.¹⁸
- (32) To further enhance support for the scenarios in a robust and non-discriminatory way, the ENTSOs shall ensure a process for stakeholder scrutiny of scenario inputs and assumptions; this is further dealt with in Section 5.
- (33) Stability and comparability must be enhanced by building scenarios around consistent time horizons, fixed around '0 and '5 years. Scenarios shall be developed at least for the short-term (indicatively up to year 7 after the TYNDP year), the mid-term (approximately up to 10 years after the TYNDP year) and the long-term horizon (approximately 15 years after the TYNDP year). The (very) long-term perspective until 2050 is inherently subject to great uncertainty and would merely have an indicative value allowing the definition of trajectories spanning the mid-term, long-term and very long-term.¹⁹ Nonetheless, to properly demonstrate the compliance of the TYNDP scenarios with the carbon neutrality objectives, a very long-term perspective until 2050 shall be included.
- (34) Stability of the scenarios across TYNDP cycles is further ensured by defining a limited set of scenarios that cover the main uncertainties affecting network planning. The choice of storylines and scenarios pertaining to this set shall not be revisited unless there are strong reasons to do so.
- (35) The set of scenarios must be balanced and informative for decision makers, stakeholders and the public. Decision makers, stakeholders and the public must understand in general how the scenario variations affect the cost-benefit assessment and how the different assessment outcomes relate to each other. In other words, the set of scenarios must be objective-oriented and must cover the main uncertainties that affect network development. The Agency emphasises that a further sensitivity analysis, which would best fit the process of cost-benefit assessment, could provide even more insights to the decision makers regarding how a change of a single assumption would affect the outcome of a project assessment. Such sensitivity analysis may be particularly suited to deal with near-term uncertainties.
- (36) The Agency recommends that a single (best estimate) scenario for the short-term is prepared to help streamline the scenario preparation activities. This scenario shall be based on the NECPs, in line with recital (31).
- (37) The set of mid-term and long-term scenarios shall include the best-estimate central scenario, based on NECPs, and contrasting "low"-economy and "high"-economy variants that serve as stress-tests of the central scenario.²⁰ The Agency finds that stress-testing network development along the dimension of a more conservative ('low') and a more optimistic ('high') view on the economy resonates with decision makers.
- (38) For the mid-term and long-term time horizons, the ENTSOs can propose additional scenarios. Before including such additional scenarios, the ENTSOs shall consult stakeholders on the key uncertainties concerning network development and the choice of corresponding storylines.

¹⁸ Such sanity check shall be performed for any bottom-up data to ensure the assumptions of the scenario are met and the resulting scenario complies with the latest policies.

¹⁹ While acknowledging the importance of considering trajectories up to year 2050 in the definition of the appropriate assumptions for the intermediate years, very long-term ("n+25") assumptions are of limited usability for the purpose of network planning and project assessment. In addition, huge uncertainties affect the period between the long term, approximately 15 years from the TYNDP year, and the very long term up to 2050.

²⁰ Conceptual and modelling work would have to be carried out to de-construct how specific assumptions regarding energy demand and supply depend on various drivers like, for instance, the evolution of energy prices, the evolution of technology and economic growth.

Thereafter, the ENTSOs, together with the SRG, shall confirm the storylines before each cycle, or decide to re-open the storyline topic (as per recital (21)). If additional scenarios are added to the set, a sufficient spectrum of contrasting scenario variants shall be included to ensure the set of scenarios remains balanced.²¹ The included variants should be adequately differentiated and contrasted already from the year considered for the mid-term horizon (i.e. after the short term single scenario year(s)).

- (39) To ensure coherent scenarios, it is crucial that inputs are checked for consistency both internally within scenarios and between scenarios, and that reasons of differentiation are explained. The ENTSOs shall explain the main uncertainties of each scenario data set, and how the different scenario variants relate to each other.
- (40) The Agency expects consistency to be maintained as much as possible between the near-term and mid-term horizon of the TYNDP scenarios and the inputs used for the European Resource Adequacy Assessment (ERAA).²² Any differences shall be appropriately explained.

4. Criteria for a transparent, inclusive and streamlined development process

- (41) The development of scenarios shall follow as much as possible an open process to involve stakeholders, enabling a broad participation. However, in line with the provisions of the TENE Regulation, for reasons of streamlining the process, and enabling a participation commensurate with the technical nature of the work, the ENTSOs shall ensure to involve at least the representative stakeholders for the groups described in Article 12(3) ('key stakeholders').
- (42) To ensure key stakeholders are appropriately consulted and have the opportunity to interact among themselves, the ENTSOs shall create a Stakeholder Reference Group ('SRG') within 3 months after the adoption of these Guidelines, by launching a call for interest to stakeholders mentioned in (43).
- (43) Besides the legally mandated key stakeholders, the ENTSOs are encouraged to include other relevant organisations and independent experts to the SRG. The composition of the SRG shall be balanced with regards to specific interest groups, avoiding, to the extent possible, individual entities to be represented more than once. The Agency recommends that each SRG member stakeholder shall be represented by one representative. After its creation, the ENTSOs shall then act as observers and facilitators of this group. In addition, ACER, the European Commission, Member State Representatives, and the European Union's Scientific Advisory Board on Climate Change (hereafter 'Scientific Advisory Board') can become observers to the SRG.
- (44) The members of the SRG shall choose a convener of the Group, who would be responsible to convene the SRG meetings,²³ take minutes of meetings and ensure a non-discriminatory dialogue within the SRG. The members of the SRG may propose to the ENTSOs new members of the SRG or to discontinue individual SRG membership where a conflict of interest is identified. The list of SRG members shall be made public.
- (45) SRG shall organise itself to act independently from the ENTSOs, with the aim of providing timely, expert input to the ENTSOs' development of scenarios in accordance with the ENTSOs' scenario development timeline.

²¹ E.g. when scenarios focusing on distribution of energy generation are developed, a 'distributed' variant shall be contrasted by a 'centralised' variant.

²² The ERAA is introduced by Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (recast). At least the best-estimate central scenario referenced in recitals (36) and (37) shall be consistent with the ERAA inputs.

²³ Which could be hosted on virtual platforms or (on a voluntary basis) by the ENTSOs or any of the Group's members.

- (46) Before starting the scenarios-building cycle, the ENTSOs shall publish a comprehensive process timeline and stakeholder engagement plan specifying the key moments for decision-makers, stakeholders and the public to provide input. To the extent possible, the SRG should be involved in co-creating these plans; in particular, the plans shall consider the SRG's feedback on the scenario-building process to be formulated at the end of each cycle as per recital (67).
- (47) The comprehensive process timelines shall at least include:
- The different steps for constructing the scenarios with their planned timings (including a timeline for any innovation not yet fully implemented before the scenarios cycle has started);
 - The cut-off date applicable to the particular scenario-building process;
 - When updates on the progress of the scenario-building process will be shared with all stakeholders (e.g. publication of documentation and data);
 - How the SRG and other stakeholder engagement are integrated in the process (linking it to the stakeholder engagement plan).
- (48) The comprehensive stakeholder engagement plan shall explain the specific elements on which input is expected by when and must be drawn up taking into account legitimate expectations of the stakeholders and different capabilities of the stakeholders:
- Allowing the stakeholders and other contributors enough time to evaluate the key inputs and provide input on the assumptions driving and influencing the results;
 - Detailing by when the SRG must deliver its different inputs;
 - Explaining how non-SRG stakeholder engagement will be carried out, noting that there should be at least one broad public consultation on the draft scenarios.
- (49) The ENTSOs shall record all stakeholder interactions, including the SRG (who shall record their own activities), in terms of the parties, the topic(s) discussed and how the interaction has been considered in the development of the scenarios; a clear overview of these interactions shall be made available to the public.
- (50) An open and streamlined process relies on clear communication about the assumptions and proper documentation of the inputs, assumptions, models and scenarios. As described more in detail in (51)-(52), all relevant information should be made available in line with the FAIR principle (Findable, Accessible, Interoperable and Reusable).²⁴ When publishing this documentation, the ENTSOs shall respect justified confidentiality claims by signalling which data is confidential and providing a sufficient explanation that allows stakeholders to understand what the data is about, why it is confidential and how the ENTSOs have considered those data in the development of the scenarios. In order to allow accessibility and reusability, the ENTSOs shall avoid any agreements which could lead to confidentiality claims and consequent data restrictions and should minimise (e.g. by publishing aggregated and simplified data) the use of sensitive information.
- (51) The ENTSOs shall adopt academic standards for the presentation of inputs, assumptions, models and final scenarios, in terms of consistency of units and having a list of the sources for the different inputs.

²⁴ Wilkinson, M., Dumontier, M., Aalbersberg, I. *et al.* The FAIR Guiding Principles for scientific data management and stewardship. *Sci Data* **3**, 160018 (2016). <https://doi.org/10.1038/sdata.2016.18>.

(52) The ENTSOs must make available information adjusted to different stakeholder needs and capabilities. All information shall be published on the ENTSOs websites and be available to all stakeholders:

- For informed stakeholders,²⁵ the ENTSOs shall publish all data sets, qualitative assumptions and formal hypotheses, as granular and disaggregated as possible, in an appropriate and predefined format²⁶. Additionally, they shall provide technical documentation of the tools and models for those wishing to replicate and reproduce the scenario building. The documentation should explain how the tools and models are used in the process for constructing scenarios. The way in which data sets are shared shall remain as much as possible consistent across cycles to increase robustness;
- For the wider public, the ENTSOs shall publish visual, as well as simplified information about the scenario-building, ensuring comprehensibility of the main data and results;
- The information shall include at least:
 - i. Regarding the inputs, the sources of the data, information on the pre-processing of data, a differentiation of endogenous and exogenous variables, and technology cost data;
 - ii. Regarding the assumptions, an explanation of uncertain factors considered, information about the construction of the set of scenarios, assumptions for processed data, and the key assumptions emphasised in recital (24);
 - iii. Regarding the methodologies (including models), the output data, model-specific properties and documentation;
 - .iii.1. Information on supply per technology and Member State (bidding zone) and the underlying energy price assumptions;
 - .iii.2. Information on installed capacity per technology and Member State (bidding zone);
 - .iii.3. Information on demand per sector and Member State (bidding zone) and underlying energy price assumptions, including the level of demand response for all segments of demand and for all price levels;
 - iv. Regarding the final scenarios, a detailed description, visual information and communication about the underlying uncertainties.

(53) The ENTSOs shall benchmark their scenarios with the most relevant external scenarios²⁷ by providing a comparison of key inputs and outputs for the whole scenario time frame. Deviations should be described in detail and, to the extent possible, explained, as well as their expected implications on scenario outcomes. ACER recognises that the extent of such benchmark exercise will also depend on the availability and the granularity of the data from the chosen external scenarios.

²⁵ These publication requirements shall not limit the functioning of the SRG, as the SRG shall have access to the information necessary to carry out its task.

²⁶ To be agreed with the users of the data and consulted with the SRG.

²⁷ The external scenarios used for benchmarking could be defined by the SRG.

5. Ensuring stakeholder scrutiny

- (54) To ensure a robust and non-discriminatory scenario development process, scenarios must be based on comprehensive information and prepared impartially. Stakeholder scrutiny of inputs, assumptions and methodologies (including models) contributes to those principles. The SRG shall offer scrutiny, by performing a balanced internal discussion, independently from the ENTSOs, on the inputs, assumptions and methodologies proposed by the ENTSOs. The time available to the SRG to discuss and reach an informed and balanced view in their advice shall be defined in the agreed procedural time-plan for scenario development (cf. the process timeline and stakeholder engagement plan mentioned in Section 4).
- (55) The SRG shall provide its advice to the ENTSOs covering the main outcomes of their discussions, reflecting majority views and minority views. This advice shall be included in the draft Scenario Report submitted for ACER's Opinion and Commission's approval.
- (56) In case the SRG cannot reach a significant²⁸ majority view, the ENTSOs are encouraged to seek further advice from energy and climate scientists and experts.
- (57) The SRG can request all information and documents to carry out its tasks; the ENTSOs shall make available that information taking into account their duty to protect confidential information in line with legal requirements.
- (58) The ENTSOs remain at all times responsible for the inputs, assumptions and timely submission of the draft Scenario Report and are not bound by the advice of the SRG; however, this advice must be recorded and published in line with the transparency requirements established in Section 4.

6. Guidance for establishing a quick-update process

- (59) The quick update is meant to add agility to the scenario-development process if last minute changes need to be made to at least one of the main scenario assumptions.
- (60) To trigger the quick-update process, a sufficiently significant event²⁹ must occur after the cut-off date, which was not foreseen at the beginning of the standard scenario-development process and which could not be considered within its regular timeline. The quick-update process can be activated by the European Commission or by ACER. Either of the ENTSOs, SRG or Scientific Advisory Board can propose the activation of the quick-update process. If doing so, the entity activating this process must inform all other entities mentioned in this paragraph.
- (61) The activating entity of the quick-update process shall provide a list of the assumptions that need to be re-assessed by the ENTSOs. Within one month from the receipt of the activation note, the ENTSOs shall jointly propose how the indicated scenario assumptions are to be updated and in which timeline, by informing accordingly the European Commission, ACER, the Scientific Advisory Board and the SRG.
- (62) The SRG shall review the proposed amendments and within three weeks provide non-binding recommendations to the ENTSOs, taking due account of the process for stakeholder scrutiny defined in Section 5. In parallel, a two-week public consultation shall be initiated by the ENTSOs. The inputs from the public consultation shall be made available to the SRG to help them finalise their inputs. This timing can be extended if the ENTSOs support such an extension.

²⁸ Indicatively, a significant majority view could mean it is supported by 2/3^{rds} of the SRG members who contributed to the discussion.

²⁹ Such an event has to clearly and sufficiently impact at least one of the assumptions that defines a scenario. In particular, if a scenario becomes at risk of not being aligned with the most recent policy targets.

- (63) The ENTSOs shall decide on the scenario adaptations, taking due account of the SRG's recommendations, and shall produce amended scenario(s) within three weeks after receiving the non-binding recommendations. This timing can be extended if the TYNDP process allows.
- (64) The quick-update process shall be performed on the central scenario, unless time allows adaption also of its variants. The final Scenario Report shall be clear on which scenarios were updated and which ones not.
- (65) The scenario update itself and the process leading to it shall be transparently explained in the final Scenario Report of the ENTSOs.

7. Implementation reporting requirement

- (66) The ENTSOs must transparently report on how the scenarios and the scenarios-development process ensure compliance with the TYNDP Scenarios Guidelines. This report must appropriately cover all the criteria in these Guidelines and could be integrated in the Scenario Report submitted to the Agency for its Opinion according to Article 12(5) of the TEN-E Regulation.
- (67) Additionally, after the submission of the draft Scenario Report by the ENTSOs, the SRG shall formulate an advice that includes an evaluation of the scenarios-development process and recommendations for improvements for the next cycle. The SRG shall share this advice with ACER and the ENTSOs.