

MINIMUM REQUIREMENTS FOR THE PREPARATION OF THE TEN-YEAR DEVELOPMENT PLAN OF THE NATIONAL TRANSMISSION NETWORK

TITLE 1 - GENERAL PROVISIONS

Article 1

Definitions

- 1.1 For the purposes of this Regulatory Order, the definitions contained in Annex A to the Regulatory Order 30 December 2004, 250/04 (Regulatory Order 250/04) shall apply.
- 1.2 For the purposes of this Regulatory Order, the following definitions shall also apply:
- a) **Authority** is the Italian Regulatory Authority for Electricity, Gas and Water;
 - b) **License Agreement** is the Agreement annexed to the Decree of the Minister of Economic Development 20 April 2005 concerning the license for transmission and dispatching of electricity, as amended and supplemented by the Decree of the Minister of Economic Development 15 December 2010;
 - c) **European Network of Transmission System Operators for Electricity** or **ENTSO-E** is the association [of transmission system operators] established by Regulation (EC) No 714/2009;
 - d) **ENTSO-E CBA 2015** is the report “*ENTSO-E Guideline for Cost Benefit Analysis of Grid Development Projects FINAL- Approved by the European Commission on 5 February 2015*”;
 - e) **transmission system operator** refers to Terna S.p.A, pursuant to Article 36(1) of the legislative Decree 93/11;
 - f) **Interconnector** is a reinforcement of interconnection infrastructure with foreign countries developed by Terna S.p.A. [and financed by private investors] under Article 32 of Law 23 July 2009, no. 99¹;
 - g) **development intervention**² [intervention] refers to the development intervention set out in Article 2(1)(1) of the **Grid Code**; it consists of (i) works closely interdependent and individually necessary for the achievement of the main benefit (major works) and (ii) of other works necessary to the implementation of the intervention (ancillary works);
 - h) **Merchant lines** are interconnection lines with foreign countries [developed by other promoters] referred to in Article 1-quinquies(6) of

¹ Note 1 to the unofficial English version: [Law 23 July 2009, no. 99 requires Terna to develop 2500 MW of interconnection capacity, to be financed by private investors (large electricity consumers), via a tender procedure].

² Note 2: [“development intervention” usually corresponds to the term “cluster” used by the Agency for the Cooperation of Energy Regulators (ACER). “Work” is usually named as “investment item” by ACER].

the Decree-Law 29 August 2003, no. 239, as transposed by Law 27 October 2003, no. 290, subject to the requests of exemptions under the Decree of the Minister of Productive Activities 21 October 2005 or under Regulation (EC) No 714/2009;

- i) **Development Plan (or Ten-Year Plan)** is the national transmission Ten-Year Network Development Plan prepared by Terna S.p.A. pursuant to Article 36(12) of Legislative Decree 93/11;
- j) **PINT (Put IN one at the Time) method** is the benefit evaluation method illustrated in the ENTSO-E CBA 2015, section 3.6.4, which adds an intervention in the network and market reference models (which normally do not include development interventions), and then calculates benefits as a difference between the results with the intervention and the results without the intervention;
- k) **TOOT (Take Out One at the Time) method** is the benefit evaluation method illustrated in the ENTSO-E CBA 2015, section 3.6.4, which removes an intervention in the network and market reference models (which normally do include development interventions), and then calculates benefits as a difference between the results with the intervention and the results without the intervention;
- l) **National Transmission Network (or RTN)** is the national electricity transmission network referred by the Decree of the Minister of Industry, Trade and Crafts 25 June 1999 and subsequent ministerial Decrees on the scope of the national transmission network, as amended and supplemented as a result of the development interventions or other expansions approved by the Minister of Economic Development;
- m) **[ENTSO-E] Ten-Year Network Development Plan (or TYNDP)** is the Union-wide network development plan, adopted by ENTSO-E every two years pursuant to Article 8(3)(b) of Regulation (EC) No 714/2009;
- n) **TIT [Tariff Integrated Text]** is the Annex A to Regulatory Order 23 December 2015, 654/2015/R/EEL.

1.3 For the purposes of this Regulatory Order, reference is made to Chapter 2 “Network Development” of the Grid Code.

Article 2

Subject matter and scope

2.1 This Regulatory Order aims at:

- a) facilitating planning and regulatory approaches based on criteria for selecting investments and focused on the utility for the power system;
- b) ensuring transparency with regard to the development needs for the entire National Transmission Network and the planned development interventions;
- c) ensuring that useful information is provided to all stakeholders to participate in the public consultation process on the Ten-Year Plan;

- d) providing useful information for the Authority's assessment, monitoring and evaluation, supervision and compliance check of the Ten-Year Plan and its implementation in accordance with Articles 36(13), 36(14), 43(3) and 43(6) of Legislative Decree 93/11;³
- e) ensuring useful information for the Authority's checks of the consistency of RTN planning and development with the needs of an efficient transmission service, open access to electricity networks, promotion of competition and minimisation of charges related to the procurement of resources for power system dispatching referred to in Article 27(2) of the Regulatory Order 250/04;
- f) providing evidence that investments in transmission networks are compatible with the economic efficiency and security of the system, as required by Article 18(1) of the TIT.

2.2 The provisions of this [Annex A] shall apply as from the Ten-Year Plan 2017, unless otherwise specified by the Regulatory Order [627/2016].⁴

TITLE 2 – MINIMUM REQUIREMENTS FOR COMPLETENESS AND TRANSPARENCY OF THE TEN-YEAR PLAN

Article 3

Minimum information requirements of the Ten-Year Plan

- 3.1 The Ten-Year Plan comprises and provides a clear distinction among:
- a) planned development interventions ["planned interventions"], which constitute an integral and essential part of the Ten-Year Plan;
 - b) interventions "under evaluation" or "under study", for which no construction activities are planned in the horizon of the Ten-Year Plan and which may become "planned" interventions in the subsequent ten-year plans⁵;

³ Note 3: [Pursuant to Article 36(13), the Authority evaluates the Ten-Year Plan, carries out a public consultation, publishes the consultation results and issues an Opinion to the Ministry for Economic Development for the subsequent Ministry's approval of the Ten-Year Plan. Pursuant to Article 36(14), the Authority monitors and evaluates the implementation of the Ten-Year Plan and may request the transmission system operator to implement an investment, unless it is delayed by exogenous reasons. Pursuant to Article 43(3), the Authority supervises the transmission investment plan. Pursuant to Article 43(6), the Authority checks compliance of the transmission investment plan with the ENTSO-E TYNDP and may issue recommendations to amend the plan].

⁴ Note 4: [Article 7 of the Regulatory Order 627/2016 stipulates that the provisions of Articles 4(1), 6(2) and 11(2) of this Annex A regarding i) accompanying scenario and CBA documents, ii) the inclusion of information from other promoters and iii) the application of the cost estimation methodology shall apply starting from the Ten-Year Plan 2018].

⁵ Note 5: [the statuses of the Ten-Year Plan include "under evaluation" and "under study" which are applicable before an intervention becomes "planned". A planned intervention can be in one or more of the statuses which are usually: "planned", "in pre-permitting public discussions", "in design phase", "in permitting", "under construction", "construction blocked" and "commissioned". Regulatory Order 627/2016 does not explicitly fix the list of statuses].

- c) Interconnectors;
- d) Merchant lines.

3.2 The Ten-Year Plan contains at least the following essential elements:

- a) description of objectives and criteria of the network planning process;
- b) analysis of the challenges that emerged in the power system and markets in the period before the preparation of the Ten-Year Plan, and other findings of the operation of the power system and market useful to plan the development interventions;
- c) analysis of the critical situations foreseen in the power system and markets in the study horizon, highlighting the evolution [of critical situations] compared to the previous Ten-Year Plan;
- d) identification of development interventions and their correlation with the existing and foreseen critical situations, including a section on network infrastructures for the development of renewable sources and a section on the analysis of new development interventions which were not planned in the previous Ten-Year Plan;
- e) perspectives and requests for connection to the RTN from Interconnectors and from Merchant lines and their correlation with the existing and foreseen critical situations;
- f) proposals for acquisition of portions of existing grids to expand the RTN, pursuant to Article 2 of the Decree of the Minister of Industry, Trade and Crafts 23 December 2002 and to the Grid Code and proposals to dismiss network elements from the RTN;
- g) identification of priority interventions pursuant to Article 9(2) of the License Agreement and list of projects of common interest (PCIs) relevant to Italy, pursuant to Article 3(6) of Regulation (EU) No 347/2013;
- h) expected results (costs, benefits and other impacts) of the realisation of the full development planned in the Ten-Year Plan;
- i) intervention sheets displaying information on the planned intervention and the results of the cost-benefit analysis, when applied, of each planned intervention and, in the case of an intervention already planned in the previous Ten-Year Plan, its progress⁶;
- j) a tabular summary, in editable format, of the main data related to the planned interventions, Interconnectors and Merchant lines, including, where applicable, the data referred to in Articles 5(2) and 5(5);
- k) a list and a brief description of the interventions “under evaluation” or “under study” or in other situations prior to the status of "planned intervention", providing separate evidence of new interventions under

⁶ Note 6: [progress options normally used include “on time”, “before schedule”, “delayed” and “rescheduled”. Regulatory Order 627/2016 does not explicitly fix the advancement options].

evaluation [interventions which were planned in a former Ten-Year Plan] and new interventions under study;

- l) monitoring of interventions for connecting users to the RTN, as defined pursuant to the Grid Code;
- m) report, in the form of a list, on interventions carried out during the year preceding the Ten-Year Plan, accompanied by an indication of the actual implementation times and of the incurred [investment] costs, as well as the non-executed implementations, due both to exogenous delays or voluntary postponement, and their causes;
- n) monitoring of grid developments due to other provisions, including for instance the plan for the adaptation and possible improvement of defense systems for the security of the electricity system or the implementation of Article 32 of Law 23 July 2009, no. 99.

3.3 The Ten-Year Plan may also contain:

- a) specific insights about the needs for power system control and regulation;
- b) summaries of the results of planning studies performed in European or regional or bilateral cooperation with other transmission system operators;
- c) perspectives on the use of innovative technological solutions and systems;
- d) proposals to mitigate difficulties, delays and non-executed implementations of the planned interventions.

Article 4

Complementary reports to the Ten-Year Plan

4.1 The transmission system operator shall accompany the Ten-Year Plan with:

- a) a report containing the description of the scenarios used in the Ten-Year Plan;
- b) a report containing the methodology for cost-benefit analysis applied to achieve the objectives referred to in Article 8(1).

4.2 The scenario description document, after its first edition for the 2018 Development Plan, is prepared by September 30 of each odd year, starting from 2019. The scenario description report [SDR]⁷ shall contain at least the following elements:

- a) the assumptions on economic growth and electricity intensity;
- b) the description of the actual Italian energy demand and electricity demand and their projected values over a study horizon of approximately twenty years, whose duration is defined in accordance with the study horizon of the scenarios used in the ENTSO-E TYNDP;

⁷ Note 7: [The term “scenario description report” corresponds to the ENTSO-E term “scenario development report”].

- c) the description of the current and foreseen electricity supply by type of source or fuel, with a section on the expected evolution of renewable sources, for the study horizon referred to in Article 4(2)(b);
- d) the assumptions regarding fuel and CO₂ prices;
- e) a description of existing and foreseen demand and supply in the interconnected power systems, which are relevant for the evaluations of the Ten-Year Plan, over the study horizon referred to in Article 4(2)(b), or appropriate references to the scenarios used in the ENTSO-E TYNDP;
- f) quantification of [Italian] inter-zonal transfer capacities and of interconnection capacities over the years studied in the Ten-Year Plan, taking into account the prospects for interconnection and the connection requests of Interconnectors and Merchant lines;
- g) the assumptions on the electricity exchanges with power systems out of the perimeter of the study;
- h) the analysis of the consistency of the Ten-Year Plan scenarios with the scenarios used in the ENTSO-E TYNDP and, in case of different approaches or assumptions, the justification for these differences;
- i) the analysis of the consistency of the Ten-Year Plan scenarios with the scenarios used by the largest operator in the natural gas transport network development plan referred to in Article 16 of Legislative Decree 93/11 and, in case of different approaches or assumptions, the justification for these differences;
- j) the results of energy planning activities both at EU level and at national level, studies and other analyses which support the assumptions used in the Ten-Year Plan;
- k) the results of market simulations on the reference market models for each scenario and each study year, at least in terms of expected electricity exchanges with foreign countries, of expected electricity exchanges between the [Italian] zones and of expected electricity generation by type of source or fuel, taking into account the coverage of electricity demand and of ancillary services.

4.3 The cost-benefit analysis (CBA) methodology report provides a detailed description of the methodology applied by the transmission system operator in the process of evaluation of infrastructures planned and included in the Ten-Year Plan, in compliance with the requirements defined in Title 3 [of this Annex A].

4.4 The CBA methodology applied in the Ten-Year Plan is described in Annex A.74 to the Grid Code⁸.

4.5 The Ten-Year Plan clearly identifies the reports used for the preparation of the Plan and highlights any improvements and modifications of the scenarios and the CBA methodology with respect to those used for the previous Ten-Year Plan.

⁸ Note 8: [Regulatory Order 627/2016 required Terna to submit to the Authority a proposal for the CBA Methodology Annex to the Grid Code. In line with the rules for the Grid Code, the Authority positively verified the proposed Annex, subject to one amendment, by its Regulatory Order 856/2017].

Article 5

Minimum requirements on transparency of information regarding planned development interventions and Interconnectors

- 5.1 For each development intervention (including interventions under evaluation or under study), the Ten-Year Plan shall contain at least the following elements:
- a) a description which specifies the existing or foreseen critical situations to which the intervention is correlated and, when necessary for particularly complex interventions, a graphical representation of the works;
 - b) a description of the major expected benefits.
- 5.2 For each planned development intervention, the Ten-Year Plan shall also contain at least the following elements:
- a) the name of the intervention;
 - b) the Ten-Year Plan identifier code of the intervention;
 - c) when applicable, the identification of intervention codes used in the list of PCIs, in the ENTSO-E TYNDP and in the ENTSO-E regional investment plans;
 - d) the name of the works which compose the intervention;
 - e) an indication whether the intervention represents a priority intervention referred to in Article 3(2)(g) or not;
 - f) the main category to which the intervention pertains ("interconnection with foreign countries", "reduction of congestion between zones", "reduction of intra-zonal congestion", "reliability in metropolitan areas", "security and quality of supply" and possibly new categories defined in the report referred to in Article 4(1)(b));
 - g) the type of intervention, whose list is defined in the report referred to in Article 4(1)(b) [of this Annex A], consistent with the intervention types defined in Article 2(6)(1)(2) of the Grid Code and the intervention types referred to in Article 2(6)(2) of the Grid Code;
 - h) the year of the Ten-Year Plan in which the intervention was planned for the first time or was reinserted in "planned" status;
 - i) the impact in terms of increased interconnection capacity or transfer capacity in each direction (when applicable);
 - j) the border or the network boundary, both intra-zonal and interzonal, on which the capacity increase takes place (when applicable);
 - k) the impacts in terms of km of occupied territory by interventions which include construction or dismantling of linear infrastructures;
 - l) the actual or estimated investment cost;
 - m) the incurred [investment] costs;
 - n) the main categories of expected benefits;
 - o) any complementarity relationships or generally interdependences with other interventions.

- 5.3 Information in Article 5(2)(k), (l), (m) and (n) refer to the impact on the Italian territory and to the cost and benefits for the Italian power system.
- 5.4 For each Interconnector, the Ten-Year Plan contains at least the information referred to in Article 5(2) and the results of the cost-benefit analysis referred to in paragraph 5.5 below.
- 5.5 For each intervention subject to cost-benefit analysis, the Ten-Year Plan also contain at least:
- a) monetisation or quantification of the main benefit categories;
 - b) the ratio between the discounted benefits and the total discounted costs for the Italian power system, evaluated in accordance with the provisions of Article 12(11);
 - c) the net present value of net benefits for the Italian power system;
 - d) when the sequential TOOT method referred to in Article 12(2) is applied, the indication of the sequence of interventions considered to determine the benefits.
- 5.6 The indicators listed in Article 5(5) shall be submitted taking into account the treatment of uncertainty set out in Article 10.
- 5.7 For the development interventions impacting on other countries, where available on the basis of the ENTSO-E TYNDP and regional plans, the Ten-Year Plan shall also show, for completeness, the costs and the benefits of each intervention for the entire perimeter of the ENTSO-E analysis.
- 5.8 For each major work, as well as for ancillary works with estimated cost equal to or greater than 15 (fifteen) Million Euro, the Ten-Year Plan shall contain at least the following elements:
- a) the name of the work;
 - b) the status of the work;
 - c) the actual or estimated investment cost and the actual or estimated operating cost;
 - d) an indication of the maturity level of the cost estimation according to the methods and estimation stages referred to in Article 11;
 - e) when applicable, the illustration of any critical issues which determine further uncertainties on the estimated costs;
 - f) the actual or estimated date of start of the permitting process or of comparable activities;
 - g) the actual or estimated date of start of construction;
 - h) the actual or estimated date of commissioning;
 - i) when applicable, the illustration of any critical issues which determine further uncertainties on the estimated dates;
 - j) the progress of the work compared to the previous Ten-Year Plan;
 - k) when applicable, the cause of delay or the cause of voluntary rescheduling.

Article 6

Communication and publication of information about interventions developed by other promoters

- 6.1 The Ten-Year Plan includes interventions developed by promoters other than the transmission system operator and provides a summary of the relevant information published in the ENTSO-E TYNDP preceding the publication of the Ten-Year Plan.
- 6.2 The transmission system operator defines, as part of the Grid Code, the ways and timings by which the promoters of interventions included in the ENTSO-E TYNDP or of PCIs may update the information relevant to their interventions.
- 6.3 The Ten-Year Plan clearly identifies the information derived from the ENTSO-E publications and the information updated by the promoters.

Article 7

Obligations of communication and publication by the transmission system operator

- 7.1 The transmission system operator publishes the scenario description report referred to in Article 4(1) by 30 September 2017 and subsequently at least every two years, by 30 September.
- 7.2 The transmission system operator transmits to the Authority the draft Ten-Year Plan by 31 January.
- 7.3 By the same date referred to in Article 7(2), the transmission system operator publishes information on interactions with network users and their associations in preparing the draft Ten-Year Plan, including interactions with the Consultation Committee referred to in Article 1(4) of the Prime Minister Decree 11 May 2004.
- 7.4 After the result of the conformity clearance of the Ministry of Economic Development pursuant to Article 9(2) of the License Agreement, or after the expiry of the 45-day period for such conformity clearance pursuant to the same Article, the transmission system operator promptly transmits to the Authority the draft Ten-Year Plan for public consultation⁹ and for other Authority's activities [see Note 3].

⁹ Note 9: [Article 3 of the Regulatory Order 627/2016 sets out that:

- a) the Authority shall publish on its website the draft Ten-Year Plan, give notice of the start of public consultation and set a deadline for the submissions of comments at least 30 days after the notice;
- b) simultaneously, the Authority shall publish an electronic format to be used by stakeholders to submit comments on the draft Ten-Year Plan;
- c) the Authority only takes into account the reasoned observations, which were provided not anonymously;
- d) if a stakeholder submitting comments intends to make certain part of them confidential, it shall transmit in electronic format also the amended version to be made public and it shall provide adequate reasons to justify the confidentiality of the omitted information.

- 7.5 Together with the transmission of the draft Ten-Year Plan referred to in Article 7(4), the transmission system operator publishes the draft Ten-Year Plan.

TITLE 3 – MINIMUM REQUIREMENTS FOR THE COST BENEFIT ANALYSIS 2.0

Article 8

Objectives of the cost-benefit analysis

- 8.1 The provisions referred to in this Title pursue the following objectives:
- a) to improve the transparency and completeness of data underlying the technical-economic analysis of the development interventions of the RTN;
 - b) to ensure the consistency and robustness of the assessments of the interventions performed by the transmission system operator;
 - c) to promote a selection of investments by the transmission system operator and by the Authority;
 - d) to align the criteria and methods to international good practices, especially considering the activities in the ENTSO-E framework;
 - e) to use a cautious approach, in order to avoid any risk of double counting, of overestimating benefits or underestimating costs, also in relation to selective regulatory mechanisms for infrastructure investments;
 - f) to monetise, where feasible and relevant, each benefit associated with each development intervention analysed;
 - g) to pay attention to the reduction of costs incurred by electricity network users and to the utility of interventions for the Italian power system;
 - h) to provide elements for developing and managing selective incentive mechanisms for investments.

Article 9

Study years

- 9.1 The transmission system operator identifies:
- a) a short to medium term study year (generally between 3 and 6 years following the year of the Ten-Year Plan);
 - b) a medium to long-term study year (approximately between 7 and 11 years following the year of the Ten-Year Plan);
 - c) a long-term study year, identified in line with ENTSO-E TYNDP.
- 9.2 In order to identify the study years, the transmission system operator takes into due consideration the increased availability and comparability of data and forecasts for the so-called fixed years (e.g. 2020, 2025, 2030).

Article 4 of the Regulatory Order 627/2016 sets out, inter alia, that the transmission system operator shall transmit to the Authority, within 30 days of the deadline for public consultation comments, its evaluations on the comments submitted, for their subsequent publication on the Authority's website].

- 9.3 The cost-benefit analysis assesses at least two study years for each intervention. Interventions with a commissioning date after the short to medium term [indicated in 9(1)(a)] are assessed in the medium to long-term study year [indicated in 9(1)(b)] and long-term study year [indicated in 9(1)(c)]. The transmission system operator defines in the Ten Year Plan the choice and justification of the most appropriate study years for the other interventions of the Ten-Year Plan.

Article 10

Requirement for treatment of uncertainties

- 10.1 The short to medium term study year is mainly represented by a single reference scenario (expected progress scenario).
- 10.2 Sensitivity analysis on specific parameters may complement the evaluation of benefits in the expected progress scenario.
- 10.3 The medium to long-term and long-term study years are represented by at least two different scenarios (contrasting scenarios), in order to treat the higher uncertainties associated with longer time horizons.
- 10.4 The development interventions in the categories "interconnection with foreign countries", "reduction of congestion between zones", "reduction of intra-zonal congestion" are evaluated with reference to each scenario of the years in which the intervention is being studied. For other development interventions, the transmission system operator defines in the Ten-Year Plan appropriate evaluation methods.
- 10.5 The presence of sensitivity analysis in the short to medium term study year, when studied, and the analysis of contrasting scenarios in the mid-long term [indicated in 9(1)(b) and in 9(1)(c)] is necessary for evaluating the interventions proposed by the transmission system operator and for the access to tariff incentives for infrastructures under the TIT.

Article 11

Requirements for the analysis of costs

- 11.1 The cost items to be considered in the CBA of each intervention are at least:
- a) the investment cost for the implementation of the intervention, including transmission-infrastructure-exogenous costs for compensation purposes and costs for the possible dismantling of existing infrastructures;
 - b) the operational cost, including operation and maintenance costs, during the economic lifetime of the intervention.
- 11.2 The transmission system operator defines, in the cost-benefit analysis methodology report referred to in Article 4(1)(b), the stages of estimation of the investment costs, which are applied for subsequent refinements of the estimate

after progresses of the intervention. It appropriately applies the cost estimation methods in relation to the status of each intervention.

- 11.3 The first stage of cost estimation, usually at the time of planning, is based on an investment cost standard value determined on the basis of the assessment of historical actual cost data of implementation of transmission infrastructures. It takes into account an additional cost coefficient to account for possible design changes.
- 11.4 The transmission system operator publishes in the Ten-Year Plan the reference unit costs determined on the basis of the assessment of historical actual cost data of implementation of transmission infrastructures and the additional cost coefficient referred to in Article 11.3.
- 11.5 The transmission system operator defines and applies in the Ten-Year Plan annual standard operation and maintenance costs by type of intervention or it illustrates in details the evaluations carried out on a specific intervention.

Article 12

Requirements for the analysis of benefits and for the economic analysis 2.0

- 12.1 The benefits of each intervention are calculated by means of network simulations in the presence and in the absence ("with and without") of the intervention under assessment, or by means of market simulations in the presence and in the absence of the impacts on transfer capacities of the intervention under assessment. The simulations shall take into account an estimate of all system requirements, including the need for ancillary services, including as far as possible in the cost-benefit analysis an estimate of the operations of the dispatching services market.
- 12.2 For each study year, the network and market reference models "with" include all the interventions whose commissioning is planned by this year. When multiple development interventions impact on the same network boundary, the sequential TOOT method is normally used, with simulations which take into account the sequence of implementation of individual interventions, as described in Annex 3 of the draft Ten-Year Plan 2015, section 4(5).
- 12.3 Additional assessments may be conducted using the PINT method, if deemed appropriate to illustrate specific interdependence effects between development interventions.
- 12.4 The benefit categories to be considered in the cost-benefit analysis are the following:
 - a) B1. variation (increase) of the socio-economic welfare (SEW) related to the day-ahead market functioning and to increased transfer capacities between network zones or at the borders;
 - b) B2a. variation ([counted positive if:] reduction) of network losses calculated by using probabilistic [network] simulations;

- c) B2b. variation ([counted positive if:] reduction) of network losses calculated through by using simplified approaches via load flow simulations at peak load and conventional coefficients of utilisation of losses at peak load;
 - d) B3a. variation ([counted positive if:] reduction) of expected energy not supplied (EENS) by using probabilistic simulations;
 - e) B3b. variation ([counted positive if:] reduction) of expected energy not supplied by using load flow simulations or by simplified calculations for "radial" portions of the transmission network;
 - f) B4. avoided or deferred costs (or [counted negative] additional costs) related to generation capacities subject to remuneration schemes which supplement or replace the revenues of the day-energy market and of the dispatching services market, in the absence of double counting with benefits B1 and B7;
 - g) B5a. greater integration of production from renewable energy sources (RES) calculated by probabilistic network simulations (local congestion); B5b. greater integration of production from renewable energy sources (RES) calculated using static load flow simulations (local congestion);
 - h) B6. avoided investments in electricity transmission infrastructure which would have otherwise been necessary in response to mandatory requirements (e.g. respect of law);
 - i) B7. variation ([counted positive if:] reduction or [counted negative if:] increase) in costs for network services and procurement of resources on the dispatching services market.
- 12.5 The benefit B1 (SEW) is calculated with reference to the Italian power system (i.e. as the sum of variations of producer surplus, consumer surplus and congestion rents relating to Italy).
- 12.6 The transmission system operator may separately present one or more components of SEW, where deemed appropriate to illustrate the value of specific interventions.
- 12.7 The benefits B2a and B2b are alternative to each other.
- 12.8 The benefits B3a and B3b are alternative to each other. The benefits B5a and B5b are alternative to each other.
- 12.9 The benefit categories referred to in Article 12(4) are monetised through the following parameters or approaches:
- a) the coefficient (expressed in €/MWh) to monetise the variation of network losses (benefit B2) is the average expected price in the day-ahead energy market in the study year, weighed against the expected electricity demand in the different hours;
 - b) the parameter (expressed in €/kWh not supplied) to monetise the EENS variation (benefit B3) is the Value of Lost Load (VOLL), in a range of values between 20 €/kWh not supplied and 40 €/kWh not supplied, with monetisation to be specifically defined by the transmission system

operator in relation to the density, industrialisation or other merit of the areas potentially affected by outages;

- c) the parameter (expressed in €/MWh) to monetise greater integration of RES production due to [relieved] local congestion (benefit B5) is assumed, for the sake of simplicity, equivalent to the expected average price in the relevant area of the day-ahead energy market, normally calculated by using market simulations which internalise the CO₂ effect in the thermal production costs.

12.10 The following benefit categories may be separately considered in the cost-benefit analysis, if deemed appropriate for specific interventions, in the presence of due methodological clarifications and transparency on the simulations:

- a) B13. variation (increase) of the resilience of the system to face extreme events, additional to effects already monetised in the benefit B3;
- b) B18. variation (reduction) of negative externalities associated with the increase of CO₂ emissions, other than the impacts already monetised in benefit B1 by the CO₂ price, in order to account for a possible different value of emissions for the society;
- c) B19. variation (reduction) of negative impacts associated with the increase of other non-CO₂ or greenhouse gases emissions, such as sulfur oxides and nitrogen oxides;
- d) B16. avoided operating costs in electricity transmission infrastructures which would have otherwise been necessary in response to mandatory requirements (e.g. compliance with law).

12.11 The economic analysis adopts the following assumptions:

- a) [social] discount rate: 4% real;
- b) economic lifetime: 25 years of operation;
- c) no residual value.

12.12 The transmission system operator shall define in the Ten-Year Plan the way to weight the expected benefits obtained for each scenario in the study years which are represented by different scenarios.

12.13 The discounting of benefits to the year of preparation of the Ten-Year Plan takes into account the following interpolation rules:

- a) for the period between the commissioning date and the first study year (both years included): value of the benefits obtained for the first study year;
- b) for the period or periods comprised between two study years (excluding the extremes): linear interpolation of the benefits obtained in the two study years;
- c) for the period between the last study year and the year when economic lifetime ends (both years included): value of the benefits obtained for the last study year;

12.14 The economic analysis identifies for each intervention at least:

- a) the indicator IUS (Index of Utility for the System) [B/C], as the ratio between the discounted benefits and the discounted costs;
 - b) the indicator NPV (Net Present Value) [VAN], as the net present value of the net benefits;
- 12.15 In case of monetisation of one or more benefits referred to in Article 12(10), the transmission system operator presents the indicators referred to in Article 12(14), providing separately the value of the indicators which consider only the benefits referred to in Article 12(4) and the value of the indicators which consider the overall benefits.
- 12.16 The economic analysis may also identify for each intervention the range of uncertainty of the indicators, specifying the reasons for uncertainties on costs and benefits.
- 12.17 Starting from the Ten-Year Plan after the 2017 Ten-Year Plan, for interventions in "under construction" status which have already been assessed by a CBA 2.0 pursuant to Title 3 [of this Annex A], the benefit results of the former CBA 2.0 may be presented.
- 12.18 The evaluation of benefits and costs presented in the Ten Year Plan is without prejudice to the Authority's powers to differently assess the robustness of the expected benefits or costs, their uncertainties and their relevance in relation to the various scenarios for the purpose of remuneration decisions and infrastructure incentives.

Article 13

Requirements for the analysis of other impacts

- 13.1 The following impact categories are quantified in the cost-benefit analysis:
- a) I21. increase of interconnection capacity or transfer capacity between network boundaries, in MW;
 - b) I22. variation, in terms of kilometers occupied by linear transmission infrastructure, of territory occupied by power grids;
 - c) I23. variation, in terms of kilometers occupied by linear transmission infrastructure, of the occupation of areas of interest for nature or biodiversity;
 - d) I24. variation, in terms of kilometers occupied by linear transmission infrastructure, of the occupation of areas of interest for society or landscape.
- 13.2 The following impact categories may be quantified in the cost-benefit analysis, but they are not monetised to ensure the absence of double counting or due to limited technical feasibility:
- a) I5. greater integration of production from RES, calculated via market simulations ("system over-generation");

- b) I8. variation of CO₂ emissions calculated via market simulations relating to the day-ahead market;
- c) I13. variation (increase) of the resilience of the system to face extreme events, which are not feasible to be expressed in monetary terms.