

**OPINION OF THE AGENCY FOR THE COOPERATION OF ENERGY
REGULATORS No 14/2017**

of 10 October 2017

**ON THE DRAFT REGIONAL LISTS OF
PROPOSED ELECTRICITY PROJECTS OF COMMON INTEREST 2017**

THE AGENCY FOR THE COOPERATION OF ENERGY REGULATORS,

HAVING REGARD to Regulation (EU) No 347/2013 of the European Parliament and of the Council of 17 April 2013 on guidelines for trans-European energy infrastructure and repealing Decision No 1364/2006/EC and amending Regulations (EC) No 713/2009, (EC) No 714/2009 and (EC) No 715/2009¹, and, in particular, Annex III.2(12) thereto,

HAVING REGARD to the favourable opinion of the Board of Regulators of 10 October 2017, delivered pursuant to Article 15(1) of 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 Regulators² (the Agency),

WHEREAS:

- (1) On 14 July 2017, the draft regional lists of proposed projects of common interest (PCIs)³ (cf. Annex 5 to this Opinion) falling under the categories set out in Annex II.1 to Regulation (EU) No 347/2013 regarding electricity transmission, storage and smart grids were submitted to the Agency.
- (2) The Agency did not receive opinions of Member States concerning proposed electricity PCIs not located on their territories but which could have a potential net positive impact or a potential significant effect on them, which Member States may present to the Regional Groups, pursuant to Annex III.2(9) to Regulation (EU) No 347/2013,

HAS ADOPTED THIS OPINION:

¹ OJ L 115, 25.4.2013, p.39.

² OJ L 211, 14.8.2009, p.1.

³ In this Opinion, the term “proposed PCIs” indicates projects which are included in the document of the draft regional lists submitted to the Agency, either included in category I or II of this document, and the term “candidate projects” indicates projects for which an application for selection was submitted.

1. The process and the methodology applied for establishing the draft lists of PCIs

1.1. Cooperation Platform in the PCI process

The Agency welcomes the establishment of the PCI Cooperation Platform and the constructive work performed by the European Commission, the European Network of Transmission System Operators for Electricity (ENTSO-E) and the Agency within the framework of the Platform (cf. Annex 1 to this Opinion), and highlights its significant role in the improvement of the PCI selection process, including the assessment of the candidate projects.

Recommendation for the future PCI selection rounds:

The Agency notes the valuable role of the PCI Cooperation Platform as a discussion framework and recommends that it be maintained for the upcoming PCI selection process. In this context, the Agency also recommends that the established working framework be used early enough in the upcoming 2019 PCI selection process, in particular for the pending necessary improvements of the ENTSO-E Ten Year Network Development Plan 2018 (TYNDP 2018).

In the Agency's view, these improvements of the ENTSO-E TYNDP deserve the highest priority. They are summarised in Annex 3 to this Opinion.

1.2. Identification of infrastructure needs and related preparatory activities

The approach followed by the Regional Groups regarding the identification of infrastructure needs is presented in Annex 1 to this Opinion.

The Agency welcomes the introduction of the infrastructure needs identification as an initial step of the PCI selection process, as proposed by the Agency⁴ in its Opinion No. 14/2015⁵. This step is acknowledged as a potentially considerable improvement in the selection process, especially if the shortcomings, identified below, are addressed.

The approach adopted by the Regional Groups did not include the quantification of the infrastructure needs, and included overlapping need drivers which could have been avoided⁶. This eventually weakened the relevance of the needs identification to verify the criterion defined by Article 4(1)(a) of Regulation (EU) No 347/2013⁷.

⁴ Agency's letter dated 2 February 2016 to European Commission
http://www.acer.europa.eu/en/electricity/infrastructure_and_network%20development/infrastructure/documents/dominique%20ristori_ec_160202_cooperation%20platform_web.pdf

⁵ http://www.acer.europa.eu/official_documents/acts_of_the_agency/opinions/opinions/acer%20opinion%2014-2015.pdf

⁶ In the context of the PCI Cooperation Platform, the Agency had proposed three drivers (market integration, security of supply and new generation connection) for all corridors, as well as the quantification and, when possible, the monetisation of each driver according to specific metrics (cf. Annex 1).

⁷ While the European Commission's letter of 14 July 2017 to the Agency did not provide any explanation on the reasons for excluding some candidate projects from the draft regional lists, the Agency understands that such

More specifically, the following shortcomings were identified, which the Agency recommends be addressed for the next PCI selection (including for the ENTSO-E TYNDP 2018, which is the basis for the 2019 PCI selection):

- The TYNDP 2016 did not provide a sufficient level of technical analysis of the infrastructure needs. More specifically, a detailed mapping of the infrastructure needs for all study years, for all scenarios studied and for all categories analysed by ENTSO-E (market integration, security of supply and new generation connection) was missing⁸, and no evidence of the storage capacity needs was provided. Due to the lack of a solid technical basis and analysis in the TYNDP 2016, the infrastructure needs identification in the PCI selection process was based on proposals submitted by individual members of the Regional Groups which were not always adequately substantiated. These proposals were based on diverse sources of information, referring to different time horizons, and mainly focused on the present and not on future needs⁹.
- No quantification (and, when possible, monetisation according to specific metrics) of the infrastructure needs was introduced, although this could have been feasible, see Annex 1 to this Opinion.
- The list of infrastructure needs that was agreed upon contained overlapping and therefore redundant need drivers: the “Impact of loop flows” driver, as well as the “Isolation” and the “Reinforcing integration of single Irish market” drivers are sufficiently covered by the “Integration of RES and accommodation of flows” and the “High price differentials” drivers. Also, “Adequacy issues due to significant changes in generation mix” (especially regarding downward adequacy) are not clearly differentiated from “System flexibility and stability”, and “Synchronisation of the Baltic States” overlaps with “System flexibility and stability”.
- The 2020 interconnection capacity target (i.e. “2020 10% target currently not met”) was taken into account as a separate driver, while it is only a proxy of all other need drivers.
- The process of identifying the infrastructure needs did not include a thorough assessment of more cost-effective alternatives to infrastructure development.

criterion was not used in practice, making the needs identification a burden rather than a value for the 2017 electricity PCI process.

⁸ E.g. the graph “SEW/new GTC” was presented only for 9 boundaries, and the optimal capacity indicated was not substantiated. Also, no such graphs were presented for security of supply and new generation connection.

⁹ E.g. for the identification of the need “Infrastructure to enable the reduction of price differentials (by adding capacity) across the EU”, ENTSO-E forecasts for average marginal cost 2020 and Commission data for current average wholesale prices were used, instead of forecasts of system conditions referring to the time horizon closer to the dates when the candidate projects become operational. The chosen approach also partly neglected the effects of infrastructure projects currently under construction that will impact the short-term and mid-term price differentials.

Recommendation for the future PCI selection rounds:

- The Agency proposes to retain the process of identification of infrastructure needs in the future PCI selection rounds. However, significant improvements in the identification and assessment of the infrastructure needs are required.
- Future needs identification should be based on a sufficient level of technical analysis in the future TYNDPs and on data that pertain to an appropriate time horizon (i.e. the dates when the candidate projects become operational).
- More specifically, the future TYNDPs should provide monetised - or at least quantified - information regarding a limited set of transmission infrastructure needs (market integration, generation integration, and security of supply) and storage capacity needs, and a consistent explanation of the contribution of each project included in the TYNDP to these needs.
- The setting of a target capacity at a boundary should come after the definition of infrastructure needs and should be linked to the associated reference costs at that boundary.
- The Agency recommends that an assessment take place as a final step of the infrastructure needs identification process examining whether the identified needs should be addressed by new infrastructure, or whether more cost-efficient solutions could sufficiently remedy the situation.

1.3. The organisation of the PCI assessment process

The Agency welcomes the improvements introduced in the process¹⁰ for the assessment of the candidate projects during this PCI selection round compared to the previous selection rounds:

- the discussion was more focused on the relevant issues, including especially the assessment of the costs and benefits of the candidate projects in the last two meetings of the Regional Groups. This improvement was achieved without the need of additional meetings and extra resources. The number of Regional Group meetings was 7, as in the 2015 PCI selection process;
- more documents were made publicly available; and
- National Regulatory Authorities (NRAs)' assessment (in early June 2017) was the starting point of the Regional Group discussions in the “regional format”, respecting the provision of Annex III.2(11) to Regulation (EU) No 347/2013 (see Annex 1 to this Opinion for a detailed list of meetings).

¹⁰ For the sake of clarity, the “assessment process” refers to the assessment stage after the infrastructure needs identification stage.

Nevertheless, despite the improvements highlighted above, the Agency is of the view that additional efficiencies could be achieved and offers the following considerations which are relevant further to improve the PCI selection process in the future:

- The process of data submission by promoters (including the data on additional benefits) was not as efficient as it could have been, i.e. the request for information on additional benefits was sent out to promoters very late in the process (on 11 April 2017) and with a short deadline (28 April 2017).
- The process of submission by promoters did not follow an appropriate and thorough explanation of the planned use of the data (also because a draft assessment methodology was not yet presented). As a consequence of strict timelines and lack of understanding, the quality of promoters' submissions was affected. Delays were noted in the submission of the data by promoters, as well as multiple submissions and correction of the initially submitted data.
- The timeframes for providing inputs by the members of the Regional Groups were, in some instances, constrained, also due to important information presented only at the Regional Group meetings, without prior circulation, which hindered the provision of high quality inputs and a useful discussion at the Regional Group meetings on some topics.
- The time given to the NRAs to prepare their coordinated assessments with other involved NRAs was limited to the period from 16 May 2017 to 7 June 2017, including a first deadline set by the Agency for the necessary consistency checks on 1 June 2017. Such a short timeframe undermined the contribution from NRAs to the PCI selection process.
- The public consultation seemed not to provide any concrete impact and inputs to the selection process¹¹, as its results were only made available to the Regional Groups at the end of June 2017.
- For Regional Group members that were not part of the PCI Cooperation Platform, the process was not fully transparent, e.g. the data on additional benefits provided by promoters were not circulated to the Regional Groups.
- There is no indication in the submission of the draft lists to the Agency of how the lists were produced and the reasoning behind the inclusion or exclusion of candidate projects in the draft lists. The justification and the reasoning for the draft list of proposed PCIs is very important to ensure transparency of and confidence in the process, considering also that not all eligible projects that passed the set threshold of 3.5 points were included in the draft list of proposed PCIs¹². Also, it is not clear whether some candidate projects

¹¹ A report on the public consultation was published only shortly before the decision making body meeting of 13 July 2017.

¹² For example, project 294 was not included in the proposed list of projects, although it seems to pass the eligibility criteria and the set threshold of 3.5 points.

that did not prove that their benefits outweigh their costs based only on monetised benefits, but which passed the set threshold of 3.5 points after consideration of the non-monetised criteria, were not included in the draft PCI lists for non-eligibility reasons or for other reasons¹³.

- The introduction of a second category of “projects subject to further assessment by considering the qualitative criteria” introduces ambiguity on the role of some candidate projects in the draft list of proposed PCIs.

Recommendation for the currently ongoing PCI selection process:

- In order to improve the transparency of the process for the Regional Group members that were not part of the PCI Cooperation Platform, the Agency recommends that the Regional Groups take care to publish the information on additional benefits, which were not included in the ENTSO-E TYNDP, but were taken into account in the assessment, before the meeting of the Decision Making Bodies of the Groups which will adopt the final regional PCI lists.
- The Agency recommends that the Chairs of the Regional Groups disclose to all their members how the assessment of the candidate projects was carried out and the justification for the inclusion / exclusion of candidate projects.

Recommendation for the future PCI selection rounds:

In the Agency’s view, significant improvements in the organisation of the selection process could be achieved with regard to the following aspects:

- The discussion of infrastructure needs in the Regional Groups should be shortened, also by directly using future TYNDP inputs.
- The process of data submission by promoters (including, if really needed, data on additional benefits beyond those evaluated by the future ENTSO-E TYNDPs) should be improved by setting the appropriate rules for data submission, providing appropriate explanation on the usage of the required data, and allowing adequate time for the promoters’ response.
- Key information on the fundamental features of candidate projects (especially costs, benefits and contribution to infrastructure needs) should be available at least to all Regional Group members. Ideally this information should be publicly available, preferably via the ENTSO-E TYNDP, and subject of the PCI public consultation.
- Better planning and synchronisation of the various activities of the selection process would give stakeholders more time to provide higher-quality inputs.

¹³ For example, projects 281 and 296 were not included in the proposed list of projects, although they seem to pass the 3.5 threshold.

- NRAs should have more time to prepare their coordinated assessments with other involved NRAs. A two-month period seems a strict minimum for this activity.
- A clear and well documented description of the PCI selection methodology should be provided to the Regional Groups allowing proper time (e.g. one month) for discussion.
- The Chairs of the Regional Groups should provide to all members of the Regional Groups, before the session of the technical Decision Making Body, the proposed draft list, details of how the assessment was carried out and the justification for the inclusion / exclusion of candidate projects.
- The Chair of the Decision Making Body should disclose detailed information to all the members of the Regional Groups, including the details of complementary evaluation (if any) carried out on top of the assessment carried out in the Regional Groups.

1.4. The assessment methodology for transmission and storage candidate projects

The assessment methodology applied by the four electricity Regional Groups is presented in Annex 2 to this Opinion.

The Agency warmly welcomes the introduction of a new assessment methodology for the candidate projects, which is for the first time partly based on monetised benefits rendering more robust outcomes.

Regarding the calculation of costs and monetised benefits, the Agency favourably notes that consistent Cost Benefit Analysis (CBA) rules¹⁴ were in general applied. This includes, in particular, the use, for the first time, of benefit results of two study years with suitable interpolation and discounting.

The Agency also positively notes that new benefit categories were taken into account in the assessment, contributing to a more complete analysis, especially regarding security of supply.

However, the following shortcomings were identified:

- The TYNDP 2016 does not provide for all candidate projects all the required data (benefits, costs, reliable contribution of investment items to increase transfer capacity) which would enable a more robust and consistent assessment of the candidate projects. In particular, the aspects related to security of supply benefits were totally missing. Further, it is unclear whether there is consistency in the

¹⁴ Lifetime of 25 years for the calculation of benefits, use of both 2020 and 2030 scenarios outcomes by applying interpolation or extrapolation of values, discounting of values to the present using a 4% discount rate, use both investment cost and life cycle costs for the total project cost.

analysis of internal congestions across the EU¹⁵. Due to these shortcomings, a significant part of the benefit evaluation had to be carried out by the PCI Cooperation Platform on the basis of the benefits presented by promoters in an *ad-hoc* manner.

- Regarding the scenarios, results from ENTSO-E's TYNDP Expected Progress Scenario for year 2020 and Visions 3 and 4 (averaged) for year 2030 were used in the assessment. In the latter case, the European Commission stated that these scenarios are the closest to the assumptions underlying the EU 2030 policy scenario¹⁶. Although the Agency sees merit in this approach and in the harmonisation of the use of scenarios for the TYNDP and the PCI selection, it has to be highlighted that Visions 3 and 4 may result in unrealistically overestimated results, both in terms of infrastructure needs and assessments of individual projects, as previously indicated in the Agency's Opinion on scenarios of the TYNDP 2016¹⁷, mainly due to a Renewable Energy Sources (RES) share well above the current expectations. In addition, using (only) these two scenarios for the year 2030 limits the input regarding the uncertainties of results in the longer term.
- Regarding the non-monetised benefits considered in the assessment, a high degree of double counting is noted. More specifically, the 10% interconnection target is a political target set by the European Council to reflect the various benefits that extra interconnection capacity brings. Therefore, in principle, this criterion should account only benefits not already accounted for in the monetised part. The criterion "Contribution to addressing loop-flows" is double counted with regard to the Socio Economic Welfare (SEW) benefit when this is properly calculated, accounting for internal congestions (see reference to footnote 15).
- The non-monetised criteria were assigned quite high a weight (30% of the overall assessment). In conjunction with the threshold set at 3.5 points out of 10.0, the methodology facilitated (in case a project scored 3.0 points on account of a non-monetised benefit) the inclusion in the draft lists of a candidate project that could not provide any evidence of significant monetary benefits compared to their costs¹⁸. This raises doubts on the actual socio-economic viability of candidate projects with low monetised benefits and on whether they deserve to be included in the PCI list.
- Benefit results were provided in the TYNDP 2016 at a cluster level, without breakdown to investment-item level and without providing calculation details.

¹⁵ For some projects (e.g. 254) it is indicated in the TYNDP 2016 projects sheets that "re-dispatch based benefit calculations were considered for SEW", but it is not clear if this pertains to all projects.

¹⁶ <http://ec.europa.eu/energy/en/data-analysis/energy-modelling>

¹⁷

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

¹⁸ For example, It was enough for a project to be located in a country included in the group of countries that qualified to be assigned 10 points for both the non-monetised criteria, and with Benefits=0, it would pass the threshold of 3.5 ($MB*70\%+NMB*30\%=1*70\%+10*30\%=3.7$)

Despite the Agency's repeated past recommendations¹⁹, no appropriate rules for "declustering" benefits were included in the TYNDP 2016, while in 13 cases it was noted that the candidate projects represented only part of a TYNDP cluster.

- Although, in the meeting of Regional and Thematic Groups for electricity, gas, oil and smart grids of 4 February 2016, it was mentioned that information from the monitoring of the 2nd PCI list would be factored into the PCI selection process, this information was eventually not included in the methodology. This allowed projects that show no or remarkably slow progress over the last years to be proposed again in the draft regional lists.
- The application of the same requirements for advanced and non-advanced projects (e.g. conceptual projects) continues to be inappropriate, as non-advanced projects, in general, cannot reliably provide the same level of details regarding costs and benefits²⁰.

In the Agency's view, significant improvements in the assessment methodology could still be achieved and should be pursued.

Recommendation for the future PCI selection rounds:

- The future TYNDPs should be more fit for the purpose of the PCI selection, by providing a sufficient level of information on the candidate projects and especially on the project benefits according to the Agency's past recommendations (see Annex 3 to this Opinion).
- The Regional Groups should use results of project assessments from contrasting the TYNDP scenarios in the long term, thus accounting for the uncertainties of project benefits. A broader cooperation with policymakers (European Commission, Member States), as well as with NRAs and the Agency should be pursued early in the process for defining the scenarios, ideally when scenarios of the TYNDP are in consultation, or, as a second best option, at least when the TYNDP results are in consultation.
- The Agency strongly supports an assessment methodology that is based on (further expanded) proven monetised benefits rather than non-technical criteria.
- The consideration of the 10% interconnection target is already accounted for through the assessment of project benefits, and there is no need of such explicit extra criterion in the technical assessment of PCIs.

¹⁹ The Agency's Opinion on the TYNDP 2014 is available at: http://www.acer.europa.eu/official_documents/acts_of_the_agency/opinions/opinions/acer%20opinion%2001-2015.pdf and the Agency's Opinion on TYNDP 2016 is available at: http://www.acer.europa.eu/official_documents/acts_of_the_agency/opinions/opinions/acer%20opinion%2001-2017.pdf

²⁰ However, it is positively acknowledged that losses were not taken into account for non-advanced projects.

- There is no need for a separate criterion “contribution to addressing loop-flows” in the PCI assessment²¹.
- The Agency reaffirms its recommendation that a methodology for de-clustering benefits to an investment item level be proposed by ENTSO-E for future PCI selections, unless correspondence between the TYNDP clusters and candidate projects are achieved.
- A simplified and standardised assessment methodology for non-advanced projects (indicated as such in the TYNDP) should be introduced.

1.5. On the assessment of storage projects

The Regional Groups observed that the benefits of storage projects were not fully captured by the TYNDP 2016, and noted a number of apparent inconsistencies in the indicated TYNDP data. For this reason, the assessment was mainly based on additional data that were provided by promoters in order to overcome the identified shortcomings. Although the same approach was used for the assessment of the submitted data for all storage projects and across all regions, the data provided by promoters was based on their own assumptions and studies, which did not adhere to a common methodology.

Recommendation for the future PCI selection rounds:

- The Agency reaffirms its recommendations provided in the Agency’s Opinion No 05/2017 on the Draft ENTSO-E Guideline for CBA of Grid Development Projects²² regarding the improvement of the CBA methodology for storage projects, that a more concrete, quantified and possibly monetised approach be applied in the future TYNDPs, especially regarding the calculation of the benefits related to flexibility and ancillary services.
- Also, in the future TYNDPs, ENTSO-E should provide more transparency on the modelling of storage projects, and the presentation of their simulation input and output data.

²¹ it is noted that according to the CBA 2.0 methodology it is expected that the re-dispatching costs (within a boundary considering grid constraints) will be included and reported in the calculation of the SEW indicator.

²²

http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Opinions/Opinions/ACER%20Opinion%2005-2017.pdf

1.6. On the assessment of smart grid projects

Compared to the 2015 PCI selection process, the assessment of the smart grid projects was better synchronised with the other Regional Group activities, and an updated assessment framework report was prepared²³.

Another remarkable improvement is the update of the Terms of Reference and a more appropriate interpretation of the eligibility criterion (“directly crossing the border of two or more Member States”) set by Article 4(1) of Regulation (EU) No 347/2013. This interpretation, *inter alia*, allowed a slight increase of project applications (four, including three new candidate smart grid projects).

A draft report on "Establishment of the third list of Union Projects of Common Interest - Evaluation of candidate Projects of Common Interest in the area of smart grids deployment" was prepared by the European Commission Joint Research Centre and shared for NRA comments in the period from 8 June to 16 June 2017. However, no information is available to the Agency on whether and when this draft report was shared for comments with all members of the Smart Grids Thematic Group. The evaluation report was published in September 2017²⁴.

Despite the above-mentioned improvements, the following shortcomings were identified:

- Although some NRAs’ assessments were presented in the last Smart Grids Thematic Group meeting, due to the tight time schedule there was no time for them to be the basis for a fruitful discussion within the Thematic Group meeting and therefore it cannot be considered that they represent the starting point of the Thematic Group project assessment, as requested by Annex III.2(11) to Regulation (EU) No 347/2013.
- Despite promoters’ application deadline on 31 March 2017, the Agency and the concerned NRAs received the related promoters’ documents only in mid-June 2017, allowing just two weeks for the NRAs’ assessment.
- The approach based on the Key Performance Indicator (KPI) introduced since 2010 with the ERGEG “Position Paper on Smart Grids” and updated in the updated assessment framework report 2017 continued to have a prominent role in the supporting assessment provided by the European Commission Joint Research Centre to the Thematic Group. Such reliance on KPIs should now be replaced by the use of reliable CBA, which should be the main basis for the assessment of smart grid projects.

²³

J. Vasiljevska, S. Gras, "Assessment framework for projects of common interest in the field of smart grids, 2017 Update". https://ses.jrc.ec.europa.eu/sites/ces.jrc.ec.europa.eu/files/publications/assessment_framework.pdf

²⁴

http://publications.jrc.ec.europa.eu/repository/bitstream/JRC107348/jrc_smart_grid_pci_science_for_policy_report_2017_gk_final.pdf

- Details on costs and monetised benefits were not presented to the Thematic Group until a couple of key indicators (Net Present Value and Benefit/Cost ratio) for three out of four candidate projects²⁵ were published in the evaluation report.

In the Agency's view, significant improvements in the smart grids process and assessment methodology could still be achieved and should be pursued.

Recommendation for the future PCI selection rounds:

- NRAs should be allowed more time to prepare their coordinated assessments with other involved NRAs. A two-month period seems a strict minimum for this activity.
- The future smart grids PCI selection process should be further simplified by focusing on CBA and limiting the relevance of any KPI-based approach.

2. The Agency's Opinion on the proposed PCIs in the draft Regional lists

On 14 July 2017, documents called "draft Regional lists of proposed PCIs" were submitted to the Agency, including a category I of projects titled "*The draft regional lists*" and a category II of projects titled "*Projects subject to further assessment by considering the qualitative criteria*". No explanation was provided on this format (see Section 1.3 of this Opinion). Although it is not clear whether the projects in the second category will be included in the final PCI lists, the Agency herein provides its opinion on all submitted projects.

Regarding the consistency of the PCI selection across regions, the Agency notes that the same terms of reference for Regional Groups and assessment methodology were applied for the evaluation of the three specific criteria of Article 4(2) of Regulation (EU) No 347/2013 across all regions, and that the benefit data used in this assessment was mainly based on the TYNDP CBA results, except for storage and smart grids projects. Therefore, a relatively high degree of consistency was safeguarded throughout the process and across all regions.

However, due to the non-completeness of the TYNDP 2016 regarding the monetised benefits, additional benefits were taken into account for many projects based on the studies and calculations provided by the promoters. Although the same principles, described in Annex 2 to this Opinion, were used for the assessment of the submitted data for all projects and across all regions and while the PCI Cooperation Platform aimed, as far as possible, to favour consistency in the metrics, some inconsistency was inevitable due to the different sources and methodologies for calculating benefits followed by promoter.

²⁵ Again COnnected Networks: NPV equal to 41.8 million € and B/C of 1.6; Alpgrid: NPV equal to 25.2 million € and B/C of 2.6 (IT) and NPV equal to 42.2 million € and B/C of 1.8 (AT); Sincro.Grid: NPV equal to 229.5 million € and B/C of 25.4;

In the following paragraphs, the Agency's opinion on the projects included in the draft lists of proposed PCIs²⁶ is presented, building on the joint assessments of candidate projects by NRAs, more details of which are presented in Annex 4 to this Opinion.

It is noted that NRAs submitted assessment of 79 candidate projects compared to 129 candidate projects included in the relevant list provided to the Agency by the European Commission, for which NRAs were asked to provide their assessment. The draft regional lists of proposed PCIs include 98 projects in category I and 8 projects in category II (based on the same grouping of the relevant list provided to the Agency). More details on the projects included in the proposed draft lists are presented in the following table:

Corridor	Candidate projects	Transmission projects included in category I "The draft regional list"	Storage projects included in category I "The draft regional list"	Transmission projects included in category II "Projects subject to further assessment by considering the qualitative criteria"	Storage projects included in category II "Projects subject to further assessment by considering the qualitative criteria"
NSOG	31	18 ⁽²⁷⁾	6	0	1
NSI West	34	19	4	1	0
NSI East	47	31	2	5	0
BEMIP	17	16 ⁽²⁸⁾	2	0	1
Total	129	84	14	6	2

In the following paragraphs reference is made only to the projects included in the documents titled "The draft regional lists" which NRAs indicated that they either were not able to assess, were opposed to, or had divergent views upon, and for those projects included in "category II" of the draft lists for which an assessment was submitted by the concerned NRAs.

2.1. Opinion on the draft regional list – NSOG Regional Group

Regarding the candidate project 1002 "iLand", included in category II of the draft regional list, the candidate project was assessed by the Belgian NRA, with the following conclusion: *"primary cost-benefit assessment of the project shows that the costs of the project outweighs the benefits by far. This confirms our great doubts about the techno-economic viability of the project."*

²⁶ Including the category II of projects titled "II. Projects subject to further assessment by considering the qualitative criteria."

²⁷ Two projects grouped as one in the list communicated by the European Commission were included as distinct projects in the draft regional list of proposed PCIs. Also, the project "Internal reinforcements Southern Norway (37.406)" was added to the draft regional list of proposed PCIs.

²⁸ Two projects (Internal line between Keminmaa and Pyhänselkä [96.801] and Internal line between Vilnius and Neris (LT) [170.382]) were not included in the list communicated by the European Commission).

Regarding the candidate projects 153.987 “France-Alderney-Britain”, 285.1383 “Gridlink”, and 247.1381 “AQUIND Interconnector”, the French NRA was not able to assess them, due to the economic uncertainties linked to the UK decision to leave the EU, while the UK NRA considers that the economic and social benefits will remain post Brexit, and therefore supports the candidate projects.

2.2. Opinion on the draft regional list – NSI East Regional Group

Regarding the candidate project 150 “Italy –Slovenia interconnection between Salgareda and Divača -Bericevo region”, included in category II of the draft regional list, the Agency notes that based on the average cost presented in the TYNDP 2016 and on the additional clarifications provided by the promoters about benefits, the project meets the criterion “benefits outweigh costs” and therefore it can be included in the final PCI list. However, it should be remarked that the Slovenian NRA raised an objection to the project due to the “disproportionate burden” on national tariffs.

Regarding the candidate project 141 “Slovenia –Hungary corridor”, included in category II of the draft regional list, the Agency notes that based on the cost figure for the project that is mentioned in the Agency’s Opinion No 08/2017 ⁽²⁹⁾ (cf. page 37), the project meets the criterion “benefits outweigh costs” and can therefore be included in the final PCI list.

2.3. Opinion on the draft regional list – NSI West Regional Group

Regarding the candidate project 31.642 “interconnection Italy- Switzerland”, included in category II of the draft regional list, the Agency notes that, based on the additional clarifications provided by the Italian promoter, the project meets the criterion “benefits outweigh costs” and can therefore be included in the final PCI list.

Regarding the candidate project 225.1107 “2nd interconnector Belgium – Germany”, the competent NRAs could not assess the project at this point in time, since the candidate project is not yet approved in their NDPs, but it is still under evaluation.

Regarding the candidate projects 270 “FR-ES project -Aragón-Atlantic Pyrenees” and 276 “FR-ES project -Navarra-Landes”, the French NRA was not able to assess them, considering that studies are still ongoing and that so far the cost-benefit analysis is still negative, while the Spanish NRA does not object to the inclusion of the project in the final PCI list.

Regarding the candidate storage projects 1011, “Reversible pumped-storage hydro-electric exploitation MONT-NEGRE, Zaragoza- Spain” and 1019 “Two reversible hydro-electric plants: GIRONES & RAIMATS in Spain” the competent NRA could not assess them because they are generation projects.

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http://www.acer.europa.eu/official_documents/acts_of_the_agency/opinions/opinions/acer%20opinion%2008-2017.pdf

2.4. Opinion on the draft regional list – BEMIP Regional Group

The Baltics synchronisation projects, i.e. candidate projects 62, 124, and 170, were jointly assessed as one project, and not based on the TYNDP CBA results, since there were no benefit calculations included in the TYNDP 2016 for the latter two projects. The benefit considered was the avoided costs of a potential blackout in the three Baltic States indicated by LITGRID based on a non-substantiated methodology. This case, which is not consistent with the methodology applied for all other candidate projects, pinpoints the importance of appropriate clustering of investments in the TYNDP, and the importance of completeness of the TYNDP calculations.

2.5. Opinion on the draft list of proposed smart grid PCIs

The Agency received filled-in checklists from the 8 NRAs of the countries hosting part of each candidate project.

In 3 cases³⁰, the NRAs supported the inclusion of the candidate projects in the final PCI lists, while in the other 5 instances³¹ they were not able to assess the candidate project.

While this finding is a worrying signal on the possibility of the NRAs to contribute to the process, as no NRAs raised objection against the inclusion of any candidate project, the Agency does not object to their inclusion either.

Done at Ljubljana on 10 October 2017.

For the Agency:



Alberto Pototschnig
Director

³⁰ SINCRO-GRID: Croatian and Slovenian NRAs; Smart Border Initiative: French NRA.

³¹ Again COnnected Networks: Czech Republic and Slovak Republic NRAs; ALPGRID: Austrian and Italian NRAs; Smart Border Initiative: German NRA. The presentation of NRA assessment is available at: https://ec.europa.eu/energy/sites/ener/files/documents/presentations_4th_meetingof_the_smart_grid_regional_group_28_june_2017.zip

Annexes

Annex 1 - The process and the main activities for establishing the draft lists of proposed PCIs

A.1.1 The PCI Cooperation Platform

Following the completion of the process for the selection of PCIs for the 2nd PCI list, the Agency, in cooperation with the NRAs, offered to support the upcoming PCI selection process by providing constructive proposals for improvements and practical support for the identification of infrastructure needs and the assessment of candidate projects beyond the comments already laid out in the Agency's Opinions Nos 14/2015 and 15/2015. For this purpose, an informal, tri-lateral working group comprising representatives from the European Commission, NRAs/the Agency and the ENTSOs, called the PCI "Cooperation Platform", was established in December 2015. The purpose of the Cooperation Platform was to discuss and propose concrete actions regarding the following:

- Identification of the infrastructure needs
- Identification of the most urgent issues that need to be improved in the TYNDPs and CBA methodologies, so that they are fit for the next PCI selection process;
- Identification of the issues that need to be improved in the project selection methodology including the process itself;
- Assignment of concrete tasks to the appropriate parties involved to implement the proposed actions.

The Cooperation Platform was the main forum of discussion of the PCI selection issues before concrete proposals were presented to the Regional Groups for decision. The members of the Cooperation Platform discussed on a daily basis bilaterally or trilaterally, in joint sessions of gas and electricity or only in sector specific meetings and held numerous physical and virtual meetings between December 2015 and July 2017. It has to be noted that, in many instances, different views were expressed by the Cooperation Platform members, and, in these instances, the final proposals to the Regional Groups were formed by the European Commission.

The joint work in the Cooperation Platform facilitated the development of a concept for the identification of infrastructure problems and needs and the methodology for the assessment of candidate projects.

A.1.2. Identification of the infrastructure needs

Following the Agency's recommendation included in its Opinion No 14/2015 on the 2015 draft regional lists of PCIs, the European Commission decided to include an additional step for the 2017 PCI selection before assessing projects (and their CBA results), namely the identification of the infrastructure needs. After the needs identification, the candidate projects were compared to the identified needs in each region.

Within the framework of the Cooperation Platform, it was agreed that, for the identification of the infrastructure needs, the “concrete problems” that can be resolved by new infrastructure projects that exist in each region should be first identified by Regional Group stakeholders.

The European Commission required from all Regional Group stakeholders to indicate the problems (or drivers for building new infrastructures) from their perspective in order to understand the infrastructure needs in each region. After the different views were collected, during the 13 December 2016 Regional Group meetings, the various views were discussed and the European Commission formed the needs per corridor, which was agreed upon by the Regional Groups. The needs were not quantified, but indicated only the Member States that these needs pertained to (and the methodology according to which this need was identified). The summary of the agreed needs per corridor is the following:

Table 1: Needs per corridor decided by the Regional Groups

Need	Corridor
Integration of RES and accommodation of flows	All
High price differentials	All
Impact of loop flows	NSI East
System flexibility and stability	All
2020 10% target currently not met	All but NSOG
Isolation (relevant for Cyprus)	NSI East
Adequacy issues due to significant changes in generation mix	NSI West, NSOG
Reinforcing integration of single Irish market	NSI West
Synchronous (synchronisation of the Baltic States)	BEMIP

The approach agreed upon by the Regional Groups did not reflect the proposed approach by the Agency. Under the Agency’s cooperation framework, NRAs’ representatives provided their input to the Regional Groups meetings (25-27 October 2016) regarding the problems (i.e. the drivers) to be used for the infrastructure needs identification (based on Article 4(2) of Regulation (EU) No 347/2013) for each priority corridor, as well as the proposed indicators to assess whether there is a need for new infrastructures. This input –regarding the generic problem categories and the proposed indicators- is summarised in the following table.

Table 2: List of “problems” (i.e. drivers) for the infrastructure needs identification and the proposed indicators for their assessment, as proposed in the Agency’s presentation

Problem categories	Assessment indicators
Price spreads (market integration)	For the past and the present: - Actual price spreads (both directions, representative of seasonal congestions) For the assessment of future time horizons: - The curves “SEW increase vs. cross-border capacity increase” - In case such a curve is not available, expected “marginal cost difference (€/MWh), accounting for both directions and taking into account the size of the bidding zones and the current market conditions.
RES integration ⁽³²⁾	- Curtailments in 2030, based on target network of the TYNDP (with effect not accounted for in the curves above) > x GWh (taking into account the generation mix across boundaries)
Security of supply	- System adequacy - System stability (including local network problems)

The proposed approach was pragmatic, as it was based on the data that was available at the time of the assessment or could be provided by ENTSO-E. The application of this proposal would have enabled a quantified diagnosis of the current situation and possible future developments. Regarding the time horizon, it was proposed to assess (and distinguish) both short-term needs (based on the assessment of today’s situation and their evolution over time) and longer-term needs (based on future expectations).

³² It is noted that the initial proposal was to make use of the curtailments data for past and present. Due to unavailability of this data indicated by ENTSO, the proposal had to be adapted to the available data for 2030.

A.1.3 Process schedule and main activities

The milestones of the PCI process in the framework of the Regional Groups are indicated in the table below.

Table 3: Main activities for transmission, storage and smart grids projects carried out in the framework of the Regional Groups

Date	Milestone / meeting
4 February 2016	First Meeting of TEN-E Regional and Thematic Groups for electricity, gas, oil and smart grids: <ul style="list-style-type: none"> - Discussion on the monitoring and implementation of the PCIs on the 2nd Union list - Presentation of the main elements of the 3rd PCI identification process. New elements: <ul style="list-style-type: none"> - Identification of the infrastructure needs - Utilisation of the input provided by the PCI Cooperation Platform when needed - Factoring in information from the monitoring of the 2nd PCI list - Presentation of the time planning of the 3rd PCI identification process
27 May 2016	Cross-sectoral Regional Groups' seminar "Infrastructure fit for Europe's energy needs"
8-9 September 2016	First Smart grids thematic group meeting: <ul style="list-style-type: none"> - Work-plan for 2016/2017 - Presentation by the Agency on experience from past Smart Grid selection process - Presentation by JRC on the Assessment Framework
21 September 2016 and 25-27 October 2016	Second cross-regional Group meeting and Third cross-regional Group meetings: <ul style="list-style-type: none"> - Presentation by European Commission of the process for the identification of infrastructure problems - Input from NRAs at each Regional Group meeting, promoters and other stakeholders in the second meeting - Finalisation by the European Commission of a problem list per region (after discussion during the third meeting)
20 October 2016	Second Smart grids thematic group meeting: <ul style="list-style-type: none"> - Approval of updated Terms of Reference - Presentation by JRC of the draft Assessment Framework
13 December 2016	Fourth cross-regional Group meeting: <ul style="list-style-type: none"> - Discussion and finalisation of the list of infrastructure needs per regional group

	- Announcement of the call for PCI candidates
12 January 2017	Third meeting of the Smart Grid Regional Group: <ul style="list-style-type: none"> - Detailed presentation on the Assessment Framework for Smart Grid PCI Candidates
22 January 2017	Deadline for submission of candidate transmission and storage PCIs
27 March 2017	Start of public consultation on candidate transmission and storage projects
31 March 2017	Deadline for submission of candidate smart grid PCIs
3 April 2017	Start of public consultation on candidate smart grid projects
5 April 2017	Fifth cross-regional Group meeting: <ul style="list-style-type: none"> - Presentation of the general principles of the assessment methodology - Update on applications received and plan for next steps - Presentation of ENTSO-E draft CBA methodology
7-8 June 2017	First Regional Group meetings: <ul style="list-style-type: none"> - Presentation of the NRAs' assessment on the consistent application of the criteria/cost-benefit analysis methodology and cross border relevance.
28 April 2017	Deadline for submission of missing data and additional benefits by promoters.
19 June 2017	End of public consultation on candidate transmission, and storage projects
26 June 2017	End of public consultation on candidate smart grid projects
27-28 June 2017	Second Regional Group meetings, Fourth meeting of the Smart Grid Regional Group: <ul style="list-style-type: none"> - Presentation of public consultation results - Presentation and discussion on a draft methodology for the assessment of candidate projects - Presentation of updated NRAs' assessment of candidate projects.
13 July 2017	Meeting of the decision-making bodies of the Regional and Thematic Groups
14 July 2017	Submission of the draft regional lists of proposed PCIs to the Agency

Annex 2 - The methodology applied for establishing the draft lists of PCIs

A.2.1 The assessment methodology applied

The main points of the methodology applied for the assessment of the candidate projects are presented in this section. A multi-criteria approach was applied for the assessment of the projects in order to account for both monetised and non-monetised benefits. The normalised values of these benefits were weighted to reflect the different significance of these benefits: a factor of 70% was applied for monetised benefits, and a factor of 15% for each of the two non-monetised benefits of “Contribution to achieving 10% target” and “Contribution to addressing loop-flows”. More specifically, the main elements of the methodology are the following:

A.2.1.1 Handling of monetised benefits:

- The total benefits of each project were calculated for each of the scenarios 3 and 4.
- In case a candidate project was not submitted as assessed in the TYNDP (i.e. some investments in the clusters as defined in the TYNDP were not included in the candidate project), the need to allocate the TYNDP benefits to the candidate project emerged. The cases and the rules applied are presented in section 2 of this Annex.
- Given the fact that, for many projects, the calculation of benefits was performed at two time horizons in the TYNDP (year 2020 and 2030) and in order to derive a single benefit value, the interpolation rule stipulated by the CBA methodology was applied. For the simplification of the calculations and taking into account the possible commissioning dates of the projects, the factors indicated in table 4 were used:

Table 4: Factors used for the calculation of project benefits based on the TYNDP benefits of 2020 and 2030 and the commissioning date of a project

Commissioning date	Weight 2020 (%)	Weight 2030 (%)
2018	34,22%	65,78%
2019	29,46%	70,54%
2020	24,53%	75,47%
2021	19,42%	80,58%
2022	14,13%	85,87%
2023 or later	0%	100%

- The monetised benefits taken into account were the following:
 - The TYNDP indicator Social Economic Welfare capturing the monetised elements of market integration and sustainability criteria.
 - The additional benefits indicated by project promoters either in the TYNDP or during the PCI selection process. An analysis of these benefits is presented in Section 3 of this Annex.

- The monetised value for losses, which is deducted from the benefits value in case the project increases the losses of the grid or added in case the project decreases the losses of the grid.
- The above calculated benefits figure was assumed to be materialised annually during the life time of the project (i.e. 25 years), starting at the commissioning year, and was discounted to 2017 value.

A.2.1.2 Handling of project costs:

- The Capital Expenditures (CAPEX) value, as reported in the TYNDP 2016 project sheets³³, was assumed to materialise in the year of the commissioning of the project, and was discounted to 2017 value.
- The lifecycle costs of each project was calculated based on the annual operational expenditure (OPEX) as reported by the project promoter. In a few cases, where no such figure was reported by the promoter, a reference value of 22% of CAPEX for overhead lines, and 30% for cables was considered. The OPEX figure was assumed to materialise annually during the life time of the project (i.e. 25 years) starting from the commissioning year, and was discounted to 2017 value.

After the calculation of the benefits and costs, the subsequent steps of the assessment methodology were the following:

A.2.1.3 Other steps of the assessment methodology

- The average of the ratio “Benefit /Cost” (B/C) for scenarios 3 and 4 was constructed for each project.
- The B/C ratio was normalised according to the scale of Table 5. The scale was constructed in such a way that a project was assigned the middle of the scale points (5 points) when project benefits at least equal project costs.

³³ In case where only part of the project was submitted for the PCI process, the adjusted CAPEX as submitted by the promoter was considered.

Table 5: Scale for normalising Benefit/Cost ratio

Benefit/cost	Normalised value
$B/C < 0,25$	1
$0,25 \leq B/C < 0,50$	2
$0,50 \leq B/C < 0,75$	3
$0,75 \leq B/C < 1,00$	4
$1,00 \leq B/C < 1,50$	5
$1,50 \leq B/C < 2,00$	6
$2,00 \leq B/C < 2,50$	7
$2,50 \leq B/C < 3,00$	8
$3,00 \leq B/C < 4,00$	9
$4,00 \leq B/C$	10

- Regarding the non-monetised benefits considered in the methodology:
 - Contribution to achieving 10% interconnection target: 10 points were assigned for all projects affecting the borders of the following countries: BG, CY, DE, ES, FR, IE, IT, PL, PT, RO, UK.
 - Contribution to addressing loop-flows: 10 points were assigned for all projects affecting the borders of the following countries (for which a problem was identified during the needs identification exercise): DE, PL, CZ
- In order for a project to be accepted in the list, a threshold of 3.5 of points was set. The additional criteria stipulated by Regulation (EU) No 347/2013 (urgency, etc.) were not taken into consideration in the assessment.

A.2.2 De-clustering of benefits

For 13 projects, it was found that the candidate projects were not submitted as assessed in the TYNDP (i.e. some investments included in the TYNDP assessment were not included in the candidate project). For these cases, the benefits calculated in the TYNDP 2016 could not be automatically attributed to the candidate project, but the contribution to the TYNDP cluster benefits of the submitted investments had to be approximated.

The general rule³⁴ for the allocation of benefits was based on the Grid Transfer Capacity (GTC) contribution of each investment, as indicated in the TYNDP. The steps applied were the following:

³⁴ In some cases, due to the topology of the projects in combination with the different commissioning dates of the investments and the values of the GTC contribution of each investment mentioned in the TYNDP, the application of the above rules could not render a sensible outcome. These cases were studied further, and the benefit allocation required some more adjustments, e.g. with regard to the commissioning date considered for the calculation of the benefits or the consideration of the total cluster benefits taking into account the whole cluster costs.

- Step 1: Take out of 100 the maximum percentage GTC contribution of the investment items not included in the PCI.
- Step 2: Sum up the percentage GTC contribution of the investment items included in the PCI. When summing up contributions, check if there are convoy lines within the project, and consider only once the contribution of convoy lines.
- Step 3: Select the lowest of the figures calculated in the previous two steps.

The outcomes of the application of the above rule are presented in Table 6 below.

Table 6: Contribution of candidate projects to the TYNDP cluster benefits considered for the calculation of benefits

TYNDP project number	Contribution to cluster benefit (%)
1	41%
21	70%
26	25%
28	100%
31	100%
47	75%
92	100%
123	100%
124	79%
136	65%
138	87%
167	80%
170 ⁽³⁵⁾	N/A

A.2.3 Assessment of additional benefits provided by promoters

Although the TYNDP 2016 includes monetised benefits (presented in the project sheet tables) related to the SEW (indicator B2) and losses (indicator B4), it lacks monetised benefits regarding security of supply aspects, improvement of system reliability, and reduction of renewable generation curtailments due to constraints inside market zones.

In order to include these benefits (or any other relevant monetised benefit) in the PCI selection process calculations, the Regional Groups allowed promoters to submit information on additional benefits on top of the ones included in the TYNDP 2016. These benefits were taken into account only if substantiated studies were submitted, and if the specific assumptions considered for their calculation could be verified. The assessment of the submitted benefits was conducted by a joint team of the European Commission, the Agency and ENTSO-E.

³⁵ For this project, there was no calculation of benefits in the TYNDP.

Within the above process, the following types of monetised benefits were considered:

- Increase of system reliability;
- Additional generation adequacy margin;
- Reduction of costs for ancillary services;
- Reduction of RES curtailments (inside market zones); and
- Reduction of non-CO₂ emissions.

The following types of monetised benefits (submitted in the process of additional benefits) were not considered:

- Benefits related to SEW calculations different from the ones of the TYNDP 2016, for consistency of the SEW benefit calculations.
- Benefits related to losses calculations different from the ones of the TYNDP 2016, for consistency of the losses benefit calculations.
- Benefits regarding a possible differential between social cost of carbon and CO₂ emission prices, because the CO₂ prices in Scenario 3 and in Scenario 4 (year 2030: 71 Euro/t and 76 Euro/t, respectively) are already relatively high.
- Benefits derived by the use of apparently disproportionate assumptions and monetisation coefficients.
- Benefits not sufficiently justified or substantiated by evidence.
- Benefits accruing to non-European countries.
- Non-monetised benefits.

Regarding the assessment of the monetised benefits that were taken into account, the following approach was followed:

Increase of system reliability

According to the ENTSO-E currently approved CBA Methodology (page 35), “the unreliability cost could be obtained using the Expected Energy Not Supplied (EENS) index and the unit interruption cost (i.e. Value of Lost Load; VOLL)”. This approach was used whenever promoters indicated non-zero EENS impacts.

The approach was applied for about 10 candidate projects with EENS in at least four countries (CZ, FI, IT and RO). The range of Value of Lost Load varied from 3000 EUR/kWh not served (CZ) to 20000 EUR/kWh not served (IT).

Additional adequacy margin

Due to the fact that the current CBA methodology does not include an elaborate methodology for the calculation of this type of benefits, the draft ENTSO-E Second CBA Methodology (CBA 2.0), dated 6 December 2016, was used. More specifically, CBA 2.0 includes the benefit “B5 security of supply: adequacy to meet demand” (described in pages 37-40), which is applicable only when the increase of reliability (EENS) is equal to zero, and was taken into account with the following two alternative valuation methods:

- Consideration of the “*MW of spare capacity that does not need to be installed as a result of expanding transmission capacity*”, and then monetisation on the basis of avoided investment costs of peak units (according to CBA 2.0 methodology, p. 40). It is noted that, in line with this methodology, the saved O&M costs for avoided generation were not accounted for;
- By using a capacity remuneration approach, as already used e.g. by Ofgem in “Cap and floor regime: Initial Project Assessment of the FAB Link, IFA2, Viking Link and Greenlink interconnectors”, March 2015 (page 32, <https://www.ofgem.gov.uk/ofgem-publications/93792/ipamarch2015consultation-final-pdf>).

The two alternative valuation methods were applied for about 25 candidate projects with adequacy impacts in at least 7 countries (BE, FR, HU, IE, PT, SP and UK).

The valuation coefficients for the saved generating capacity method ranged from 425 kEUR/MW (HU) to 600 kEUR/MW (FR).

The valuation coefficients for the capacity remuneration method was 35 kEUR/MW/y for UK and 80 kEUR/MW/y for IE. In this method, an important impact is also due to the time-related coefficient³⁶, which averaged around 0.7.

Reduction of costs for ancillary services

Benefits calculated according to the CBA methodology issued by the Italian Regulator (Decision n.627/2016 <http://www.autorita.energia.it/allegati/docs/16/627-16eng.pdf>) and Ofgem were considered.

Reduction of RES curtailments (inside market zones)

The benefit of reduction of RES curtailments between internal boundaries (when available capacity is increased there), which is not accounted for in the calculation of the SEW benefit, was considered.

Reduction of costs for non-CO2 emissions

The relevant benefit, which is not accounted for in the calculation of the SEW benefit, calculated according to the CBA methodology issued by the Italian Regulator (The Italian Regulator Decision n. 627/2016) was accounted for.

The valuation coefficients were derived from the report of European Environmental Agency “Costs of air pollution from European industrial facilities 2008-2012” published in November 2014.³⁷

³⁶ This coefficient is called “derating factor” by Ofgem.

³⁷ <https://www.eea.europa.eu/publications/costs-of-air-pollution-2008-2012>

A.2.4. Assessment of storage projects

Due to the non-completeness of benefit calculations indicated in the TYNDP 2016³⁸, the assessment was mainly based on the additional data provided by project promoters on the following indicators:

- more detailed information on losses per TYNDP scenario
- generation cost savings
- capacity utilisation of storage assets
- expected variation in Loss of Load Expectation (LOLE)

These additional benefits were added as follows: the additional data for the first two variables were reflected in an economic indicator of annual storage benefits, as the sum of SEW and savings on ancillary services generation minus monetised losses. This was summed up into a measure of overall benefits by discounting it over the project's assumed life cycle: twenty years for ion battery storage (with replacement of the batteries half way through) and twenty-five for all other technologies.

Storage projects were ranked per priority corridor on the basis of their monetised benefit/cost ratio, taking into consideration the additional monetised benefits that were reported.

³⁸ Only a part of the benefits for storage projects is captured by the CBA methodology. This is due to the fact that the CBA values are based on a model with a granularity of 1 hour, whereas many of the benefits of storage projects derive from ancillary services, provided mainly to the very short-term market. Furthermore, for many storage candidate projects, the values for losses and generation cost savings in the TYNDP are identical across the TYNDP horizons and Visions, although it would be expected that these values would vary in function of the RES penetration.

Annex 3 – Recommendations for improvements of the ENTSO-E TYNDP

In Section 1 of this Opinion, various high-level recommendations for improving the future ENTSO-E TYNDPs were provided, including:

- to provide monetised - or at least quantified - information regarding a limited set of transmission infrastructure needs (market integration, generation integration, and security of supply) and storage capacity needs, see Section 1.2;
- to make available key information on the fundamental project features (especially costs, benefits, contribution of investment items to increase transfer capacity and contribution to infrastructure needs), see Sections 1.3 and 1.4;
- to improve the analysis of benefits of storage projects, see Section 1.5.

What follows provides more details on these high-level recommendations and on how they can be implemented. It also deals with additional elements aimed at improving the TYNDP.

Mapping of needs

The next TYNDP package should include the mapping of infrastructure needs for all study years and all scenarios. The needs must be presented in a quantified manner (MW per boundary), and the methodology and the assumptions used must be clearly presented in the Needs Identification report, including the reference cost assumptions used.

Competing projects

Following the needs mapping, a clear identification of competing projects must be included in the TYNDP (i.e. a list of project that mainly impact a boundary and may be competing among themselves, because the sum of their capacity increases is above the capacity needed at that boundary), so that the RGs can evaluate the need for a tailored selection methodology.

Clustering of investment items

An appropriate clustering of investments, according to the new CBA rules, should be performed so that aggregated assessment of clusters (projects) is not needed during next PCI selection.

De-clustering of benefits

Since there are cases where the TYNDP clusters are not aligned with candidate projects, ENTSO-E should propose an approach to estimate benefits per investment item during the construction of the TYNDP. Also, the GTC contribution of investments should be carefully checked, and a consistent methodology for the estimation of the benefits of each investment item should be applied.

Consistency of benefit calculation across regions

The TYNDP should describe the differences amongst market modelling tools used across ENTSO-E regional groups (if applicable) and define the impact on the estimated benefits.

Handling of projects with different advancement

The projects should be divided in 2 groups, depending on their level of advancement, according to the past recommendation of the Agency, so that a different assessment methodology can be applied for non-advanced projects.

Internal grid congestion and loop flow issues

The TYNDP information on the SEW indicator (under the new reporting sheet stipulated by the draft CBA 2.0) should make it clear which aspects of loop flow issues are (potentially not) covered in the indicator and in which area there is room for more specific studies.

New indicators for system flexibility (B6) and system stability (B7)

ENTSO-E should make concrete proposals in the TYNDP as indicated in the Agency's Opinion No. 5/2017 on the Draft ENTSO-E Guideline for CBA of Grid Development Projects:

- to monetise the indicator B6;
- to quantify the indicator B7;
- to address the value of “ancillary services / flexibility” impacts, with a target to quantify and monetise as far as possible, at least by means of avoided costs (e.g. avoided installations of reactive compensation devices, avoided costs for voltage control from generating units)

New indicator B4 (Societal well-being as a result of RES integration and a variation in CO₂ emissions):

Attention should be given to the presentation of the results of this new indicator in the TYNDP (according to the draft CBA 2.0) and the main assumptions used for its calculation, so that it can be potentially used in the PCI selection.

Losses

The multiplier(s) used for the monetisation of EENS and an explanation of their selection should be provided.

CBA methodology implementation

- Costs should be presented per individual investment item in each project cluster. Also, consistency of indicated costs (safeguarding application of CBA rules) should be ensured.
- SEW indicator: the consistency of the costs considered in all market modelling tools (e.g. variable fuel costs, internalised cost of CO₂ emissions, variable operation and maintenance

costs, start-up and shut-down costs) should be safeguarded and the values used displayed in an annex of the TYNDP.

Assessment of storage projects

The implementation of the recommendations for improving storage projects assessment included in the Agency's Opinion No. 05/2017 should be pursued. More attention should be given in order to:

- clarify cases where a storage plant may be competing with a transmission project, and how the Take Out One at the Time methodology is applied to the storage plants;
- provide a more concrete, quantified and possibly monetised approach on benefits related to flexibility and to ancillary services.

Annex 4 — NRAs' assessment of candidate projects

The NRAs under the coordination of the Agency provided their assessment and views on the following topics:

- Criteria set out in *art. 4.1.c of Reg. (EU) 347/2013* (cross border relevance).
- Contribution of the projects to the specific criteria set out in *art. 4.2.a of Reg. (EU) 347/2013* (market integration, sustainability, security of supply).
- Identification of inconsistencies regarding the provided cost data (CAPEX, OPEX).
- Identification of inconsistencies regarding the available benefits (SEW, Security of Supply SOS, losses, additional benefits indicated by promoters).
- Do benefits outweigh costs?
- Projects' commissioning dates

NRAs submitted in total 88 checklists regarding 79 candidate projects (grouped at a cluster level, according to the TYNDP structure), compared to 129 candidate projects included in the candidate list.

In the following table, some statistics of the NRAs' submissions per corridor are provided:

Table 7: NRAs' assessments by corridor

	Candidate projects	Assessments per corridor (*)	Assessment in coordination with other EU-NRAs	Assessment in coordination with non EU country
NSOG (**)	31	23	17	3
NSI West(**)	34	33	8	0
NSI East	47	19	4	1
BEMIP (**)	17	13	6	0
Total	129	88	35	4

(*) in 19 cases, the assessment referred to a part of the candidate project.

(**) in 9 cases (6 in NSI West, 2 in NSOG and 1 BEMIP corridors), double assessments were provided by different NRAs.

In 5 cases, NRAs indicated that the project does not meet one of the conditions of Art. 4.1.(c) (i.e. regarding cross-border relevance), and, in 10 cases, they were not able to assess.

In 12 cases, NRAs were not able to assess whether the project contributes significantly to at least one of the specific criteria of Art. 4.2.(a), and, in 6 cases, there were divergent views.

The statistics regarding the identification of inconsistencies in the calculations provided by the PCI promoter regarding CAPEX and OPEX are presented in table 8 below.

Table 8: NRAs' assessments regarding inconsistency in the calculation of CAPEX and OPEX

	CAPEX	OPEX
No	48	44
Yes	6	4
Not able to assess	31	37
Divergent views	3	3
Total	88	88

The statistics regarding the identification of inconsistencies to the calculations of benefits provided by the PCI promoters are presented in table 9 below.

Table 9: NRAs' assessments regarding inconsistency in the calculation of benefits

	SEW	SoS	Losses	Additional benefits
No	43	36	38	51
Yes	1	3 (*)	5	7 (**)
Not able to assess	38	44	42	26
Divergent views	6	5	3	4
Total	88	88	88	88

(*) SoS data was not in the TYNDP, but a project may indeed contribute to SoS according to national data.

(**) Indicated additional benefits were not monetised or no proof was provided, or are overlapping with already calculated benefits or are overestimated.

The statistics regarding the assessment of plausibility of the commissioning dates provided by the PCI promoters are presented in table 10 below.

Table 10: NRAs' assessments of plausibility of the commissioning dates

We agree on the commissioning date	48
The commissioning date will be sooner	3
The commissioning date will be later	9
Not able to assess (e.g. the project is not mature enough)	27
Divergent views of the NRAs	1
Total	88

Regarding the issue of whether “overall benefits outweigh costs”, the replies received are presented in the following table:

Table 11: Are benefits higher than costs?

Yes	39
No (*)	13
Not able to assess	30
Divergent views of the NRAs	6
Total	88

(*) at the time of checklist submission.

The 10 projects for which NRAs indicated that the criterion “overall benefits outweigh costs is not met” (in three cases via separate submissions by involved NRAs) are the following:

170.1010
 281.1379
 283.1378
 283.1430
 296.1437
 189.1389
 294.1356
 31.642 (*)
 282.1297
 1002

(*) The Italian NRA updated its assessment by stating that benefits outweigh costs after promoter’s documentation of additional benefits delivered after the closure of the standardised NRAs’ submission process.

Finally, regarding the question “Do NRA object to the inclusion of the project in the final PCI Regional list?”, the replies received are presented in the following table.

Table 12: Do NRAs object to the inclusion of the project in the final PCI Regional list?

No	61
Yes (*)	14+1 (**)
Not able to assess	5
Divergent views of the NRAs (***)	8
Total	88+1

(*) The 12 projects for which NRAs provided an objection (in three cases via separate submissions by involved NRAs) are the following:

136.227
281.1379
283.1378
283.1430
296.1437
189.1389
294.1356
31.642 (****)
282.1297
1002
1016
250.1384

(**) One extra objection was provided outside the standardised assessment.

(***) The projects for which NRAs have divergent views are projects 247, 150, 270, 276, 153, and 285.

(****) The Italian NRA updated its assessment by stating no objection after promoter's documentation of additional benefits delivered after the closure of the standardised NRAs' submission process.

Annex 5 - Draft regional lists of proposed PCIs

The draft regional lists of the proposed PCIs are available at:

http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Opinions/Pages/Annex-5-to-ACER-Opinion-14-2017.aspx