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CONSOLIDATED REPORT

ON THE PROGRESS OF ELECTRICITY AND GAS PROJECTS OF COMMON INTEREST

Ljubljana
10 July 2018

Contents

1 Summary

1.1 Legal basis and background

Article 5 of Regulation (EU) No 347/2013 requires the Agency to monitor the progress achieved in implementing the projects of common interest (PCIs). The Agency carries out this monitoring on the basis of annual reports submitted by the project promoters and inputs received from the national regulatory authorities (NRAs) cooperating in the framework of the Agency. The present Report represents the results of the fourth instance of the Agency's annual monitoring of the progress in PCI implementation. The Report covers the period from 1 February 2017 until 31 January 2018[1].

After receiving the promoters' reports, the Agency assessed the completeness and the quality of the received information. The Agency requested clarifications from the promoters regarding missing, incomplete or inconsistent data, and also consulted the NRAs regarding the quality and completeness of the data relevant to their jurisdictions.

Overall, the submitted information, its scope and quality were deemed acceptable for the purpose of preparing this consolidated Report, with a few exceptions as indicated in the sections on electricity and gas below.

This summary gives an overview of the Agency's main findings and recommendations for the electricity and gas sectors. Separate chapters of the Report include in-depth analyses of the electricity and gas projects and detailed sector-specific findings and recommendations.

Differences between the electricity and the gas chapters are primarily due to the specific features of the two sectors, which make some issues only applicable to either gas or electricity, as well as to the varying availability of data.

1.2 Main findings

1.2.1 Fulfilment of the reporting obligations and quality of the reports

Although most of the promoters submitted an annual report (only 3 reports are missing, all for electricity projects), and a sufficient level of completeness of the submitted data was achieved for many categories of requested data, the input to certain parts of the reporting form[2] was missing or of inadequate quality. Also, the consistency of the data (not only the data submitted in the 2018 PCI monitoring exercise, but also with the data provided by promoters in previous PCI stages) needs significant improvement. The areas where further improvement is necessary in terms of the quality and coverage of data include, in particular, the coherence of the implementation plan, the expected lifecycle costs of the projects, and the monetised benefits for electricity storage projects and all types of gas projects.

The Agency re-affirms the importance of ensuring the integrity and the consistency of the data throughout the entire PCI process, from the moment when the TYNDP drafting begins to the PCI selection and PCI monitoring, including the use of consistent data sets, key project milestones, and aligned lists of project description items.

[1] In this case, the 2017 PCI list. (Cf. Commission Delegated Regulation (EU) 2018/540 of 23 November 2017) https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32018R0540).

[2] In electricity, a survey form was used for collecting data for the purpose of the 2018 PCI monitoring, and in gas the Agency's infrastructure information system "VALVE".

The Agency stresses that promoters are obliged to submit an annual report for each PCI each year following the year of inclusion of the project in the PCI list. Failure to submit such a report represents a breach of Regulation (EU) No 347/2013.

1.2.2 Consistency of the 2017 PCI list with the TYNDPs and NDPs

In spite of the legal obligation included in Article 3(6) of Regulation (EU) No 347/2013, several PCIs continue to be absent (or partially absent) from the National Network Development Plan (NDP) in one or several hosting Member States. The Agency encourages both the project promoters and other relevant entities to pursue maximum consistency between the NDPs and the PCI list.

In gas, the Agency found two cases where the same investment item was present as part of two PCI projects. The Agency recommends that each investment item or project component exists only in one instance in the PCI list. Having the same investment item or project component as part of several PCIs may lead to double counting the project characteristics, and potentially to confusion in the treatment of investment requests under Article 12 of Regulation (EU) No 347/2013. Double-listing of investment items may also cause ambiguity in subsequent requests for Connecting Europe Facility (CEF) grants, as the scope of the investment associated with the relevant PCI and its costs and benefits would not be clearly defined and uniquely attributable to the relevant PCI.

The Agency found that Liquefied Natural Gas (LNG) and Underground Gas Storage (UGS) projects tend to be described in NDPs and other plans less frequently as projects having a cross-border impact compared to transmission projects (pipelines, compressor stations).

1.2.3 PCI status and progress

The Agency recognises that 20 electricity and gas PCIs, out of those PCIs which were already on the previous PCI lists, advanced their status during the monitored period. At this time, the largest number of PCIs are in the stage of permitting. However, despite the advancement in status of a considerable number of projects, the commissioning dates for almost half of the PCIs have again been shifted by 1-2 years into the future compared to the dates foreseen in previously reported schedules, adding up to the accumulated delays that are repeatedly noted in the Agency's annual PCI monitoring reports.

In gas, 7 PCIs with unchanged scope registered a setback or "reverse progress", i.e. they are currently in a less advanced status than before. The Agency finds that such a "reverse progress" of projects with unchanged scope is difficult to explain. Possible explanations may include the cancellation or negative outcome of a permitting procedure, or an inaccurate assessment of the project's status by the promoter, either in the earlier or in the current round of monitoring.

The Agency invites promoters explicitly to report cancellations and negative outcomes of permitting procedures, and pay due attention when assessing and reporting the status and the progress of their projects. Given that once again the most frequently mentioned reason for delays is related to permit granting, the Agency deems it useful that Regional Groups and Competent Authorities investigate in more detail the permit granting hurdles, hampering the timely implementation of the PCIs, as reported by the project promoters.

For 16 electricity and for 10 gas PCIs, no works or activities were reported to have been carried out during 2017. The Agency strongly encourages Regional Groups thoroughly to examine, in the context of the up-coming PCI selection process, the merits of those PCI candidates for

which no evidence of implementation efforts can be observed during the time of their presence in the PCI list.

1.2.4 Costs and benefits

The investment costs, as reported by the promoters, amount to €49.3 billion in 2018 values[3] for electricity PCIs and €43.7 billion for gas PCIs. The cost tag is actually even higher, since the expected life-cycle costs of the projects also have to be considered. The overall budget of electricity PCIs is at a similar level to the one related to the 2015 PCI list, and by €9 billion lower than the figure of the 2015 PCI list for gas.

The total amount spent by 2017[4] was **€5.8 billion** for electricity PCIs and **€9.65 billion** for gas PCIs, representing only 11.8% of the overall PCIs budget for electricity and 22.1% for gas, revealing an insufficient pace to meet the indicated implementation schedules, according to which around half of the overall projects' budget should be incurred in the coming 4-5 years.

Given some significant discrepancies of project budgets, the Regional Groups should take action to ensure the incorporation of the PCI monitoring results into the next PCI selection in order to help ensure a more realistic cost estimate of future PCIs.

Regarding the forecasted benefits of the electricity projects, the figures considered in the PCI selection process 2017 were used in order to increase integrity between the PCI selection and the PCI monitoring processes. The overall cost-benefit ratio for transmission PCIs was found to exceed 1.5. Although this ratio has increased compared to 2017, this is seemingly due to the more optimistic TYNDP scenarios used for the PCI selection 2017, and not due to an efficiency increase. Also, for 18 transmission PCIs it was found that the considered monetised benefits do not outweigh their total expected costs. The Agency discourages listing as PCIs projects which do not provide credible information or cannot reliably justify that the project benefits outweigh their costs.

The assessment of the benefits of the gas PCIs faced serious difficulties and the Agency lacked comprehensive monetised benefits data for gas projects, as it was only reported for 6 gas projects. The Agency recommends ENTSOG to foresee in the CBA methodology ways and means that would allow project promoters to assess the value of the lifecycle costs and the benefits of the PCIs. The Agency recommends project promoters to evaluate the costs and the benefits of their projects from the inception of the project and to disclose the progress of the costs and benefits over the entire project cycle.

[3] Cost data refers to the value as of the expected commissioning date of the projects. The Agency converted this data to present value as of 2018 by applying a factor of 4% p.a., in order to make the cost data of projects comparable and allow for cost data aggregation.
[4] Since the establishment of the first PCI list in October 2013, i.e. over a period of time of 4 years and 2 months.

2 Volume 1: ELECTRICITY PROJECTS

2.1 Introduction

2.1.1 Fulfilment of the reporting obligations

The 2017 PCI list includes 110 electricity PCIs. By the legal deadline of 31 March 2018, the Agency received reports for all but four PCIs[5]. In one instance[6], the report was submitted after the legal deadline, but the Agency could still consider it in its analysis. In the other three instances, no report was submitted (in one case[7] because the project is about to be finalised, and in the other two cases[8] without any reason).

The Agency stresses that promoters are obliged to submit an annual report for each PCI each year following the year of inclusion of the project in the PCI list. Failure to submit such a report represents a breach of Regulation (EU) No 347/2013.

The Agency used the online EU Survey tool to collect the information from the promoters. On 27 February 2018, the single contacts appointed by the project promoters for each PCI were invited to submit the PCI reports by filling in the Agency's templates[9].

2.1.2 Completeness, consistency and adequacy of the submitted data

The Agency checked the received data in order to assess its completeness and consistency. The Agency notes that the information related to **project identification, technical parameters and** incurred or additional contracted **cost appears to be adequately provided**, after incorporating the requested clarifications or additional data. However, the completeness of the information was achieved for mandatory questions[10] in the monitoring questionnaire, while it was low for non-mandatory questions[11]. The main reasons raised by project promoters to justify the missing data are uncertainties regarding the projects.

The consistency of the submitted data was not satisfactory, and for this reason the Agency, in many instances, had to require further clarifications, especially regarding the consistency of the implementation plan dates, the life cycle costs and the incurred or additional contracted costs.

The Agency contacted the promoters of 82 PCIs, sending more than 150 clarification questions or further data requests, and received clarifications only for 68 PCIs. Furthermore, more than 85 further data corrections were deemed necessary by the Agency to increase the consistency of the submitted data.

[5] In this volume of the Report, the focus is on electricity PCIs, therefore "all PCIs" refers to all the electricity priority projects only, and not to gas PCIs, unless otherwise indicated.
[6] The report for the PCI 10.5 ALPGRID "An innovative integration of synergetic, mature, technology-based solutions in order to simultaneously increase the operational efficiency of the Italian and Austrian regional electricity systems" was submitted to the Agency on 3 April 2018.
[7] For PCI 1.8.2 -Reinforcement of internal lines in southern Norway. The reasons provided by the promoter are the following: a) the project is purely internal Norwegian, all permissions are received and the project is about to be finalised, b) there is no intention to apply for CEF, and c) the project consists of several investments complicating the reporting.
[8] For PCI 1.12.1- Compressed air storage in Lane, and PCI 1.12.2 - Compressed air energy storage in Chesire.
[9] The template for the PCI monitoring reports was consulted with competent authorities and project promoters.
[10] All questions of the questionnaire should be filled in by promoters, however, for the most important ones, the report could not be technically submitted if an answer to these questions was not provided.
[11] For example, the expected or actual dates for tendering of construction were not provided by 40 PCIs, and public consultation start date was not provided by 55 PCIs.

For this year's monitoring exercise, the Agency did not ask for promoters' forecasts of the PCIs total investment cost. Instead, the figures considered in the PCI selection process 2017 were used. This approach was deemed appropriate, among other reasons, to check the consistency of the estimates provided by promoters in the phase of the PCI selection with the PCI implementation data (e.g. the incurred costs). As explained in section 2.4, the conducted checks revealed some important discrepancies of the submitted data, raising doubts on the credibility of the data provided by some promoters in the PCI selection phase, and emphasising the need of considering and evaluating the PCI monitoring results in the PCI selection process.

Key findings and recommendations:

- Although a sufficient level of completeness of the submitted data was achieved, the consistency of the data (not only among the data submitted in the PCI monitoring exercise, but also with the data provided by promoters in previous PCI stages) needs significant improvement. **The Agency discourages listing as PCIs, projects which do not provide credible information or cannot reliably demonstrate that the project benefits outweigh their costs.**
- **The Agency re-affirms the importance carefully to define the projects' scope and ensure the integrity and consistency of the relevant data throughout the PCI process** (i.e. from TYNDP drafting to PCI selection and PCI monitoring)[12].

2.2 Overview of the electricity PCIs

2.2.1 General statistics of the PCIs

The 2017 PCI list includes 110 electricity PCIs. Out of the 107 projects for which annual reports were submitted, 85 were included either in the 2013 or in the 2015 PCI list (from now on referred to as "old" PCIs). 90 PCIs are transmission projects, 4 are smart grid projects and 13 are storage projects. Of the transmission projects, 47 are interconnectors and 43 are internal projects.

As shown in Figure 1, the priority corridor North-South electricity interconnections in Central Eastern and South Eastern Europe ("NSI East") hosts the highest number of PCIs, followed by the Northern Seas offshore grid ("NSOG"), North-South electricity interconnections in Western Europe ("NSI West") and the Baltic Energy Market Interconnection Plan ("BEMIP"). Because of the relatively low number of electricity smart grid PCIs, some assessments focused only on transmission and storage projects. An analysis per priority corridor is given so that the report is informative for the Regional Groups.

[12] Cf. 2016 PCI monitoring report of the Agency, p. 18
http://www.acer.europa.eu/official_documents/acts_of_the_agency/publication/consolidated%20report%20on%20the%20progress%20of%20electricity%20and%20gas%20projects%20of%20common%20interest%20for%20the%20year%202015.pdf
and 2017 PCI monitoring report of the Agency, p. 9
http://www.acer.europa.eu/official_documents/acts_of_the_agency/publication/consolidated%20report%20on%20the%20progress%20of%20electricity%20and%20gas%20projects%20of%20common%20interest%20for%20the%20year%202016.pdf

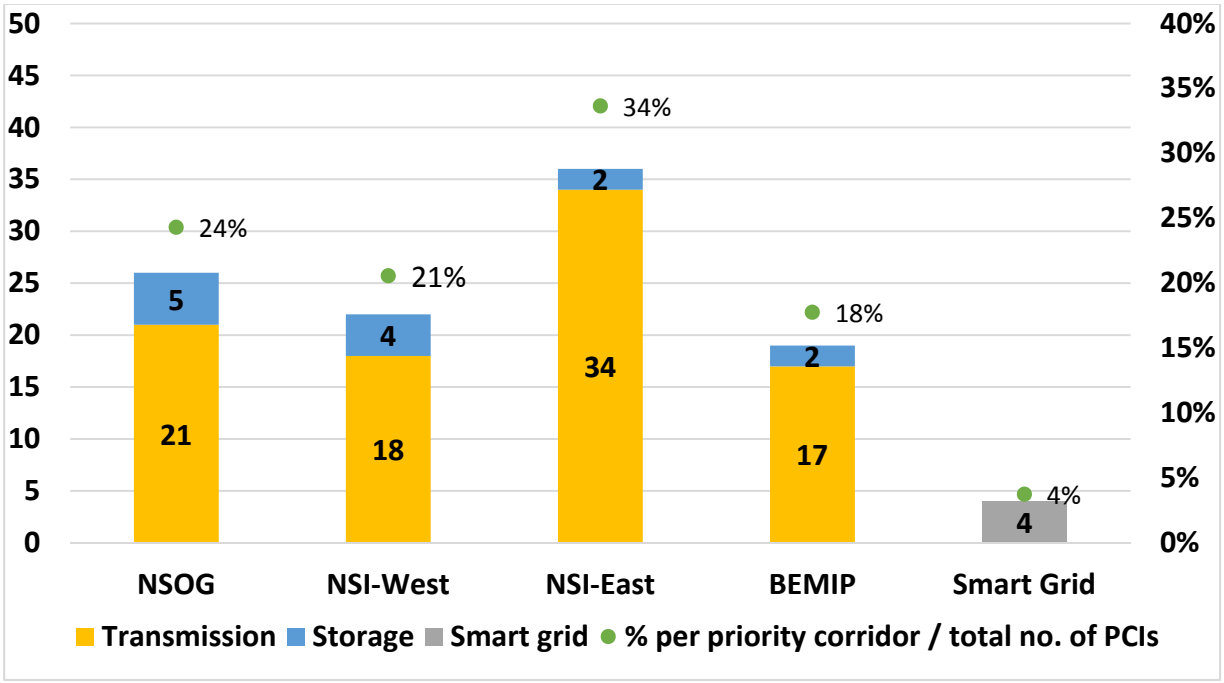


Figure 1- Distribution of electricity PCIs per priority corridor and thematic group

Technical changes

9 out of the 85 "old" PCIs reported changes to their technical description compared to last year report. These changes relate to the following technical parameters:

- Change of content of the PCI, i.e. removal of an investment item (4 instances);
- Connection of the project to a different substation (3 instance);
- Change of the length of the transmission line (1 instance);
- Undergrounding of an overhead line (1 instance).

For detailed information on the technical changes, please refer to Annex II.

2.2.2 Presence of the PCIs in the TYNDP and NDPs[13]

In the 2017 PCI monitoring report, the Agency observed that two PCIs were not included in the ENTSO-E TYNDP 2016. **This time, all the transmission and storage PCIs were included in the TYNDP 2016, which was used as the basis for the selection of the 2017 PCI list**[14].

[13] In order to provide relevant information, in this section only those PCIs which are not commissioned are assessed.

[14] The TYDNP 2016 does not include the smart grid PCIs. It is to note, however, that pursuant to Annex III 2 (3) of Regulation (EU) No 347/2013, there is no requirement for smart grid projects to be in the Union-wide TYNDP to obtain a PCI status.

However, the Agency notes that, compared to last year, the number of non-included or only partially included PCIs in the relevant[15] NDPs has doubled[16]. The project promoters' annual reports indicate that **7 PCIs do not appear in any of the relevant NDP(s)** [17]. Out of those 7 projects, four are private storage projects and three are smart grids projects. **For 13 PCIs, the project promoters reported that the PCI is included in only some, but not all of the relevant NDPs.** Although these PCIs are usually at an early stage of their development (their status is either "under consideration" or "planned, but not yet in permitting"), in five cases they are already under permitting.

For further details on the projects not included in the relevant NDPs, please refer to Annex I.

Key findings and recommendations:

- Although a small number of PCIs reported changes to their technical description, substantial technical changes may affect the costs and/or benefits of the PCIs**. Therefore, the Agency invites the Regional Groups to consider the reported changes in the next PCI assessment.**
- The Agency also notes that, compared to last year, the number of PCIs which are not present in the NDPs of the hosting countries has increased. **The Agency encourages all relevant stakeholders to pursue maximum consistency between the NDPs and the PCI list.**

2.3 PCI status and progress

2.3.1 Current PCI status[18]

Similar to previous years, the Agency considers that the status of the least developed element of the PCI constitutes the overall status of the project. This information is therefore rather

[15] For the purpose of this Report, the relevant NDPs correspond to the NDP of the countries or jurisdictions which are hosting the PCI.

[16] In the 2017 PCI monitoring report, the Agency identified 3 fully and 7 partially absent PCIs in the relevant NDPs.

[17] Pursuant to Article 3(6) of Regulation (EU) No 347/2013, a PCI included in the Union list shall become an integral part of the relevant regional investment plans and of the relevant national 10-year network development plans and other national infrastructure plans concerned, as appropriate. Those projects shall be conferred the highest possible priority within each of those plans.

[18] In order to classify the PCIs based on their status, promoters had to choose between one of the pre-defined categories as follows: Commissioned; Cancelled; Under construction; Permitting; Planned but not yet in permitting; Under consideration. Being "commissioned" or "cancelled" means that the PCI has completed its final stage. A PCI's progress across the other stages – in the order indicated above – demonstrates an advancing maturity level of the project. In the Agency's view, a key moment to consider whether a project is sufficiently mature is the time when the promoter files an investment request. Pursuant to Section 1.2 of the Agency's Recommendation No 05/2015 regarding cross-border cost allocation (CBCA), a "sufficiently mature" project is a project exhibiting: sufficient certainty about the costs and reasonable foresight of the benefits assessed by the cost-benefit analysis, and good knowledge about the factors affecting expected costs and benefits and their ranges. In addition, permitting procedures need to have started in all hosting countries and commissioning is to be achieved indicatively within 60 months.

conservative, as some of the investment items included in the PCI might be in a more advanced implementation stage.

One electricity PCI was commissioned between 1 February 2017 and 31 January 2018.

Overall, the share of projects which are in permitting or in a more advanced status is 63%[19], which is similar to what was reported last year. The current status of the electricity PCIs (as of 31 January 2018) is shown in Figure 2.

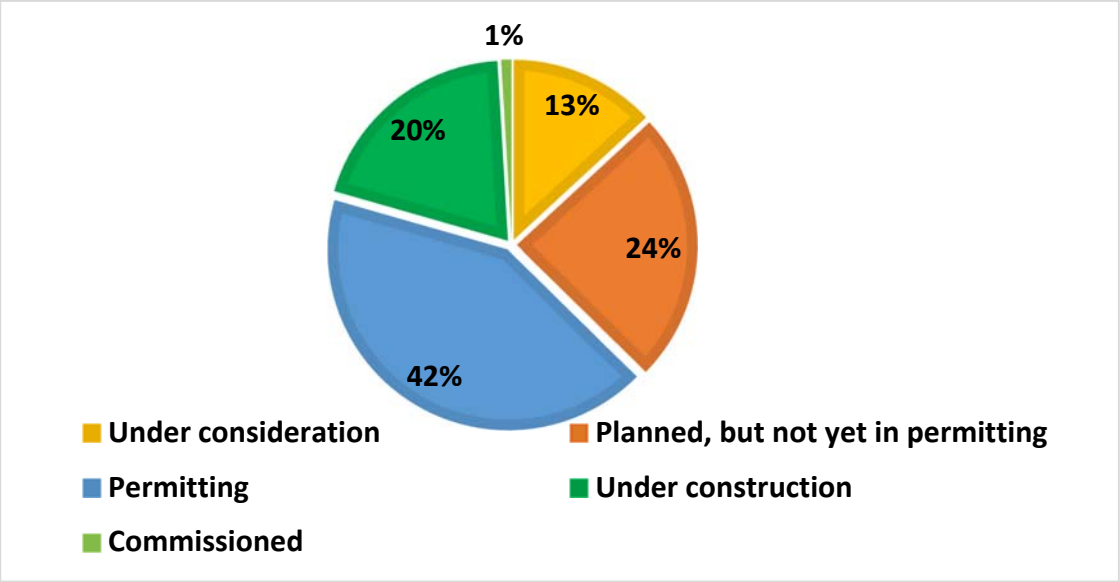


Figure 2 - Share of electricity PCIs in the various status categories

Evolution of the status of electricity PCIs in 2017-2018

Besides the commissioned PCI, 68 PCIs did not change their status, while 14 PCIs (16%)[20] indicated progress in their status between 1 February 2017 and 31 January 2018[21] .

More specifically, 5 PCIs advanced from the "planned but not yet in permitting" status to the "permitting" status, while 9 entered into the "under construction" status from "permitting".

In contrast, in 1 instance, the project regressed from "planned, but not yet in permitting" to "under consideration".

Figure 3 below shows the status of projects in the different priority corridors. Putting smart grid projects aside, the PCIs of the NSOG corridor are the most advanced, similar to last year.

[19] The assessment is based on all the 107 PCIs reported in the 2018 questionnaire. 20% of PCIs reported "under construction" status; 42% reported "permitting" status and 1% reported "commissioned" status.
[20] The assessment is based on 83 "old" PCIs present in the 2015 PCI list with available information (including one smart grid project).
[21] Please note that the change (or lack of change) of the status gives information only about the PCI as a whole. A more detailed focus into the implementation schedule and the reports on the work carried out provides a full overview of the actual progress of the project.

It has the highest share of PCIs "under construction" (38%), while the share of PCIs "under construction" is significantly lower in the other priority corridors (14-16%). The share of PCIs "in permitting" is the highest in the NSI East priority corridor (64%) and varies between 23% and 45% in the other corridors. The share of PCIs, which are "under consideration" or "planned, but not yet in permitting", is the highest in the BEMIP priority corridor (58%).

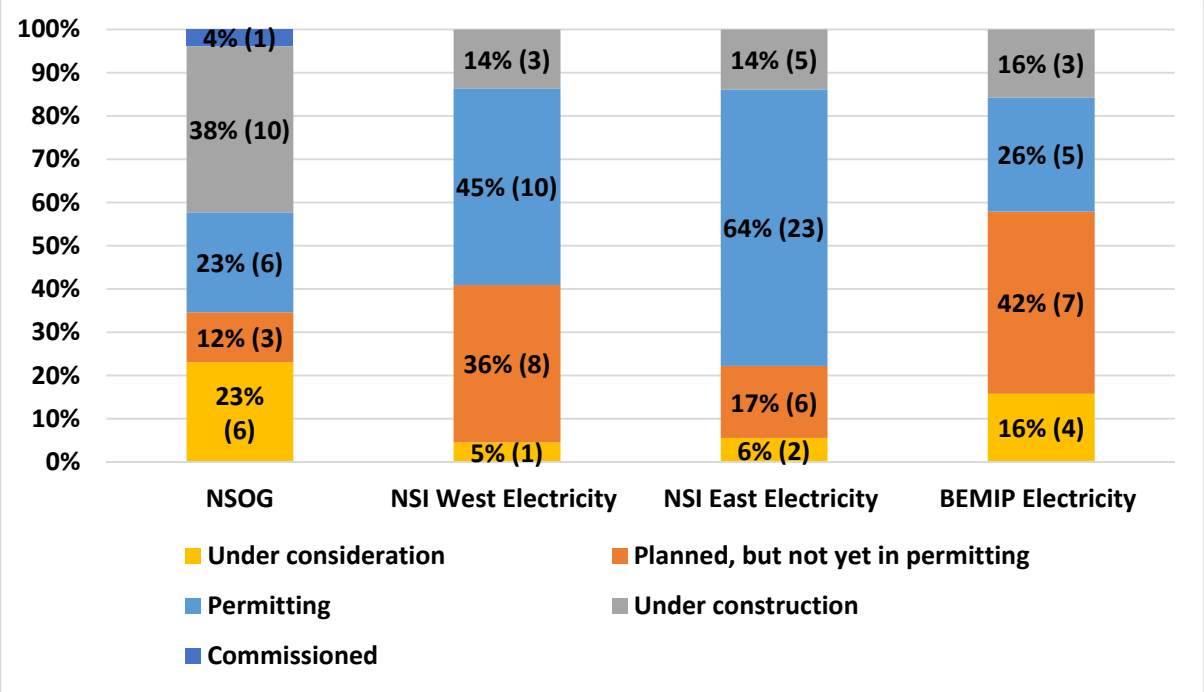


Figure 3 – Breakdown of electricity PCIs by status in the priority corridors

2.3.2 Progress of works

Project promoters were invited to indicate the type of works and activities which were carried out between 1 February 2017 and 31 January 2018.

Most of the project promoters reported to have carried out activities related to permitting[22]. This is followed by activities related to the preparation of environmental, spatial planning, technical and socio-economic feasibility studies.

When comparing the consistency of the reported works and activities with the implementation schedule of the PCIs, the Agency notes that, in many cases, project promoters seem to have listed all the works or activities performed until 2018 and not only those performed over the last year, which limits the reliability of the findings regarding the progress of works in 2017.

For 16 PCIs (14 transmission projects, 1 storage and 1 smart grid project), the promoters did not report any work or activity during 2017 related to their project implementation[23].

[22] These activities include the preparation for the process (e.g. collecting the necessary documents), negotiations with landowners and land acquisition, and the to-dos related to the undergoing process itself.
[23] In the 2017 PCI monitoring report, 17 such cases, where no works or activities were reported, were identified.

Most of them (12 PCIs) belong to the NSI East priority corridor, while the rest is evenly distributed among the other corridors. It is remarkable that, in 9 instances, the corresponding PCIs seem to be "on time" or even "ahead of schedule" compared to last year's schedule, even in the absence of any actual work.

2.3.3 Expected commissioning dates

Figure 4 below shows the cumulative share of PCIs expected to be commissioned each year, based on the foreseen commissioning dates reported by promoters.

The Agency notes no overall advancement of the commissioning terms of the PCIs compared to the previous years. The share of projects expected to be commissioned by 2022 is 49%, i.e. project promoters expect to construct and commission half of the projects in the next four years.

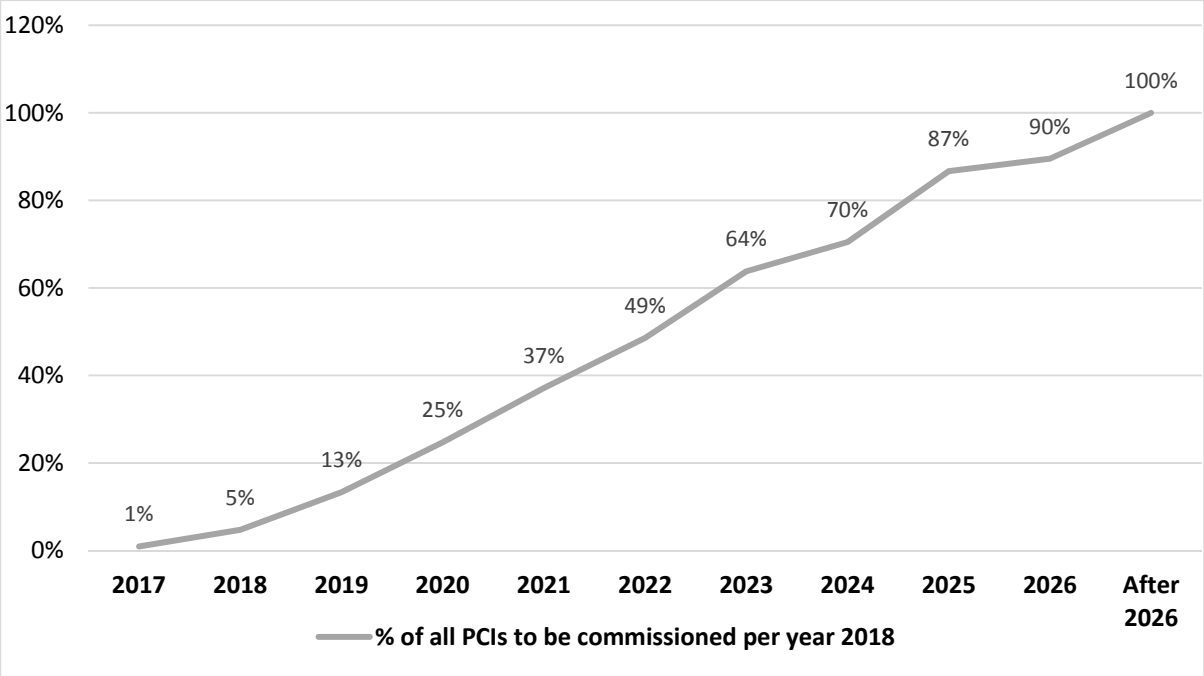


Figure 4 - Cumulative share of electricity PCIs to be commissioned per year[24]

The Agency notes that - if the past reporting pattern of repeated postponement of commissioning dates continues in the future - the commissioning dates of some projects are likely to be postponed.

2.3.4 Progress of PCI implementation

In each annual report, promoters indicate whether their project is on track compared to the commissioning date planned in the previous year. A project which has the same expected commissioning date as what was expected in the previous year is considered to be "on time". A project which managed to speed up its implementation and for which, therefore, the expected

[24] For the construction of the graph, 105 PCIs were taken into account, as 2 PCIs did not provide an expected commissioning date.

commissioning date is earlier than in the previous year is considered as “ahead of schedule”. A project can be behind its previous schedule due to either delay or rescheduling. For the purpose of this Report, the Agency considers an investment “rescheduled” if it is voluntarily postponed by a promoter as a result of changes like lower demand, less urgent need for an investment due to updated planning data or priority given to other transmission solutions, while an investment is considered as "delayed" if it is still needed at the expected date, but cannot be delivered on time due to various external factors like permitting (including environmental licencing), legislative reasons, etc.[25].

The results of the current year-on-year analysis are similar to those presented in the 2017 PCI monitoring report[26], except for the slight increase (by 3% and 1% respectively) of the share of “on-time” and “ahead of schedule projects against the “delayed” ones (which decreased by 5%). According to Figure 5, **more than half (57%) of the PCIs are “on time” or “ahead of schedule”, whereas more than 40% are behind last year’s schedule.**

27 PCIs (26%) encountered delay within a year and 15 PCIs (15%) were rescheduled.

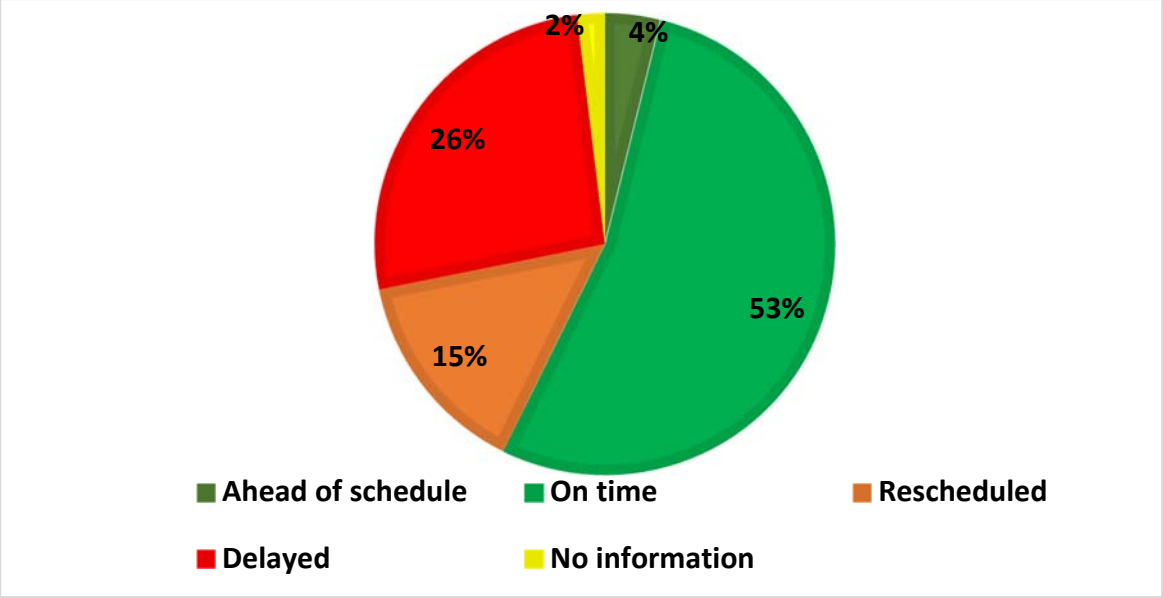


Figure 5 - Progress of electricity PCIs

Average duration of delays and rescheduling

The duration of delay and rescheduling varies significantly across the projects: the shortest duration of delay is 3 months; the longest is 73 months, while **the average delay is 26 months**. Regarding rescheduling, the length of rescheduling of the PCIs ranges from 6 months to 36 months and **the average rescheduling is 19 months**. As shown in Figure 6, the most typical

[25] Cf. Section 5 of the Agency’s Opinion No 16/2014.

[26] As a reference commissioning date for the “new” PCIs, the commission date indicated by promoters during the PCI selection process was considered. The assessment is based on 103 PCIs, as 4 PCIs were not included: the commissioned PCI, and the three new smart grid ones, for which there is no reference commissioning date available to make a comparison.
In 2 instances, project promoters did not provide an expected commissioning date, and these 2 PCIs are included in the “no information” category.

duration of delay is more than 18 months. For just 3 delayed PCIs the shift is less than 6 months and for 5 PCIs the delay is more than 42 months.

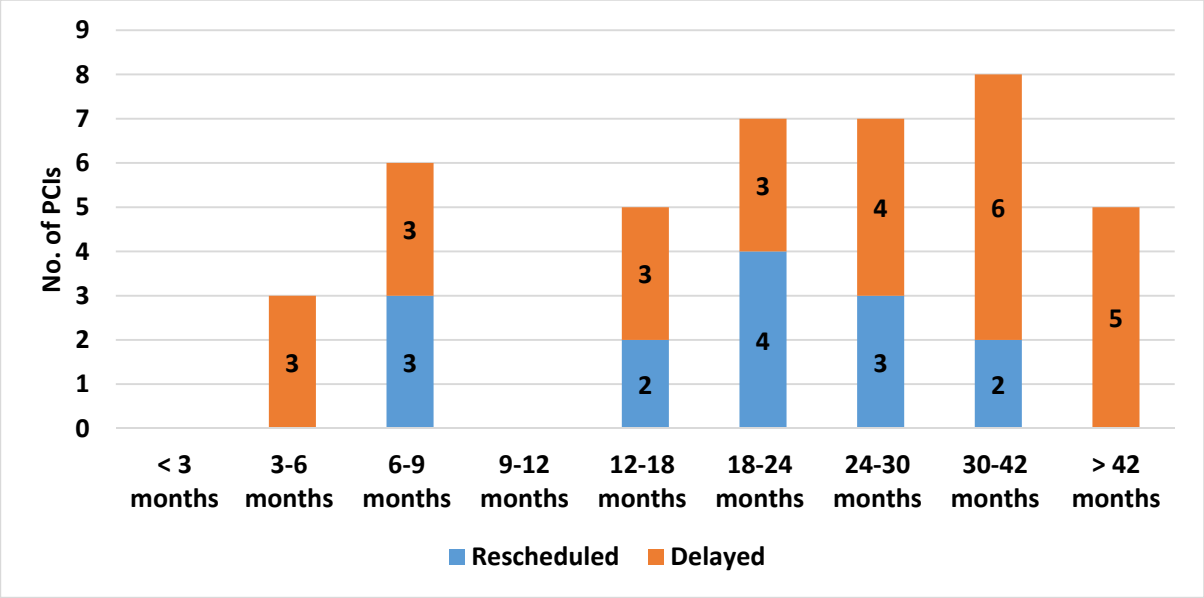


Figure 6 - Duration of Delay and Rescheduling for electricity PCIs[27]

2.3.5 Reasons for rescheduling, delays and difficulties encountered by the project promoters

Project promoters were invited to indicate the main reasons for rescheduling and delays encountered during the project implementation, using 31 January 2017 as the reference point to evaluate the PCI progress.

2.3.5.1 Rescheduling

15 instances of rescheduling were reported. In 4 cases, the reason reported was that the project was at an initial stage and the implementation plan was preliminary, in 2 cases that the PCIs are still under consideration and their planning is not yet defined, and in another 2 cases that the implementation depends on other rescheduled (complementary) investments. For the other 7 cases, the following reasons were mentioned only for one PCI (except for the last reason that was mentioned for 2 PCIs):

- Changes on the generation side;
- Changes on the demand side;
- Changes due to priority given to other transmission investments;
- Environmental limitations (noise in urban area);
- Dependency on the approval of the NDP and the progress of the environmental and engineering studies;
- A socio-economic feasibility study is required to assess the CBA of the project.

[27] The assessment is based on 27 out of 27 delayed projects and 14 out of 15 rescheduled projects as 1 did not provide the 2017 expected commissioning date.

In conclusion, the initial stage of the project and the subsequent uncertainties attached to its implementation plan can be identified as the most frequent reason for rescheduling.

2.3.5.2 Delays

The most frequently mentioned reason for delays in PCI implementation is related to permit granting (for 12 out of 27 delayed PCIs), which confirms last year's finding, although at a lower frequency. Most frequently, the permit granting is longer than expected due to environmental problems (6 instances), or due to national law changes (5 instances). 5 project promoters did not provide any reason for the delay. The rest of reported reasons for delays (either related to permit granting or due to other reasons) are diverse and applicable only to one or two PCIs:

- Correlation with other delayed investments;
- Risks related to the national regulatory framework or uncertainty of regulatory decisions;
- Lawsuits and court proceedings;
- Discussion about acquisition of or access to land.

For the complete list of reasons for delays for each delayed PCI, please refer to Annex IV.

In 12 instances, the promoters already took measures to address the cause of the delay. In most cases, these efforts, according to the promoters, proved to be successful and it is expected that further delays will be avoided.

2.3.5.3 Difficulties

19 PCIs reported difficulties, which did not result in delays or rescheduling of the commissioning date. Some of the PCIs listed more than one difficulty, therefore the total number of occurrences is higher than the number of PCIs impacted by them. **The most frequent reported difficulty was in relation to permit granting** (9 occurrences). Other common reported difficulties are problems in construction works (3 instances) and lawsuits and court proceedings (3 occurrences). Other difficulties, reported only for one or two PCIs, are the following:

- Difficulties due to risks related to the national regulatory framework or uncertainty of regulatory decisions;
- Difficulties in the final detailed engineering
- Difficulties due to financing reasons;
- Delayed political decisions;

In 13 instances, the promoters took or planned some measures to address the encountered difficulties, and in most of the cases they expect positive impact on the progress of the projects as a result of the action taken.

2.3.6 Duration of implementation

For the purpose of this Report, the overall duration of the implementation of an electricity PCI is considered to be the time period starting from the **date of request for the planning approval**[28] **and the commissioning date**. **The average (expected) duration of**

[28] Planning approval is the approval (at the level of national development planning) by the NRA or by the competent Ministry or national competent authority, as provisioned in the national law of each country.

implementation of the electricity PCIs is about 10.5 years[29], which confirms last year's finding. The shortest implementation duration is less than 3 years, while the longest is over 19 years. Only 11% of the PCIs are implemented in less than 6 years, 32% between 6-10 years and about **57% of the PCIs are expected to be commissioned more than 10 years after their planning started**.

2.3.7 Duration of permitting

The Agency notes that the average duration of permitting is 3.8 years[30]. Indeed, as shown in Figure 7, the expected duration of the permit granting process for most of the PCIs is less than 5 years, typically between 2 and 4 years. For 3 PCIs, the duration of the permit granting process exceeds 10 years. The Agency also confirms its previous year's finding that those PCIs which applied for permit granting after 16 November 2013[31] are in general more optimistic about the expected duration of the permit granting process than those which applied before. **The average duration of permit granting is 2.8 years for the former and 6 years for the latter**.

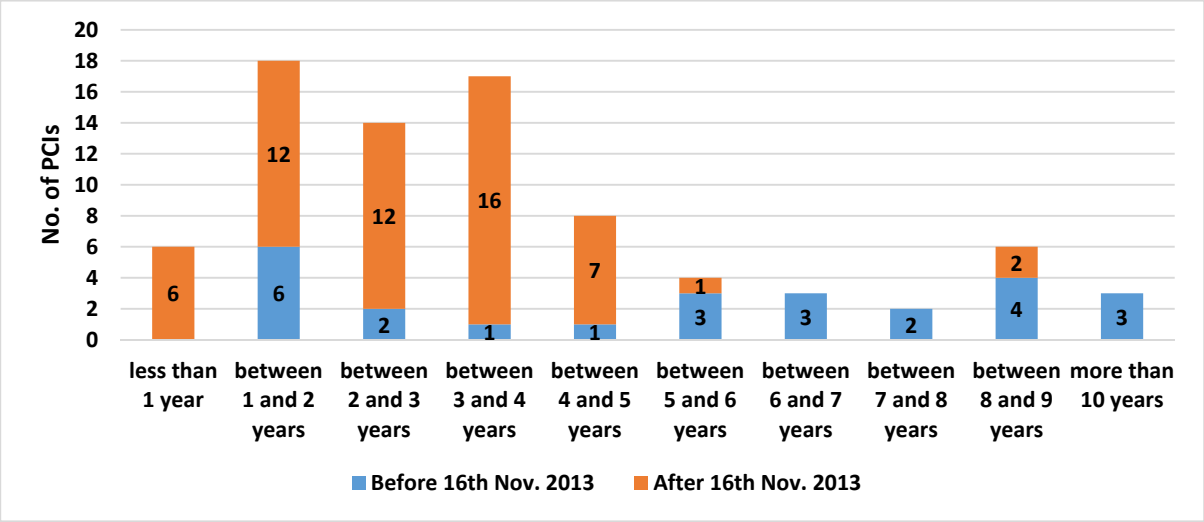


Figure 7 - Duration of the permit granting process for electricity PCIs

Key findings and recommendations

- The commissioning dates of the electricity PCIs continue to be shifted to the more distant future. In 2017, one PCI was commissioned and only 14 out of 83 "old" PCIs (for which information was available) indicated progress in their status over the last year, while for one PCI backward progress was identified.
- The Agency notes that 16 PCIs reported no activity over the last year. **The Agency recommends that the Regional Groups thoroughly scrutinise the merits of PCIs**

[29] This figure is based on the analysis of the data of 66 PCIs, for which the expected dates for start of planning and commissioning were available.
[30] The assessment includes 25 out of 27 projects, which first applied for permit granting before 16 November 2013 and 56 out of 76 projects which first applied after 16 November 2013
[31] According to Regulation (EU) No 347/2013, for these projects Chapter III of the Regulation (Articles 7-10) regarding permit granting and public participation applies.

which re-apply for a PCI label, whilst not making any implementation effort during their presence in the PCI list. A list of those projects is provided in Annex III.

- Similar to last year, almost half of the PCIs are on track, the other half is either delayed (27 PCIs) or rescheduled (15 PCIs).
- The most frequently mentioned reason for delay is related to permit granting, while there is no outstanding reason for rescheduling. **The Agency deems it useful that Regional Groups and Competent Authorities investigate in more detail the permit granting hurdles, hampering the timely implementation of the PCIs, reported by the project promoters.**

2.4 Progress of costs and benefits

2.4.1 Investment costs

Starting from this year, the Agency has introduced a new approach to monitoring the costs of PCIs, which is intended to be applied every second year, i.e. the years following the PCI selection. Promoters were not requested to provide new forecasts of the PCIs total investment costs, since these figures were confirmed during the PCI selection process, which preceded the monitoring exercise only by a few months. Therefore, the figures considered in the 2017 PCI selection process were used to monitor costs[32], and in cases in which the available numbers pertained to more than one PCI, or it was unclear to which investments they pertained, additional specific data was requested.

This approach was deemed most appropriate since: (i) increases the consistency of the data provided by promoters in the different phases of the PCI cycle; (ii) reduces the administrative burden for promoters; (iii) increases the ability of the Agency and the PCI Regional Groups to verify the robustness of the submitted data (e.g. by checking investment costs with the provided PCI implementation data like the incurred costs); and (iv) increases the link between PCI selection and the monitoring stage.

The total amount of the expected investment costs for 105 PCIs in 2018 values[33] is **€49.3 billion (€40.5 billion for transmission projects, €8.4 billion for storage projects and 0.4 for smart grids)**[34], at a similar level compared to €51.8 billion of the total cost of the 2015 list[35] (in 2018 value).

[32] The CAPEX value as reported in the TYNDP 2016 project sheets was considered, and assuming that the cost is incurred in the year of the commissioning of the project, it was discounted to 2018 value. In case only part of the project was submitted for the PCI process, the adjusted CAPEX as submitted by the promoter was considered.
[33] The investment cost figures considered in the PCI selection were real values, which referred to the year of the commissioning, therefore the sum was calculated after discounting all costs to 2018 values to make them comparable.
[34] For the total investment costs figure the available data included 88 transmission, all 13 storage, and all 4 smart grid PCIs. In the cases where an aggregate value was available at a cluster level containing more than one PCI with different commissioning dates, for simplicity the cost was split evenly among the different dates. The commissioning dates considered during the PCI selection 2017 were used to keep consistency of the calculations, except for a few cases where they were not available, and the Agency used the commissioning dates indicated in the 2018 report.
[35] 96 transmission PCIs, 8 storage PCIs, and one smart grid PCI were taken into account for this calculation.

The Agency regrets to note that the promoter of two PCIs refused to provide the requested expected investment cost data[36] claiming that "*the disclosure of reported values could influence tendering procedures and the bidding behaviour of the tendering participants*", despite the fact that an option of non-disclosure of this data was allowed to the promoters. For the specific information regarding the projects, please refer to Annex IV.

Expected investment costs over the coming years[37]

Figure 8 shows the distribution of the expected investment costs over the coming years (at real values at the commissioning date). It can be inferred that, if projects were implemented as planned and if the indicated commissioning dates were met, within the coming 4 years, i.e. by 2022, **50% of the total investment costs would have to be incurred**.

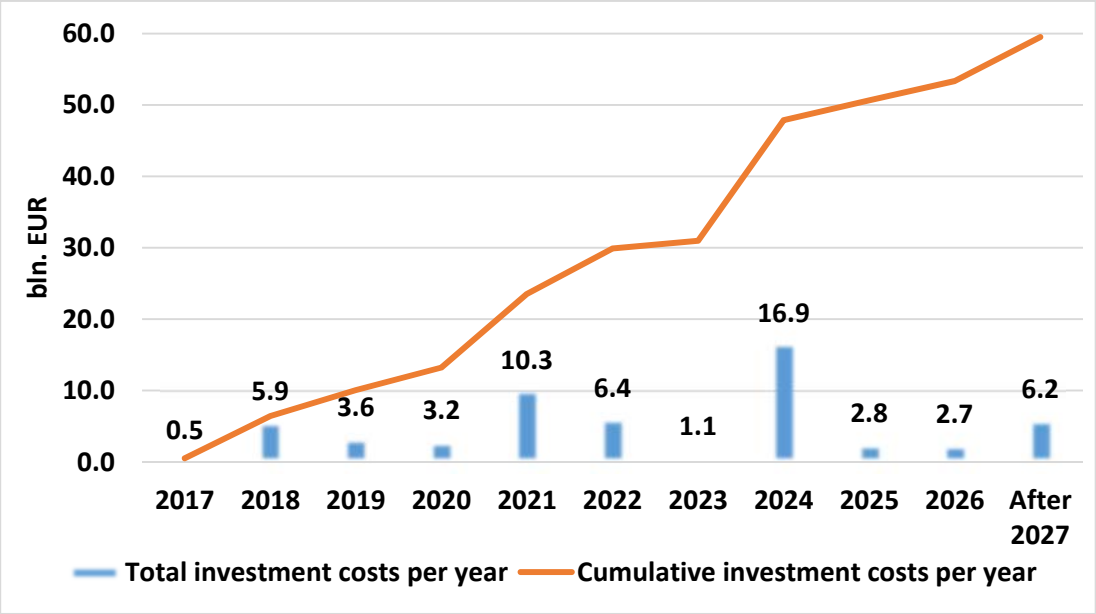


Figure 8 - Total investment costs of electricity PCIs

Actual spending

Tracking the actual level of spending until now provides a useful insight into the progress of PCIs. Similar to last year, the Agency invited promoters to report the total amount of capital costs spent on the project until the end of 2017. The total amount incurred by 2017 was **€5.8**

[36] In both cases the PCIs were assessed and included in the PCI lists based on the cost of the whole TYNDP cluster of projects that they belonged, and their specific cost projections were not made available. Therefore, during the monitoring exercise, the Agency requested the expected total investment cost only for the investment items included in each PCI.

[37] For the purpose of this assessment, the Agency used the conservative assumption that 100% of the indicated investment costs are realised in the year preceding the commissioning of the project to provide a view of the scale of expected investment needs which would appear by certain years if all PCIs were implemented as planned.

billion, representing 12% of the overall PCIs budget, and, in addition, **€3.8 billion were contracted[38].**

In two cases[39], the comparison of the expected total investment cost (considered in the PCI selection) with the already incurred costs and contracted costs of the PCI revealed the severe underestimation of the PCI budget, raising doubts on the credibility of the data provided by some promoters in the PCI selection phase.

2.4.2 Life-cycle costs

Similar to the expected investment cost, the Agency introduced a new approach for the lifecycle costs'[40] monitoring.

Transmission promoters were not requested to provide new forecasts of the PCI lifecycle costs, since these figures were confirmed during the PCI selection process, which preceded the monitoring exercise only by a few months. Therefore, the figures considered in the 2017 PCI selection process were used to monitor lifecycle costs.

Regarding the storage and smart grids projects, the annual lifecycle costs were requested to promoters (including, for storage, the annual costs of power purchase needed for the operation of the plant reported as a separate item), since they were not available in the PCI selection process.

Due to the small number of storage projects, and considering also the diversity of the storage technologies employed, and the concerns about the comparability of the data, the assessment of the life-cycle costs focuses on the transmission PCIs only.

The aggregate expected life-cycle costs[41] for the transmission PCIs in 2018 values are **€5.7 billion[42],** which corresponds to **14.2%** of the total investment costs of the same project sample.

2.4.3 Expected benefits

Similar to the monitoring approach for costs, the Agency introduced a new approach for the benefits' monitoring. Promoters were not requested to provide updated benefits forecasts, since these figures were used during the PCI selection process, which preceded the monitoring exercise only by a few months. Therefore, the figures considered in the 2017 PCI selection process were used to monitor PCI benefits.

[38] The "Additional Contracted Investment Costs" include all the costs which promoters are committed to (e.g. tender and consequent contracts are signed, even if no invoices are issued yet or no payments are made yet) excluding the Incurred Investment Costs.
[39] For PCIs 1.3.2 and 2.2.1. In another case (PCI 1.7.2), it was noted that a lower figure was considered during the PCI selection process compared to the promoter's expected investment cost reported in the 2017 monitoring report.
[40] For the purpose of this Report, the currently expected life-cycle costs include replacement costs of devices, dismantling, maintenance and other life-cycle costs and they do not include investment costs.
[41] The lifecycle costs of each project was calculated based on the annual OPEX reported by the project promoter. The present value (2018) of the annual lifecycle costs was calculated, applying the CBA rules and starting from the year of commissioning.
[42] Based on 78 transmission PCIs.

The benefit calculation[43] included 76[44] transmission PCIs (for which lifecycle cost data was also available), all storage projects, for which both investment costs and benefits data were available, and no smart grid projects since monetised benefit data was not available for them.

Regarding the calculation of benefits, the following steps were followed during the PCI selection process:

- The total benefits of each project were calculated for scenarios 3 and 4 of the TYNDP, taking into account the two time horizons studied in the TYNDP (year 2020 and 2030) and by applying the interpolation rule stipulated in the CBA methodology. The monetised benefits taken into account were the following:
  - The TYNDP indicator Social Economic Welfare (SEW).
  - The additional benefits indicated by project promoters either in the TYNDP or during the PCI selection process.
  - The monetised value for losses.
- 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.

Regarding transmission PCIs[45], the aggregated total considered benefits amount to €70 billion (in 2018 values), as compared to €45.1billion total costs (in 2018 values). Therefore, the **overall cost-benefit ratio for these transmission PCIs is over 1.5.** This ratio is higher than the one of 1.2 calculated in the 2017 monitoring report based on promoters' expectations, but given that most of the PCIs were already included in the previous PCI lists, this increase may be attributed to the more optimistic benefit values of vision 3 and 4 of the TYNDP 2016 that were considered in the recent PCI selection process, and not to an actual improvement of the PCIs efficiency.

Also, the Agency notes that **for 18 transmission PCIs, the expected monetised benefits considered do not outweigh their total expected costs**.

Regarding storage projects, and considering the total expected investment and lifecycle cost reported in the monitoring reports (including the costs of power purchase), for only 4 out of the 14 PCIs benefits seem to outweigh costs. This finding mainly signals the need for further improvement of the CBA methodology for storage projects, so as better to capture storage projects costs and benefits.

[43] It is noted that, in this analysis, the benefits considered in the 2017 PCI selection were taken into account, i.e. the ENTSO-E TYNDP 2016 results for vision 3 and 4 and additional benefits reported by promoters and assessed by the Regional Groups.

[44] For 5 PCIs out of the 14 that could not be considered in the analysis (i.e. PCIs 1.1.1, 1.1.2, 3.1.1, 3.1.2, 3.1.4), benefits were available at a cluster level, which, however, included more investment items than the PCIs, and at the same time costs were made known by promoters only for some of the PCIs. For the rest 9 PCIs (i.e. 4.10.2, 4.8.1, 4.8.2, 4.8.3, 4.8.4, 4.8.5, 4.8.7, 4.8.8 and 4.8.9) benefit calculations were not available by ENTSO-E TYNDP 2016, and were not considered in the 2017 PCI selection process.

[45] For this calculation, 76 transmission PCIs were considered, for which all investment and lifecycle costs and benefits data were available.

Key findings and recommendations:

- The total amount of expected investment costs is €49.8 billion, at a similar level to the 2015 PCI list.
- The benefit over cost ratio for transmission PCIs increased to 1.5. However, this increase is seemingly caused by the more optimistic TYNDP scenarios used for the 2017 PCI selection, and is not due to an actual improvement of the PCIs efficiency. In this regard, the Agency notes the importance of appropriate selection of scenarios in the future, as the benefits values strongly depend on them.
- Regarding storage projects, the failure of most of PCIs to justify their benefits in monetary terms signals the need for a significant improvement of the CBA methodology for storage projects and better CBA application, so as better to capture their costs and benefits.
- The total life-cycle costs for transmission PCIs amount to approximately 14% of the total investment costs of the same project sample.
- Refusal of disclosure of important project elements like costs should not be allowed in the future. Also, given the significant underestimation of project budget that was noted in some cases, the Regional Groups should take action further to scrutinise the indicated cases and ensure the incorporation of the PCI monitoring results into the next PCI selection.
- Promoters reported to have spent €5.8 billion on the current PCIs by end of 2017. However, this progress is deemed insufficient to meet the indicated planning, according to which around 50% of the overall projects' budget should be incurred in the coming 4 years.

3 Volume 2: GAS PROJECTS

3.1 Introduction

3.1.1 Fulfilment of the reporting obligations

In 2018, the Agency refined its monitoring practice for gas PCIs by using a new information support system known as "VALVE". The system's interface allowed promoters to access VALVE remotely via an on-line tool[46]. The system was pre-filled with the information submitted by the promoters for the 2017 TYNDP[47]. Promoters could confirm that the information is still valid or they could provide an update.

The 2017 PCI list includes 53 gas PCIs, which consist of 98 investment items. The Agency collected information at the level of each single investment item in VALVE, and converted and aggregated the data (if applicable) to PCI level. In this Report monitoring results are presented at PCI level.

By the legal deadline of 31 March 2018, the Agency received full reports for 52 out of the 53 PCIs[48]. The report for 1 PCI[49] was submitted after the legal deadline.

The Agency stresses that promoters are obliged to submit an annual report for each PCI each year following the year of inclusion of the project in the PCI list. Failure to submit such a report represents a breach of Regulation (EU) No 347/2013.

3.1.2 Completeness, consistency and adequacy of the submitted data

The Agency checked the received data in order to assess their completeness and consistency. The Agency notes that the **information related to project identification, technical parameters and expected total investment costs appears to be adequately provided. However,** the Agency **identified a significant number of cases in which sections of the reporting template were not completed[50]**. Most of the missing or incomplete information is related to the expected **benefits** to be provided by the projects. While promoters did select the category of applicable benefits for each PCI, the estimated monetised value of benefits was provided only for 6 PCIs. Similarly, **project life-cycle cost data were missing or incomplete for 66% of the PCIs**. Project promoters seem to have difficulties to identify or report these data, even though a project cost-benefit analysis (CBA) was carried out already at the stage of preparing the 2017 PCI list, before its adoption. The Agency notes that this year, once again, **most of the missing data is related to costs and benefits**.

The Agency contacted the promoters of 25 PCIs to ask for clarifications of the submitted data. In the majority of the cases, these requests addressed apparent inconsistencies in the total

[46] In the future, the information support system will also cover electricity projects.

[47] Cf. https://www.entsog.eu/publications/tyndp#ENTSOG-TEN-YEAR-NETWORK-DEVELOPMENT-PLAN-2017

[48] In this volume of the Report, the focus is on gas PCIs. Here, "all PCIs" refers to all the gas priority projects only and not to any electricity PCIs, unless otherwise indicated.

[49] PCI 5.1.1 Physical reverse flow at Moffat interconnection point (IE/UK).

[50] The Agency recalls that the exact elements of the promoters' reports are not prescribed in Article 5 of Regulation (EU) No 347/2013. So far, for each PCI monitoring exercise, the Agency compiled reporting forms, after consulting them with the Competent Authorities, the NRAs and the project promoters, which were used to collect the information.

investment costs compared to January 2017 and/or the lack of an adequate explanation for such changes, the amount of the reported incurred costs[51] or the implementation status of projects.

Some PCIs foresee implementation in several project "phases", which can be consecutive (e.g. different sections of a pipeline to be built one after the other or installing compression power in stages at a compressor station), or in parallel. Regardless of the implementation order, phases are essentially different project implementation stages. Each "phase" of the same PCI may foresee different commissioning dates, and be individually implemented on time or be postponed. The information in this Report is generally aggregated and provided at PCI level. However, the relevant sections of this Report indicate whether the submitted reports on investment item level show inconsistencies with other parts or items of the same PCI.

Key findings and recommendations

- The Agency notes that most project promoters apparently continue to experience difficulties in assessing and reporting the value of the lifecycle costs and, in particular, the monetised benefits associated with their projects. The Agency is of the view that, since all PCIs should be subject to CBA already at the stage of preparing the PCI list, the lack of any estimate of the value of a project's expected lifecycle costs and benefits casts fundamental doubts on the projects merits' level[52].
- The Agency recommends ENTSOG to foresee in the CBA methodology ways and means that would allow project promoters to assess and update the lifecycle value of the costs and the monetised benefits of the PCIs. The Agency recommends project promoters to evaluate the costs and the benefits of their projects from the inception of the project and to track the progress of the costs and benefits over the entire project cycle.

3.2 Overview of the gas PCIs

3.2.1 General statistics of the PCIs

The 2017 PCI list includes 53 projects in gas, mostly in transmission (42 projects). The list also contains 5 liquefied natural gas (LNG) regasification projects and 6 underground gas storage (UGS) projects. Approximately half of the projects on the 2017 PCI list (27 projects) are present in an unaltered form compared to the previous 2015 PCI list, a circumstance providing a good basis for the tracking of the progress achieved by these PCIs over the lifetime of the two PCI lists[53].

PCIs 6.2.10 and 6.2.12 share a common investment item[54]. In order to avoid double-counting, the data of the common item it is accounted only once, for PCI 6.2.12. For PCI 7.1.1 the

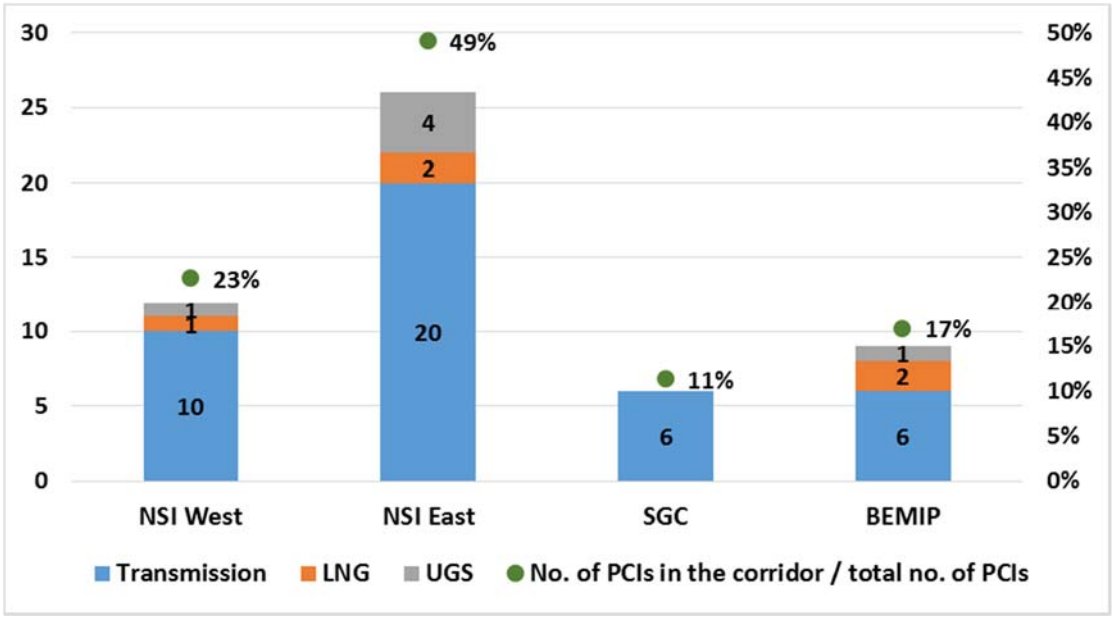
[51] The concerned promoters often indicated a lower overall level of costs incurred so far over the entire time span of the PCI, compared to the costs already reported earlier for the same PCI.
[52] The Agency provided an opportunity to the project promoters to mark cost and benefit data as confidential, should promoters wish to do so. Nevertheless, very few promoters provided information about benefits and most also did not provide data for lifecycle costs.
[53] Note that the actual comparison is possible only if the information for both monitoring exercises is available. In some cases, the scope of comparable PCIs might be small if the information is missing from either of the monitoring exercises.
[54] The project "Poland-Czech Republic Interconnection (CZ)", TYNDP code: TRA-N-136 appears as part of both PCIs.

aggregated information is available for this Report. However, due to the divergent reported maturity of the sub-projects belonging to this PCI (ranging from "under consideration" to "under construction"), the Agency recommends that the individual investment items of PCI 7.1.1 constitute separate PCIs within one project group in future PCI selections.

On the other hand, PCIs 5.5.1 and 5.5.2 partially overlap, since PCI 5.5.1 is actually a subset of PCI 5.5.2. In this sense, the common investment item is the entire PCI 5.5.1, and this PCI appears twice, once as a PCI on its own standing with an assigned individual PCI list code, and the other time as a sub-set of PCI 5.5.2. From this point of view, the Agency recommends that no PCI is listed twice on the PCI list or reported as part of another PCI, and that codes are uniquely assigned to individual PCIs.

The geographical features of the PCIs – the project hosting countries and their location in the priority corridors – remain unchanged from the previous PCI list. As shown in Figure 9, North-South Gas Interconnections in Central Eastern and South Eastern Europe ("NSI East") hosts the majority of the PCIs, followed by the North-South Gas Interconnections in Western Europe ("NSI West"), the Southern Gas Corridor ("SGC") and the Baltic Energy Market Interconnection Plan ("BEMIP"). Since a reduction[55] in the number of PCIs took place in the NSI East and in the SGC corridors, their shares within the total number of PCIs decreased compared to 2017.

Figure 9: Number of gas PCIs by type and corridor



Project promoters reported **major technical changes** for 11 projects (approx. 20% of all PCIs). Changes and works performed during the last year have been reported mostly for transmission projects. Since there is no exact definition of the notion of a "major technical change", the reported cases of a "major technical change" reflect the project promoters' own judgement. In general, "major technical changes" are commonly due to changes in the scope of the project,

[55] The reduction includes both discarding projects and merging projects with other PCIs. A comparison between the 2015 and 2017 PCI lists shows that 14 projects which used to be PCIs ceased to be PCIs in 2017. A significant reorganization took place in the NSI East corridor, where 22 PCIs were integrated or merged into 11 other PCIs.

i.e. to the addition or removal of some investment items or sub-projects. Other types of major changes include changes in the technical and technological features of the infrastructure or in the auxiliary equipment, including both downsizing or increasing the planned capacity. New routing and siting were also reported as major technical changes.

3.2.2 Presence of the PCIs in the NDPs

The Agency notes that NDPs typically include the national sections of cross-border gas transmission projects. However, NDPs – as a rule – do not consider the cross-border aspects or effects of LNG or UGS projects located outside their geographical scope. For this reason, the listing of an LNG or UGS PCI with significant cross-border impacts in the NDPs of fewer Member States compared to the number of Member States which would be impacted by such a PCI, should not be interpreted *a priori* as inconsistent.

12 PCIs are entirely absent from the NDP of their hosting countries. These PCIs include 6 transmission projects, 5 UGS projects and 1 LNG project. Furthermore, **11 investment items of PCIs are missing from the NDP of at least one of the hosting countries.**

The following reasons for the absence of a PCI in the NDP are reported:

- No NDP exists in the country or the operators are not required to prepare and publish an NDP (8 instances);
- The project is not developed by the TSO, but by an independent developer (6 instances);
- The NDP was prepared at an earlier date compared to the date of the adoption of the PCI list, and the PCI will be proposed for the next edition of the NDP (4 instances);
- The promoter has not yet applied for a connection to the national transmission system and thus is out of the scope of the NDP (3 instances).

The Agency acknowledges that NDPs are not necessarily prepared and adopted at the same time as the PCI list, and, as projects are formulated and progress, differences could appear between the information provided in the NDPs, the data submitted when the project was a candidate for a PCI, and the data at the time when the progress report for the project was submitted to the Agency and to the relevant Competent Authorities.

Key findings and recommendations

- The Agency recommends that each investment item or project component exist only in one instance on the PCI list. Having the same investment item or project component as a part of several PCIs may lead to double counting the project characteristics, and potentially to confusion in the treatment of investment requests under Article 12 of Regulation (EU) No 347/2013 and also in subsequent requests for CEF grants, as the scope of the investment associated with the relevant PCI and its costs and benefits would not be clearly defined and uniquely attributable to the PCI.
- Greater consistency is recommended in the assessment of the cross-border impacts of gas transmission (pipelines, compressor stations), LNG, and UGS projects

- The Agency reiterates its earlier recommendation[56] that consistency is pursued by ENTSOG, the Regional Groups and project promoters to the maximum extent possible between the identity and the scope of the projects in the TYNDP and in the PCI list, to avoid ambiguities and enable effective monitoring.

3.3 PCI status and progress

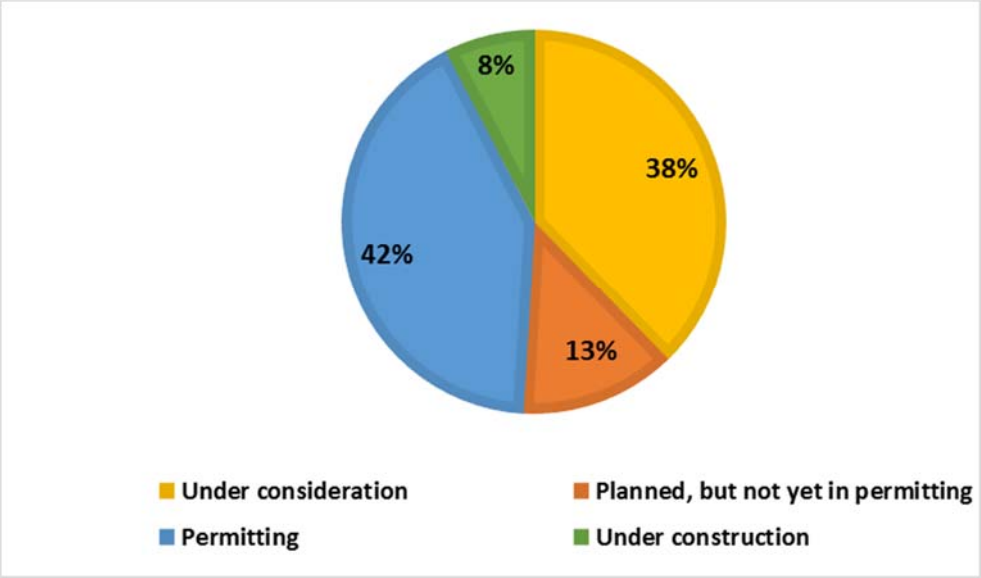
3.3.1 Current PCI status[57]

One of the main indicators of a project's progress is the advancement in its implementation. Project promoters are requested each year to indicate a PCI's status by marking **the stage of the least developed section or part of the project** (if applicable). This information is a conservative indicator for a project's progress, as some parts of the project may already be in a more advanced stage of implementation. Compared to the report of last year, which analysed the 2015 PCI list, the share of less advanced PCIs (i.e. those under consideration or planned but not yet in permitting) is slightly higher[58] and covers 51% of the PCIs. This is due partly to the fact that 7 PCIs which were present in the same scope on the 2015 PCI list experienced a setback or "reverse progress" in the reported status[59]. Another reason is the inclusion of a less advanced project item within a PCI, which inevitably leads to reporting a less mature status for the PCI. For instance, there are 4 PCIs in the "under consideration" stage and 3 PCIs in the "planed but not yet in permitting" stage, which have components that are currently in permitting. Thus, the overall status of the PCI may not give a very refined view of the progress of its components.

In the case of PCI 6.8.1, one investment item has been cancelled, but the PCI as a whole continues to be developed. The Agency also highlights that according to the information available from ENTSOG[60], projects TRA-N-018 and TRA-N-061 are reported as cancelled in the draft list of TYNDP project candidates for 2018. However, the promoter of these projects submitted to the Agency a PCI progress report indicating that the projects are advancing as planned.

[56] Cf. the 2016 and 2017 PCI monitoring reports of the Agency.
[57] In order to classify the PCIs based on their status (implementation "phase" or "stage"), promoters reported by choosing one of the following pre-defined answers: Commissioned; Cancelled; Under construction; (In) permitting; Planned but not yet in permitting; Under consideration. Being "commissioned" or "cancelled" means that the PCI has completed its final implementation stage. A PCI's progress across the other stages – in the order indicated above – demonstrates an advancing maturity level of the project. In the Agency's view, a key moment in considering whether a project is sufficiently mature is the time when the promoter files an investment request. Pursuant to Section 1.2 of the Agency's Recommendation No 05/2015 regarding cross-border cost allocation (CBCA), a "sufficiently mature" project is a project exhibiting: sufficient certainty about the costs and reasonable foresight of the benefits assessed by the cost-benefit analysis, and good knowledge about the factors affecting expected costs and benefits and their ranges. In addition, permitting procedures need to have started in all hosting countries and commissioning is to be achieved indicatively within 60 months.
[58] In the 2017 PCI monitoring report, the share of PCIs in permitting was 51%, whereas the two less advanced stages together constituted 43% of PCIs.
[59] 3 PCIs have reversed from "Permitting" to "Planned but not yet in permitting", while 2 PCIs reversed from "Permitting" and from "planned but not yet in permitting" to "Under consideration".
[60] Published on ENTSOG's website on 1 June 2018 https://www.entsog.eu/publications/tyndp#ENTSOG-TEN-YEAR-NETWORK-DEVELOPMENT-PLAN-2018

Figure 10 – PCI maturity



Evolution of the status of PCIs in 2017-2018

There are 25 PCIs in the current list which were on the 2015 PCI list in the same form. In the case of 5 of these PCIs, progress is visible (2 moved from permitting to construction and 3 advanced from "planned but not yet in permitting" into the permitting phase). The status of 13 PCIs remained unchanged, and 7 PCIs registered a setback or "reverse progress", i.e. they are currently in a less advanced status than before[61].

3.3.2 Progress of works

Project promoters were invited to indicate the **types of works and activities carried out between 1 February 2017 and 31 January 2018**.

The most frequently reported type of work relates to feasibility / technical studies, which are undertaken for projects that are still in an early implementation stage, or because of technical changes that occurred during the permitting phase. The second most often cited types of works carried out concern front-end engineering and design (FEED) activities and activities related to an application for financial assistance from CEF.

Several promoters indicated that they have carried out activities related to permitting, in particular the filing of requests for location permits to the competent authorities.

Other type of reported activities, such as tendering for construction or agreements with contractors, are related to the advanced implementation stages of a PCI.

The Agency compared the reported activities to the major milestones contained in the implementation schedule of the projects and in their status as reported by the promoters. The

[61] 2 PCI downgrade from Permitting status to Planned but not yet in permitting. In 4 instances the project status regressed from Permitting to Under consideration and in 1 case the project status is reported backward from Planned but not yet in permitting to Under consideration.

Agency notes that the submitted information is generally consistent. **Promoters indicated that no work[62] was performed in the case of 9 transmission projects[63] and 1 UGS project.** Almost all the projects for which no activities were reported are located in the NSI East corridor. A few are located in the NSI West and the SGC, and one in the BEMIP corridor.

The Agency notes a generally positive decreasing trend in the number of PCIs for which **no work has been reported**, in comparison to last year[64]. However, the Agency also notes that in many of the cases where no work was carried out, the PCI is still reported to be "on time" in its implementation schedule, which looks inconsistent[65].

3.3.3 Expected commissioning dates

Similarly to the methodology used for determining the status of a PCI, the Agency used a conservative approach to establish the expected commissioning date. **If a PCI consists of several elements, the commissioning date of the element which is to be commissioned last is indicated as the commissioning date for the entire PCI.**

Figure 11 shows the number of projects expected to be commissioned per year, per priority corridor. The Agency notes that the overall trend for the commissioning terms of the PCIs remains unchanged compared to the previous years. The share of projects expected to be commissioned in the next 2 years is modest (13%), and then, in just two more years, it grows to a remarkable 64%, i.e. project promoters plan to construct and commission almost 2/3 of all PCIs within 4 years, and half of all PCIs within years 3 and 4 of the project implementation cycle.

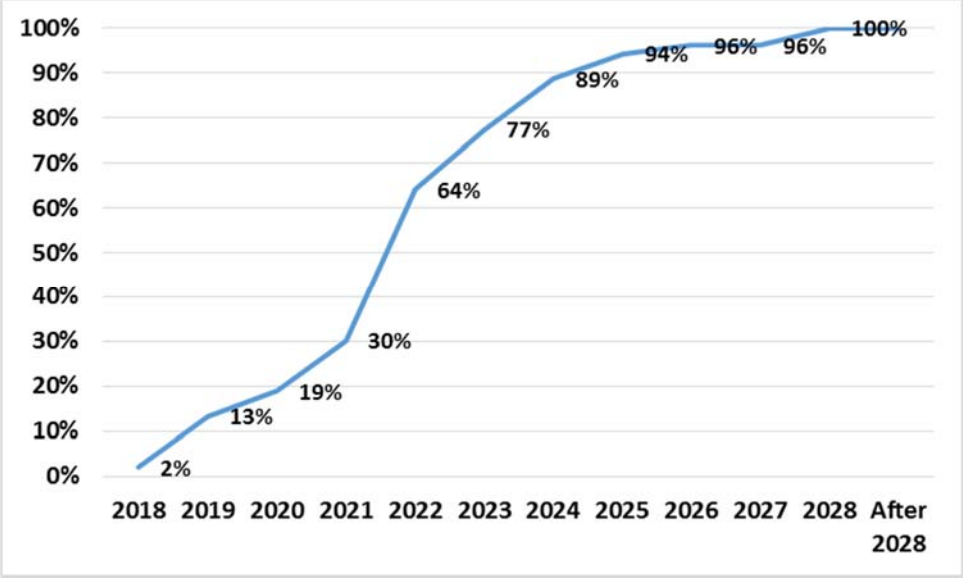
The Agency maintains the view that, due to the existence of competing projects and other factors such as the potential evolution of needs to be served by a project, not all PCIs will (or should) be commissioned. The Agency notes that the likelihood of the majority of projects being commissioned by 2022 according to the expectations reported by PCI promoters is highly uncertain. Therefore, Figure 12 provides only an indication for the rhythm of construction and commissioning as reported by the project promoters.

[62] For the purpose of monitoring the progress of the PCIs, **"work" is defined as *any* activity related to the implementation of the project**.
[63] Including one PCI for which the promoter informed the Agency that the project is under consideration.
[64] In 2017, promoters reported 13 PCIs for which no works were performed.
[65] Cf. Annex VI for details.

Figure 11 - Number of gas PCIs to be commissioned (per year, per priority corridor)

The Agency notes that - if past reported implementation patterns continue in the future - the commissioning dates of some projects are likely to be postponed.

Figure 12 – PCIs expected to be commissioned in 2021-2022



Changes in the commissioning dates in 2017-2018

The Agency was able to compare the planned commissioning dates as reported by project promoters in 2017 and 2018 for 22 PCIs. The commissioning date has not changed for 12 PCIs. However, for 10 PCIs it was shifted to a later date due to delays or rescheduling.

3.3.4 Progress of PCI implementation

In each annual report, the promoters indicate whether their project is on track **compared to the commissioning date planned in the previous year**. A project is considered to be "on time" if the commissioning date is unchanged compared to that of last year[66]. A project whose implementation is sped up and for which therefore the expected commissioning date is now earlier than in the previous year is considered to be "ahead of schedule".

A project can fall behind its schedule due to either delays or rescheduling, or both. The Agency considers a project as **"rescheduled" when it is voluntarily postponed by a promoter,** as a result of changes such as lower demand, less urgent need for an investment due to updated planning data or priority given to other transmission solutions. A project is considered as **"delayed" when the promoter would like to keep the expected date, but it cannot be delivered on time due to various external factors,** such as incomplete permitting (including environmental), legislative reasons, etc.[67]

In 2018, the PCI reports were collected in more depth (i.e. on individual project / investment item level) than in the previous years, and the granularity of the information available for evaluating the progress of the PCIs is higher.

Figure 13 illustrates that the progress of the PCIs is far from homogenous for all the items that a project consists of. A quarter of the PCIs demonstrate various combinations of being on time, delayed and rescheduled for the individual investment items forming the PCI. The reported state of implementation for 2018 is very similar to that described in the 2017 PCI monitoring report: **a bit less than half of the PCIs are reported to be on time and the other half is reported to be behind schedule**.

Figure 13 – Progress of gas PCI implementation

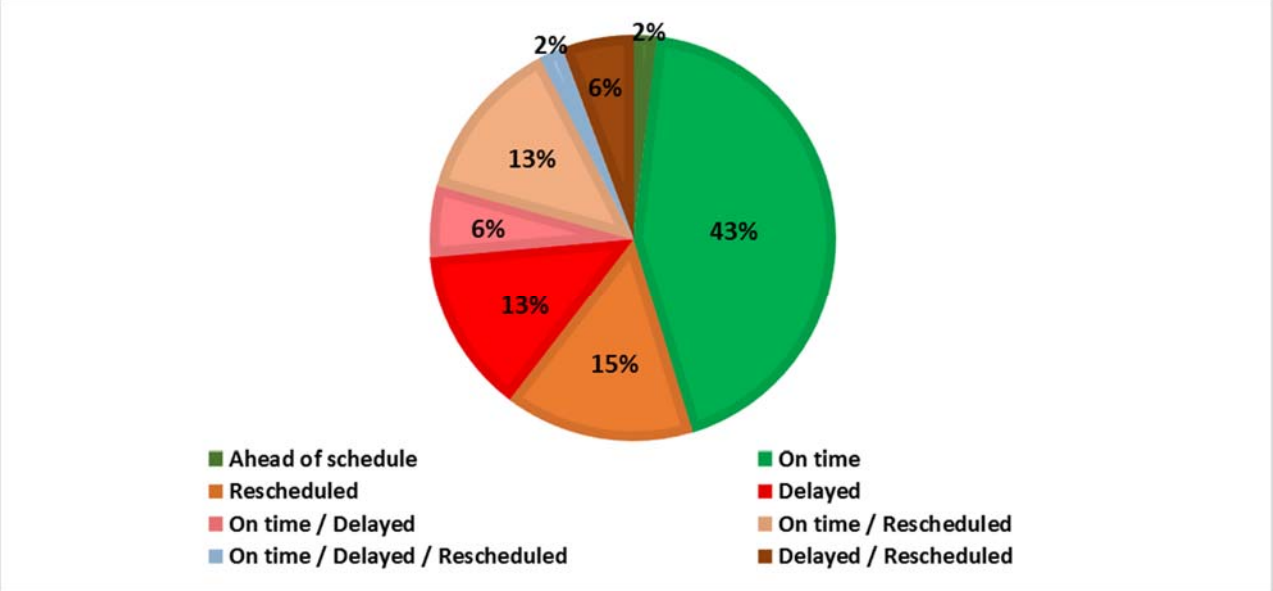
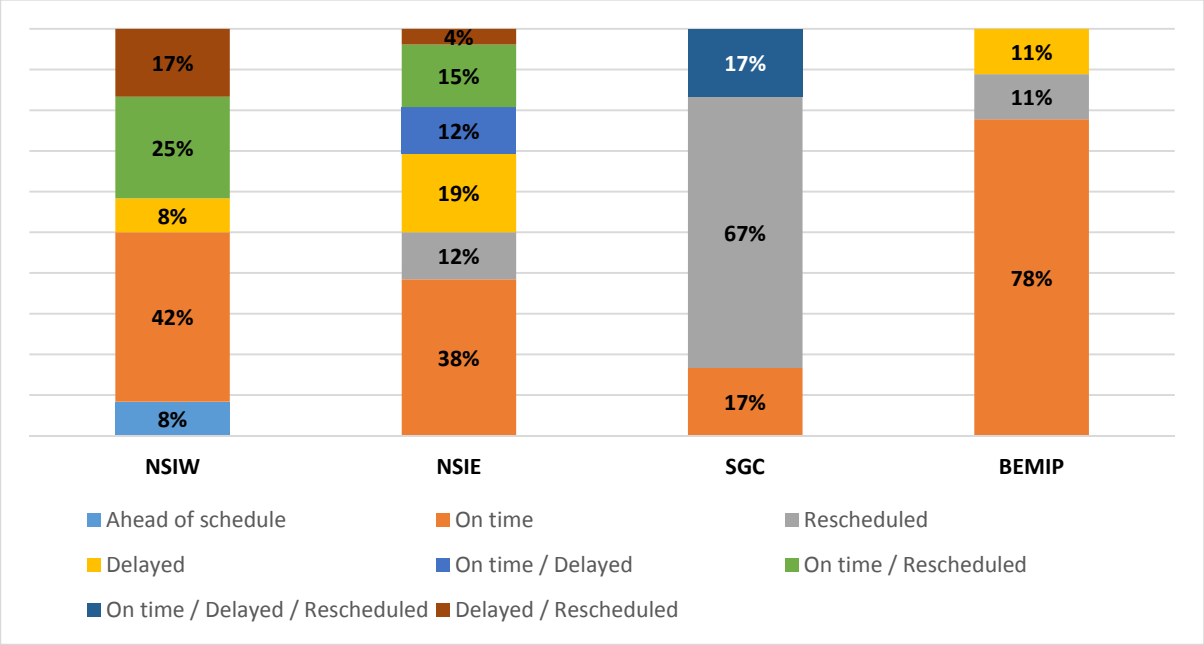


Figure 14 displays the current state of implementation per priority corridor in 2018. The largest share of PCIs reported on time is in the BEMIP corridor. In the NSI West corridor, the trend is

[66] If a project was present on previous PCI lists and reported as delayed or rescheduled two or more years ago, but was able to keep up to that postponed schedule in 2017, it appears here as being "on time"
[67] Cf. Section 5 of the Agency's Opinion No 16/2014.

the opposite: the share of PCIs expected on time decreased from 80% to 42%, due mostly to the higher number of rescheduled projects. Several projects in SGC also fell behind schedule during 2017. The share of projects on time fell sharply in SCG from 42% to just 17%. The progress of PCIs in the NSI East corridor in 2018 slightly increased compared to the last yearly report.

Figure 14– Current state-of-implementation of gas PCIs per priority corridor



3.3.5 Reasons for rescheduling, delays and difficulties encountered by the project promoters

Project promoters were invited to indicate the main reasons for rescheduling and delays encountered during the project implementation, using 31 January 2017 as the reference point to evaluate the PCI progress.

3.3.5.1 Rescheduling

The number of rescheduled projects remained essentially the same as in the 2017 PCI monitoring[68] report and accounts for 36% of gas PCIs.

In most of the cases, the rescheduling was the result of the **re-prioritisation of the project's implementation against other investments of the project promoter[69],** or changes due to **complementarity with the rescheduled infrastructure investments** of another project promoter[70].

In other instances, the rescheduling of the projects was due to **uncertainties in the gas market** or **changes** associated with the gas **demand/supply balance**.

[68] 19 projects out of the 53 PCIs were rescheduled.
[69] In the case of 3 out of the 19 rescheduled projects.
[70] In the case of 3 out of the 19 rescheduled projects.

In three cases, promoters reported different reasons for rescheduling for each sub-section of the project: for instance, the cluster Croatia – Slovenia – Austria was rescheduled due to the re-prioritization of the project's implementation against other investments, and also because of uncertainties in the gas market.

Other reasons for rescheduling were mentioned by project promoters only in individual cases:

- Opposition of local authorities;
- Archaeological findings[71];
- Re-routing.

3.3.5.2 Delays

Delayed projects account for 26% of the PCIs on the 2018 list. The majority of the delayed projects – similarly to the status highlighted in the Agency's 2017 report – are in the permitting[72] stage. The second largest group of delayed PCIs are those which are under consideration, and the remaining delayed PCIs are in the planned but not yet in permitting and under construction stages.

Promoters could indicate the main reason for the delays. The reasons for delays reported by the project promoters are related to the following issues[73]:

- Environmental issues (including re-routing and/or re-siting of the facility(ies), problems with cultural heritage authorities or any other authority involved in the environmental procedure);
- Financing reasons;
- Permit granting process.

Other reasons for delays mentioned in individual cases are:

- Correlation with other delayed infrastructure investments;
- Tendering process;
- Lawsuits and court proceedings.

In some cases[74], the reasons for delays reported by the promoters seem to be more related to causes for rescheduling (e.g. lack of market interest, demand-side changes) rather than to delays.

It seems that delays tend to happen more often during the permitting stage of the projects, rather than during other stages. However, due to the diverse nature of a number of responses, **no definite conclusion can be drawn regarding typical difficulties in permitting and other procedures that cause delays.**

[71] Opposition of local authorities and archaeological findings may be reasons for delays rather than for rescheduling. Here, the reasons for being behind the schedule of implementation are indicated as reported by the project promoters.
[72] 9 out of 14 delayed projects.
[73] The listing of reasons is in alphabetical order and does not reflect any priority or merit order.
[74] 3 projects out of 14 delayed PCIs.

Overall, the Agency observes that there is a general consistency of the reasons for rescheduling/delays as reported by the promoters in 2018 vs. those reported in 2017, and an increasing number of promoters providing justification of the reasons for rescheduling/delays.

3.3.5.3 Difficulties and measures taken by promoters to resolve the delays and the difficulties

Promoters were invited to indicate the main difficulties encountered during the implementation of the PCIs, and any measures taken to resolve the delays and the difficulties of those PCIs reported to be on time.

Some of the difficulties reported by the promoters for projects which are on time are related to the permitting process and missing contracts with suppliers.

The measures taken by the promoters to resolve the issues that caused difficulties include:

- Requests for CEF funding;
- Requests for government support for permitting and obtaining regulatory decisions;
- Entering into new commercial contracts with suppliers/shareholders;
- Undertaking risk management activities.

3.3.6 Duration of implementation

The promoters were requested to provide the dates of the major project implementation milestones. In order to evaluate the duration of a PCI's' implementation, the Agency examined the **length of time** which is expected to pass **between the end of the market test and the expected commissioning date**.

For approximately half[75] of the PCIs, the promoters provided dates for the market test and for commissioning. The results of the analysis represent only an approximate estimate of the expected typical duration of a PCI's implementation, and the "expected duration" indicator should not be used as a benchmark that could help to shed light on the "typical duration" of individual projects.

For transmission projects, the typical PCI life cycle from market test to commissioning is expected to last approximately **5 years** (64 months), while LNG PCIs are foreseen on average to reach commissioning in 8 years (92 months). Only one UGS facility project reported information for both milestones, and the expected duration for the project's implementation is 7 years (81 months).

The results show a year-on-year **increase in the expected time that would elapse between the completion of a market test and the commissioning of a transmission project (additional 8 months) or an LNG project (additional 14 months)**. Conversely, for the storage project, the expected implementation timeframe is now shorter (30 months less than in 2017), but as only a single data point exists for 2018, the observation cannot be considered as a trend.

[75] 26 out of 53 PCIs

Key findings and recommendations

- The Agency points to the improvements leading to the streamlining of the monitoring activities of the Agency and those of ENTSOG, the European Commission and INEA, by striving to define a consistent set of key project milestones and using aligned lists of project description items.
- The Agency notes positively that 5 PCIs indicated progress in their status from one stage of implementation to a more advanced one.
- The Agency highlights that no PCIs were planned to be commissioned in the lifetime of the 2015 PCI and only 7 PCIs are planned to be commissioned during the lifetime of the current PCI list, i.e. in 2018 and 2019. These figures illustrate the fact that the 2-year period of validity of the PCI lists represents a much shorter timeframe than the typical life cycle duration of a PCI. While the Agency sees value in re-evaluating regularly the PCI status granted to projects, to ensure that they still make sense in an ever evolving context, and sees the 2-year frequency for this exercise as appropriate, the Agency recommends that consideration is given to appropriate ways of better reconciling the duration of the PCI list validity with the observed duration of the typical PCI life cycle. The Agency recommends using the results of the monitoring of the progress of projects already on the PCI list in the selection for future PCI lists, to make sure that the continuous relevance and progress of projects over longer period of time are properly considered[76].

3.4 Progress of costs and benefits

3.4.1 Investment costs

As in previous Reports, the Agency assumed for the sake of simplicity that 100% of the indicated investment costs occur in the year of commissioning of the project[77] and assessed the scale of investment that would be made in the coming years if all PCIs were to be implemented according to the schedules reported by the promoters[78].

The indicated **total investment costs for all gas projects included in the 2017 PCI list amounts to €43.5 billion,** which is €9 billion less than the total figure of the previous 2015 PCI list.

Promoters indicated whether the current total investment costs match those provided by them during the selection process leading to the 2017 PCI list. Reports point to instances of both **increases and decreases of the reported investment costs of projects**.

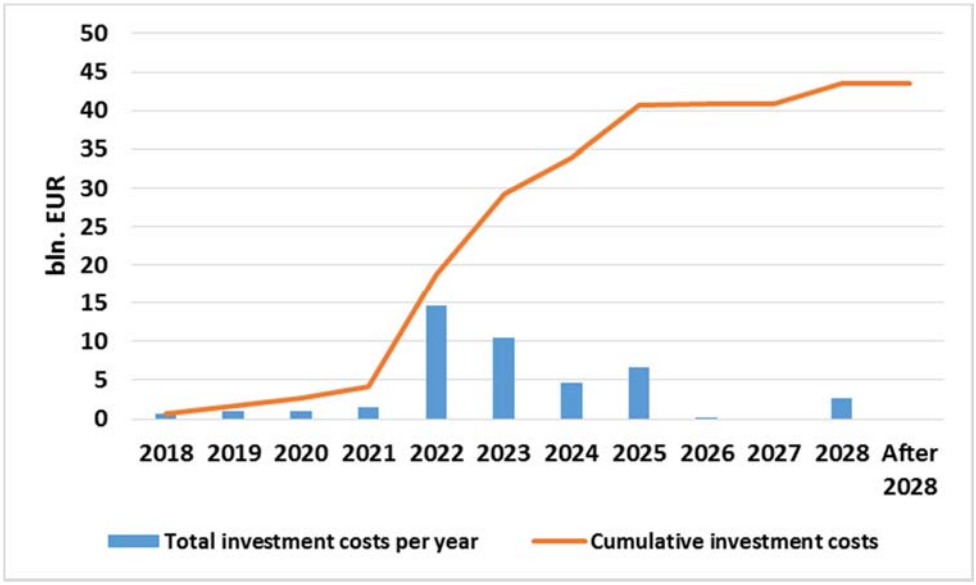
[76] For example, by asking project promoters of projects which have been already included in previous PCI lists to re-confirm the validity of the project's essential features and verifying the project's progress as reported to the Agency, rather than treating such projects as entirely new and unknown ones every other year.
[77] In reality, most of the investment costs may be incurred already in the aftermath of tendering and during the construction period, i.e. within a much earlier timeframe.
[78] It is unlikely that all PCIs will be implemented, as the PCI list contains some competing projects, and some projects may be cancelled or abandoned. The Agency's assumption serves the aim of presenting an overall picture of the characteristics of the priority projects as reported by the promoters.

The most frequently (6 cases) reported **reasons for an increase in the investment costs** were the occurrence of major technical changes (e.g. changes in the routing or in the equipment needed) and the availability of a more precise budget (e.g. via studies or the recalculation of costs). Other reasons were indicated only in a handful of cases. Such reasons include changes in the project components (new investment items added or items removed from the project), additional costs encountered during the construction, and an increase in the price of materials.

Regarding **decrease in investment costs**, there is only one major reason (quoted in 5 cases), namely the availability of a more precise budget developed via studies or revised cost calculations. Other indicated reasons mentioned in individual cases include technical changes, changes of the project scope, and updates in the planning permit design.

Figure 15 shows that **currently promoters plan to invest €15 billion and €10 billion in 2022 and 2023 respectively, which would mean that about 60% of the total investment costs would be incurred within 5 years, and 57% in just two years (2022-2023).**

Figure 15 - Total investment costs of gas PCIs (billion EUR)



On the other hand, promoters indicated that the costs actually incurred by 2017 since the establishment of the first PCI list in October 2013, i.e. over a period of time exceeding 4 years, amount to **€9.65 billion**, i.e. 22.1% of the total budgeted costs of the PCIs. For the investment plans actually to be carried out by 2023 as indicated by the promoters, the pace of investment would have to accelerate by almost 300% p.a. compared to the observed levels since 2013.

3.4.2 Reported investment costs vs. reference values

The Agency compared the reported investment costs to the unit investment cost indicators and corresponding reference values (UIC) developed by NRAs and published by the Agency in July 2015[79].

[79] Cf. ACER UIC report for gas infrastructure, July 2015, see pp. 19-26 - http://www.acer.europa.eu/official_documents/acts_of_the_agency/publication/uic%20report%20-%20gas%20infrastructure.pdf

The UIC reference values are based on statistics of historical costs of gas infrastructure and, where relevant, are accompanied by a brief explanation of the observed trends. For the reasons explained in the UIC report, **the indicators and the corresponding reference values should be used and interpreted with caution** and **must not be regarded as a substitute for the due diligence in each instance of assessing a planned investment in gas infrastructure[80].**

The results presented in this Report are only limited to the types of gas infrastructure which are more prone to standardisation (transmission pipelines and compressor stations) and exclude UGS and LNG facilities. UGS and LNG facilities may significantly vary in terms of basic physical features and other key cost-impacting parameters.

Further caution should be used because the comparison of the investment cost estimates provided by the project promoters with the UIC reference values relies on a number of assumptions, of which the main ones are listed in Annex V: Reported investment costs vs. reference values – gas

3.4.2.1 *Overview of investment costs and main technical parameters*

In total, 42 transmission PCIs have been analysed, which corresponds to 70 projects included in the TYNDP 2017 and to 122 project sections[81].

Figure 16 shows the reported investment costs and the main technical parameters of transmission projects (e.g. the total length of pipelines and compressor power) per priority corridor. The **largest share of investment costs** for pipelines and compressor stations part of the transmission PCIs - 54% of total - is in the SGC, up from 42% in 2017. The **highest share of installed compressor power** - 51% of total - also occurs in the SGC. In terms of **total length**, out of more than 17,000 km of planned PCI pipelines, 1,000 km less that in 2017, the NSI East corridor's projects dominate (44%), followed by the SGC (32%), the NSI West corridor (16%), and the BEMIP corridor (8%). The figures have not significantly changed since last year, showing a general continuity of the projects and their main technical features both year-on-year and from the 2015 to the 2017 list of PCIs.

The Agency notes that the total length of planned transmission PCIs exceeds approximately twice the estimated length of pipelines to be constructed in Europe over the next few years as reported by industry sources[82] for major probable pipeline projects in Europe (9,613 km), which is approximately 2,300 km more than in 2017. The Agency notes that, even though the industry sources limit their estimate only to "probable" pipeline projects, the total length of the planned PCIs still seems significantly to exceed, although to a lesser extent that in 2017[83], the one reported by industry sources. Moreover, the latter covers all the geography of Europe, and

[80] One of the reasons for advising such caution is the fact that the UIC indicators and values are based on actually observed costs, while the values reported by project promoters are based on estimates and expectations. Another reason is the different time horizon of the UIC indicators and values, which are backward-looking (2005-2014 for gas transmission), while the values reported by the project promoters are forward-looking, generally for the period 2018-2026.

[81] Section defined as a change in main technical characteristics of a transmission project, such as the diameter or the pressure of a pipeline.

[82] Cf. Oil and Gas Journal, 5 February 2018, p. 81. In Europe, gas pipeline construction in 2018 – *projects planned to be commissioned in that year* - is estimated at 1,252 miles, and beyond 2017 - *for some probable major projects whose installation will begin in 2018 or later* - at 4,721 miles. This includes gas projects of a diameter higher than 12 inches, where "**Europe" includes the regions West of the Ural Mountains and North of the Caucasus Mountains.** Conversion factor miles to kilometres: 1 mile = 1.60934 km.

[83] Where planned PCIs were estimated to exceed 2.5 times the transmission pipelines as reported by industry sources.

a broader geographic area than the PCIs. This mismatch may indicate that industry does not see all the transmission PCIs as likely to be constructed, or that some PCIs are rather immature and industry cannot realistically assess them as reasonably "probable" projects.

Figure 16 - Main technical parameters and investment costs of gas transmission PCIs

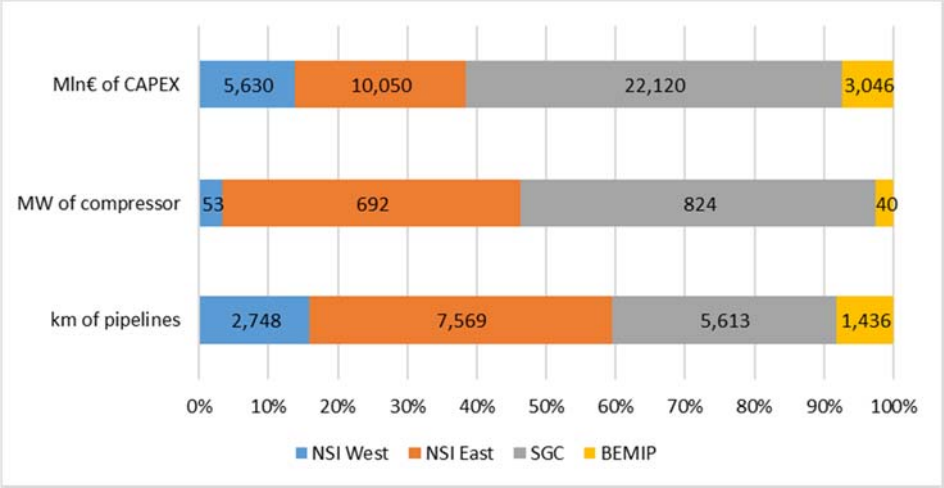
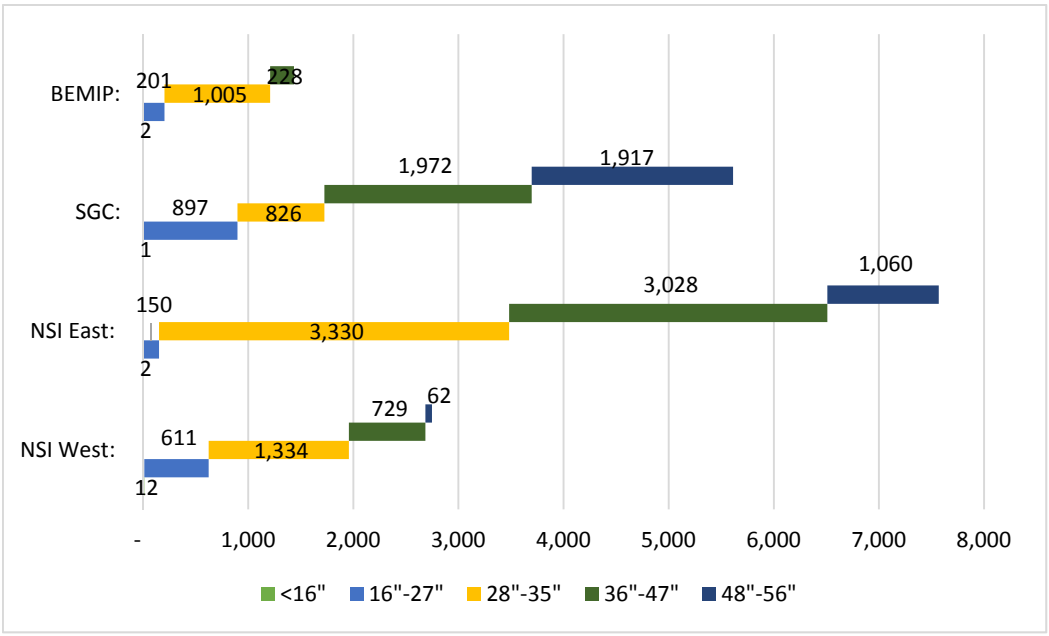


Figure 17 shows the length of pipeline PCIs, per diameter and per priority corridor. The pipeline capacity is directly correlated to the diameter of a pipeline. Thus, it can be said that the highest share of high (36"-47") and very high capacity pipelines (>=48") is in the SGC (69% of the total length of pipe in this corridor), followed by the NSI East corridor (54%), the NSI West corridor (54%) and the BEMIP corridor (16%). The share of medium size pipelines (28"-35") is very high (70%) in the BEMIP corridor, followed by the NSI West corridor (49%), the NSI East corridor (44%) and the SGC corridor (15%). Pipeline diameters are generally in line with those reported last year.

Figure 17 - Length of gas PCI pipelines per range of diameter, per priority corridor (km)



Regarding the location of PCI projects, promoters reported all their projects to be on-shore. This contrasts to last year monitoring of PCIs, where approximately 25% of all transmission PCI were located partially or totally offshore with **significant differences across the priority corridors**. The Agency notes that it is very unlikely that all projects in the 2017 PCI list are on-shore, and that the difference between the data received this year and last year's data could be explained by the promoters' lack of attention on how to report offshore sections, either in 2018 or in 2017.

3.4.2.2 *Comparison of total reported investment costs vs. total investment costs calculated by using UIC reference values*

Figure 18 shows that the **total reported investment costs for transmission PCIs exceed the total investment costs calculated by using the average UIC reference values by 46%, up from 33% in 2017.** The difference between the reported and the UIC costs went up year-on-year, reflecting expectations of promoters that the cost of transmission projects would continue to rise. This consideration should be interpreted with caution since, as mentioned before, the sample of projects, although similar, is not identical, and UIC look at historic cost while promoters report expected future costs that include inflationary expectations, among other considerations.

The reported values are 22% over the third quartile (Q3) of UIC values, but 23% below the maximum observed UIC values. There are a number of possible reasons explaining, to some extent, such deviations from the average UIC reference values**.** Among such possible reasons, the following may be considered, in order to avoid deriving premature conclusions regarding the reported costs of transmission PCIs:

- Reference values are available only for onshore pipelines. However, it is estimated, according to last year PCI monitoring, that approximately 25% of the total length of transmission PCIs is located either partially or entirely offshore. Offshore pipelines are generally more expensive per unit (km) than onshore lines of equivalent capacity. Thus, it is reasonable to expect that project investment cost estimates for offshore projects tend to be higher than investment cost calculated with the help of UIC reference values.
- Pipelines and compressor stations tend to use a number of "standard" technologies, which could nevertheless be project-specific. Such variations in the technology chosen for a project affect both the overall level and the structure of its costs.
- Assumptions are made regarding the type of certain PCIs (e.g. all compressor station projects are assumed to be new stations using gas-fired engines, which are generally cheaper than the ones operating with electricity), but most likely some compressor power will be installed at existing compressor stations, and some compressor engines will be driven by electricity.
- The UIC reference values – which are used for this analysis – are based on a sample of pipelines located exclusively in the territory of the European Union (EU) and are arrived at by using average figures at EU level. However, some transmission PCIs are located outside the EU, in particular some projects in the SGC, where the cost levels may be different.

Figure 18 - Total reported investment cost vs. total cost calculated by using UIC values, gas transmission PCIs (€ million)

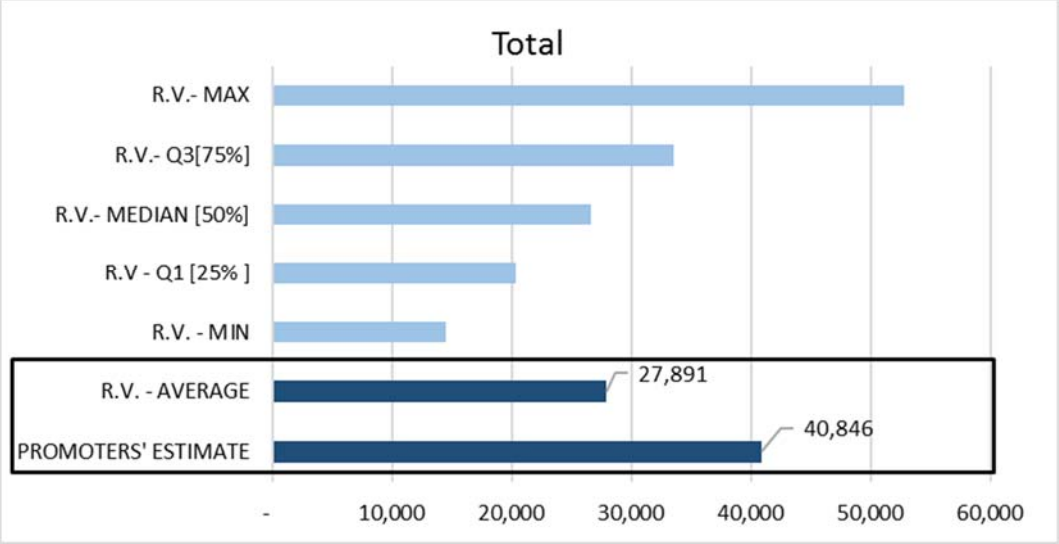


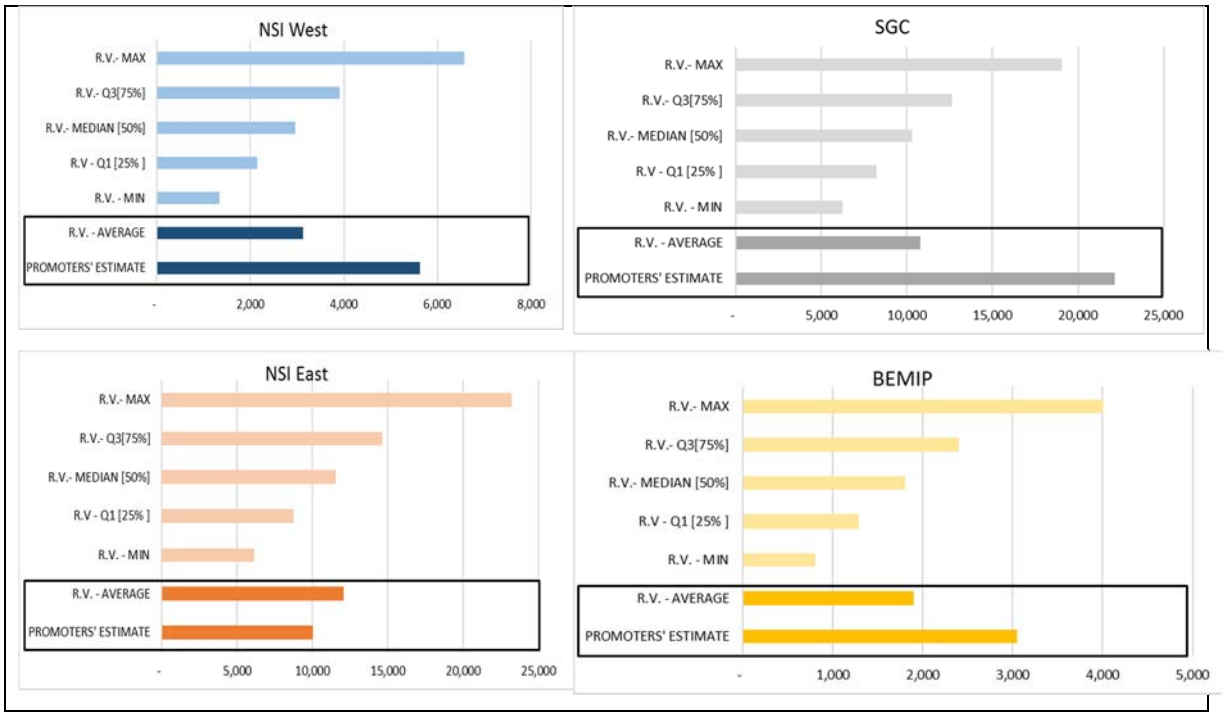
Figure 19 shows the results of the analysis per priority corridor and Figure 20 provides the number of PCIs reporting investment costs above or below certain types of reference values (average, minimum, and maximum).

The Agency notes the following differences in terms of reported estimated investment costs across priority corridors.

NSI West corridor:

- The total investment costs reported by the promoters exceeds by 80% the total investment costs calculated by applying the average UIC reference values, and is slightly (by 14%) below the investment costs calculated by using the maximum UIC reference value. Approximately 75% of transmission PCIs in the NSI West corridor are over the average UIC reference values.
- The fact that NSI West corridor's projects appear to be more "expensive" with reference to the UIC values may be due to some extent to a number of factors, such as high population density and therefore difficult routing, high density of other infrastructure and thus many special crossings, a generally higher purchasing power vs. the EU average possibly resulting in higher labour cost, etc. Besides, in the NSI West corridor, it can be estimated that about 25% of the length of the pipeline PCIs is offshore, which may also be correlated with the upwards deviation compared to the UIC reference values which only consider onshore projects.

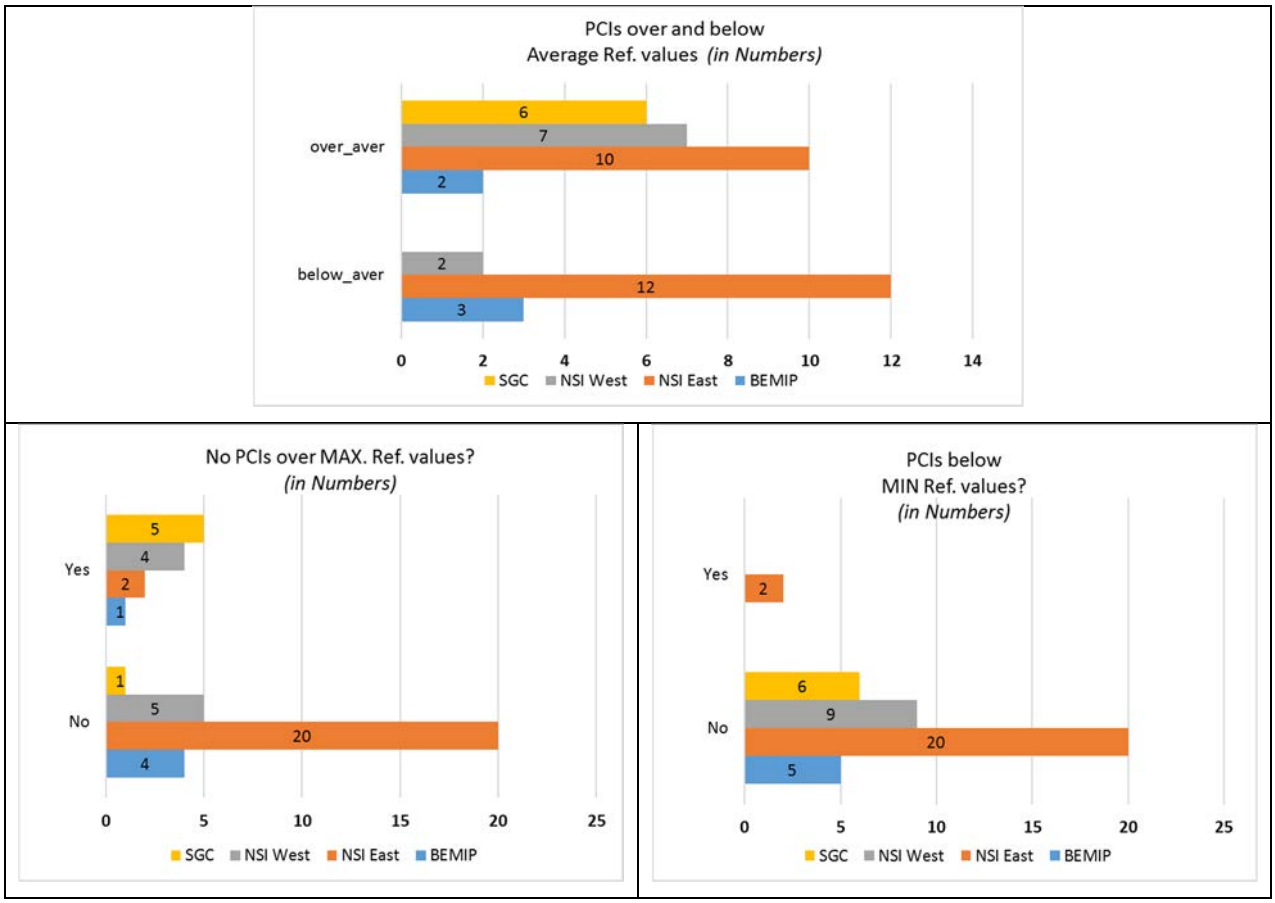
Figure 19 - Total reported gas PCI investment cost vs. total cost applying reference values (€ million), per priority corridor



NSI East corridor:

- The total investment costs reported is 17% below the total investment costs calculated by applying the average UIC reference values, but well above (63%) the investment costs calculated by using the minimum UIC reference value. Approximately 45% of transmission PCIs are over the average reference UIC reference values.
- NSI East corridor's projects appear to be slightly "cheaper" compared to the pan-EU UIC reference investment cost values. The Agency notes that the lower purchasing power in some Member States vs. the EU average and the absence of offshore projects may explain this downward deviation.

Figure 20 - No. of gas PCI projects over and/or below the average, maximum and minimum reference values



SGC:

- The total investment costs reported by project promoters is approximately twice as high as the total investment costs calculated by using the average UIC reference values, and is slightly over (by 16%) the total investment costs calculated by using the maximum UIC reference value. 80% of transmission PCIs located in this region are over the average UIC values.
- SGC projects appear to be "the most expensive projects" when compared to the available UIC reference values. Among other factors, the complex terrain of the route of some projects, and the presence of long offshore sections[84] may explain the "high cost" of the SGC projects in comparison to both the UIC reference values and to projects located in other corridors. For these reasons, the Agency finds that the reported cost of PCIs in SGC may not necessarily be unreasonable and advises NRAs and other authorities involved in checking the efficiency of the incurred costs and the level of competition in tendering procedures to take a closer look at the specific project features and circumstances before arriving at conclusions.

[84] More than 50% of the total length of the projects falls either partially or totally off-shore. Mostly off-shore: PCIs No: 7.3.1. (EastMed Pipeline), 7.1.4 (Poseidon Pipeline). Partially off-shore: PCIs No: 7.1.3 (TAP), 7.1.1 (part of TANAP, part of TAP).

BEMIP:

- The total investment costs reported by project promoters are 60% higher than the total investment costs calculated by using the average UIC reference values, but generally within the range of maximum and minimum UIC reference values.

A better insight into the technical characteristics, the scale of the projects and the existence of cost factors dependent on geography and local circumstances might help to explain the observed deviations in the different priority corridors.

The Agency recalls the recommendations in the UIC report[85] focusing on ways and means that could help achieve lower project costs. At the same time, the Agency notes that the UIC should not be used by project promoters as a substitute to cost estimates developed by the promoters as a result of due diligence for the PCIs.

3.4.3 Expected benefits

For the majority of the PCIs[86], promoters did not provide information about the quantified benefits as requested by the Agency[87]. The information was provided in just 6 cases, which did not allow the Agency to carry out an analysis of the expected PCI benefits or their annual changes.

The results of this and of the previous monitoring round carried out by the Agency repeatedly demonstrate that **promoters are not in a position to provide clear and easily understandable quantified (monetised) data about the benefits of their projects, or have no intention of calculating monetised benefits**.

Key findings and recommendations

- The Agency stresses that one key aspect of PCIs is that they are subject to cost-benefit analysis as applied under a methodology developed by ENTSOG. The Agency notes that the inability of most project promoters to estimate or provide monetised values of the benefits which their projects are expected to bring may be an indication of the need further to improve the CBA methodology and its application. The Agency calls on ENTSOG to improve its draft 2nd CBA methodology in view of the Opinion of the Agency[88]. The Agency calls on project promoters to evaluate the monetised benefits of their projects and provide the result in their annual reports to the Agency.
- After comparing the total reported investment cost to the total cost calculated by using UIC reference values, the Agency finds that promoters of transmission PCIs "prima facie" may overestimate the investment costs of the projects. The total reported investment costs exceed the level calculated by using the UIC average reference values by 46%, up from 33% in 2017, but in the majority of instances costs appear to remain within a reasonable range. The difference between the reported and the UIC costs went

[85] Cf. ACER UIC report for gas infrastructure, July 2015, pp. 27, 28 and 31.
[86] 47 out of 53 projects.
[87] In order to be able to identify the level of benefits for each relevant Member State, the Agency requested promoters to provide the information on monetised benefits broken down by category (market integration, security of supply, competition, sustainability) and per Member State.
[88] *C.f.* Opinion of the Agency No 15/2017, on the ENTSOG's draft Second Cost-Benefit Analysis Methodology.

up year-on-year, potentially reflecting expectations of promoters that the cost of transmission projects would continue to rise[89].

- The Agency reiterates its view that promoters and NRAs should continuously monitor costs, and especially civil, mechanical and electro-mechanical works (CIME) costs, including the modality in which contracting is executed and the effective level of competition and market conditions in tendering procedures. The Agency believes that the use of open and competitive tendering procedures, following the principles of integrity, publicity, transparency and accountability, could have a positive effect on the cost efficiency of the PCIs.

[89] Having in mind the fact that the UIC and the reported PCI costs are now separated by about a decade of years in time, the trend of a growing gap between the UIC and the reported costs is generally to be expected and is likely to be an irreversible phenomenon in view of the overall and sector-specific inflationary trends observed in the meantime.

Annexes

Annex I: PCIs not included in the NDPs – electricity

PCI Code	Hosting Countries	Missing from the NDP of the following countries/jurisdictions
Transmission[90]		
1.13	DK, IS, UK	*partially included - not specified in which NDPs*
1.15	BE, UK	*partially included - not specified in which NDPs*
1.16	NL, UK	*partially included - not specified in which NDPs*
1.7.4	FR, UK	France *(Not included in the latest NDP)*[91]
1.7.5	FR, UK	France *(Not included in 2016 NDP)*[92]
3.10.1	CY, (IL)	Cyprus *(Not included in 2016 NDP)*[93]
3.10.2	CY, EL	
3.21	IT, SI	Slovenia *(Partially included in NDP 2017)*[94]
3.4	AT, IT	Austria *(Not included in 2017 NDP)*[95]
4.8.9	EE, LT, LV	Estonia *(Partially included in NDP 2017)* Lithuania *(Partially included in NDP 2017)* Latvia *(Partially included in NDP 2017)*[96]
Storage		
1.12.3	UK	United Kingdom *(Partially included in the latest NDP)*
1.12.4	UK	United Kingdom *(Not included in the latest NDP)*[97]
1.17	NL	Netherlands *(Not included in the latest NDP)*
1.18	BE	Belgium *(Not included in the 2016 NDP)*[98]

[90] PCI 2.4 is not included in the French NDP, but since it pertains to Corsica on the French side, and it is included in the Corsican Energy Plan (PPE), it is not mentioned in this Annex.
[91] The project promoter clarified that it will be included in the 2018 French NDP.
[92] The project promoter clarified that it will be included in the 2018 NDP.
[93] The information of the NDP in Cyprus is not publicly available.
[94] The project promoter clarified that only the study part of the Project is financially included in the current Slovenian NDP, because the final investment decision in Slovenia is still pending.
[95] Reason for not inclusion in the Austrian NDP was not provided by the project promoter.
[96] The project promoter clarified that the project is dependent on the selection of the Baltic synchronization scenario. A complete set of the projects will be clear after technical conditions for synchronous operation are issued by ENTSO-E.
[97] National Grid is based on the generating and storage facilities that have planning consent and this project is in the process of preparing its application for planning consent.
[98] The project promoter clarified that based on the Belgian Electricity Law the Belgian NDPs are updated every five years. The latest NDP was adopted in 2015, and therefore the next one is scheduled for 2020, in which the project is expected to be included.

PCI Code	Hosting Countries	Missing from the NDP of the following countries/jurisdictions
2.28.3	ES	Spain *(partially included in the NDP)*
4.6	EE	Estonia *(Not included in the NDP 2015)*[99]

[99] Private investments are not included in the Estonian NDP.

Annex II: Technical modifications – electricity

PCI Code	PCI Name	Technical modification
1.14	Interconnection between Revsing (DK) and Bicker Fen (UK) [currently known as "Viking Link"]	Investment 436 is no longer included in the PCI
1.3.1	'Interconnection between Endrup (DK) and Niebüll (DE)	Change of substation from Niebüll (DE) to Klixbüll (DE)
1.3.2	Internal line between Niebüll and Brunsbüttel (DE)	Future change of substation from Niebüll to Klixbüll
2.10	Internal line between Brunsbüttel-Groβgartach and Wilster-Grafenrheinfeld (DE) to increase capacity at northern and southern borders [currently known as "Suedlink"]	Change of substation from Grafenrheinfeld to Bergrheinfeld
3.11.1	Internal line between Vernerov and Vitkov (CZ)	After the commissioning of investment item no. 307 in 10/2017, the substation Vernerov is no longer included in the PCI
3.11.4	Internal line between Kocin and Mirovka (CZ)	Investment item 314 is not included in this PCI anymore, but it is a stand-alone PCI
3.11.5	Internal line between Mirovka and line V413 (CZ)	Investment item 314 was removed from PCI 3.11.4 and is now PCI 3.11.5
3.12	Internal line in Germany between Wolmirstedt and Bavaria to increase internal North-South transmission capacity	Decrease in length of the transmission line
3.4	Austria — Italy interconnection between Wurmlach (AT) and Somplago (IT)	Undergrounding of the transmission line, and increase of its length

Annex III: PCIs without any activity in 2017 – electricity

PCI Code	PCI Name	Old or new PCI
10.3	SINCRO.GRID	"old" PCI
2.15.1	Interconnection between Airolo (CH) and Baggio (IT)	"old" PCI
2.18	Capacity increase of hydro-pumped electricity storage in Kaunertal, Tyrol (AT)	"old" PCI
3.14.2	Internal line between Krajnik and Baczyna (PL)	"old" PCI
3.14.3	Internal line between Mikułowa and Świebodzice (PL)	"old" PCI
3.14.4	Internal line between Baczyna and Plewiska (PL)	"new" PCI
3.21	Italy — Slovenia interconnection between Salgareda (IT) and Divača — Bericevo region (SI)	"old" PCI
3.22.1	Interconnection between Resita (RO) and Pancevo (RS)	"old" PCI
3.22.2	Internal line between Portile de Fier and Resita (RO)	"old" PCI
3.22.3	Internal line between Resita and Timisoara/Sacalaz (RO)	"old" PCI
3.22.4	Internal line betwee Arad and Timisoara/Sacalaz (RO)	"old" PCI
3.27	Interconnection between Sicily (IT) and Tunisia node (TU) [currently known as "ELMED"]	"new" PCI
3.8.4	Internal line between Cernavoda and Stalpu (RO)	"old" PCI
3.8.5	Internal line between Gutinas and Smardan (RO)	"old" PCI
4.4.2	Internal line between Ekhyddan and Nybro/Hemsjö (SE)	"old" PCI
4.8.8	Internal line between Vilnius and Neris (LT)	"new" PCI

Annex IV: PCI specific information - electricity

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
1.1.1	NEMO project: Interconnector between Brugge (BE) and the vicinity of Richborough (UK)	Nemo Link Limited Elia System Operator NV/SA	Under construction	2019	On time		650	4
1.1.2	Internal line between the vicinity of Richborough and Canterbury (UK)	National Grid Electricity Transmission	Under construction *(last year: Permitting)*	2018	Ahead of schedule		N/A	N/A
1.10.1	North Sea Link	Statnett SF National Grid Interconnector Holdings Limited	Under construction	2021	On time		The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted because it is deemed sensitive information by the promoter
1.10.2	NorthConnect	NorthConnect KS	Permitting	2023	On time		1613	25
1.12.3	Compressed air energy storage in Middlewich	Storelectric Limited	Under consideration	2026	N/A[101]		The figure is redacted due to promoter's request	The figure is redacted due to lack of

[100] For the current progress, "repeatedly" means that the PCI was reported as "delayed" or "rescheduled" in 2017 as well. For PCIs which are delayed or rescheduled by not more than 6 months, the duration of delay or rescheduling is also provided in the table.
[101] The Agency chose to take out from the analysis of the current progress the PCI 1.12.3 due to the missing reference commissioning date.

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
	[currently known as "CARES"]							promoter's consent to allow its publishing
1.12.4	Hydro-pumped electricity storage at Cruachan II	ScottishPower Generation Limited	Planned, but not yet in permitting	2025	On time		688	27.78
1.12.5	Hydro-pumped electricity storage at Coire Glas	SSE	Permitting	2026	Rescheduled	Changes on the demand side	1100	364.8
1.13	Interconnection between Iceland and United Kingdom [currently known as "Ice Link"]	Landsnet, Landsvirkjun and National Grid Interconnector Holdings Ltd.	Under consideration	2030	Delayed	Delays due to risks related to the national regulatory framework or uncertainty of regulatory decisions	1800	21
1.14	Interconnection between Revsing (DK) and Bicker Fen (UK) [currently known as "Viking Link"]	National Grid Interconnector Holdings Ltd. www.nationalgrid.com Energinet.dk www.energinet.dk	Permitting *(last year: Planned, but not yet in permitting)*	2022	On time		The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted because it is deemed sensitive information by the promoter
1.15	Interconnection between the Antwerp area (BE) and the vicinity of Kemsley (UK)	ELIA	Under consideration	2028	Rescheduled	Project was still at an initial stage and previous implementation	700	6

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
						plan was preliminary		
1.16	Interconnection between Netherlands and United Kingdom	National Grid;TenneT TSO BV	Under consideration	2030	On time		850	6.2
1.17	Compressed air energy storage in Zuidwending (NL)	Gaelectric Energy Storage Ltd	Under construction	2024	Delayed[102]		275	33.5
1.18	Offshore hydro-pumped electricity storage facility in Belgium [currently known as "iLand"]	THV iLand	Under consideration	2022	Delayed	Due to the innovative nature of the project (i.e. the first cross-border hybrid storage project of its kind, including elements of transmission), the complexity of discussions with various stakeholders involved incurs delays.	1327	1.9
1.3.1	Interconnection between Endrup (DK) and Niebüll (DE)	TenneT TSO GmbH, Energinet.dk	Planned, but not yet in permitting	2022	On time		210	The figure is redacted because it is deemed sensitive

[102]Although the promoter stated in its annual report 2018 that the commissioning date was not shifted, the commissioning date provided in the 2017 PCI selection was 2021 while the one provided in the promoter's annual report was 2024. Hence, the Agency concludes that the PCI is delayed.

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
								information by the promoter
1.3.2	Internal line between Niebüll and Brunsbüttel (DE)	TenneT TSO GmbH	Under construction	2019	On time		250	The figure is redacted because it is deemed sensitive information by the promoter
1.4.1	Interconnection between Kassø (DK) and Audorf (DE)	TenneT TSO GmbH; Energinet.dk	Under construction *(last year: Permitting)*	2020	On time		500	The figure is redacted due to promoter's request
1.4.2	Internal line between Audorf and Hamburg/Nord (DE)	TenneT TSO GmbH	Commissioned *(last year: Under construction)*	2017	On time		205	The figure is redacted due to promoter's request
1.4.3	Internal line between Hamburg/Nord and Dollern (DE)	TenneT TSO GmbH	Under construction	2018	On time		125	The figure is redacted due to promoter's request
1.6	France — Ireland interconnection between La Martyre (FR) and Great Island or Knockraha	EirGrid plc (IE) and Réseau de transport d'électricité (FR)	Under consideration	2026	On time		920	7.5

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
	(IE) [currently known as "Celtic Interconnector"]							
1.7.1	France-United Kingdom interconnection between Cotentin (FR) and the vicinity of Exeter (UK) currently known as the “FAB” Project	FAB Link Limited and Reseau de Transport d'Electricite (RTE)	Permitting	2023	Delayed	Delays due to risks related to the national regulatory framework or uncertainty of regulatory decisions	850	12
1.7.2	Interconnection between Tourbe (FR) and Chilling (UK) [currently known as "IFA2"]	Réseau de Transport d'Electricité (RTE) National Grid Interconnector Holdings Limited	Under construction *(last year: Permitting)*	2020	On time		685	5
1.7.3	France - United Kingdom Interconnection between Coquelles (FR) and Folkestone (UK) [Currently known as "ElecLink" project]	ElecLink Limited	Under construction	2019	On time		350	The figure is redacted because it is deemed sensitive information by the promoter
1.7.4	Interconnection between Le Havre (FR) and Lovedean (UK) [currently	Aquind Limited	Permitting	2022	Delayed	Delay due to further feasibility studies required[103]	1400	27.97

[103] Agency’s classification based on the project promoters’ description of the reason for delay.

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
	known as "AQUIND"]							
1.7.5	GridLink	Elan Energy Ltd	Permitting	2023	Delayed	Delays due to risks related to the national regulatory framework or uncertainty of regulatory decisions	600	23.9
1.8.1	Interconnection Germany — Norway ["NordLink"], between Wilster (DE) and Tonstad (NO)	Statnett SF	Under construction	2019	On time		The figure is redacted due to promoter's request	53
1.9.1	Ireland — United Kingdom interconnection between Wexford (IE) and Pembroke, Wales (UK) [currently known as "Greenlink"]	Element Power Ireland Limited; Greenlink Interconnector Limited	Planned, but not yet in permitting	2023	On time		400	8.4
10.3	SINCRO.GRID	ELES, d.o.o., sistemski operater prenosnega elektroenergetskega omrežja Hrvatski operator prijenosnog sustava d.o.o. HEP Operator Distribucijskog	Permitting	2021	On time		88.6	N/A

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
		Sustava d.o.o. SODO sistemski operater distribucijskega omrežja z električno energijo, d.o.o.						
10.4	ACON	*Západoslovenská distribučná, a.s.; E.ON Distribuce, a.s.*	Planned, but not yet in permitting	2024	N/A[104]		221	N/A
10.5	ALPGRID (Austria, Italy) - An innovative integration of synergetic, mature, technology-based solutions in order to simultaneously increase the operational efficiency of the Italian and Austrian regional electricity systems	Italy: e-distribuzione (coordinator), Enel Green Power, Enel Produzione. Austria: Verbund, Wiener Netze, Karntën Netz.	Under consideration	2022	N/A[105]		The figure is redacted due to promoter's request	N/A
10.6	Smart Border Initiative	Enedis, Tour Enedis, 34 place des Corolles, 92079, Paris la Défense Cedex, France and energis Netzgesellschaft mbH, Heinrich-Böcking-	Under consideration	2020	N/A[106]		33.1	N/A

[104] The Agency chose to take out from the analysis of the current progress of this PCI due to the missing reference commissioning date.
[105] Idem.
[106] Idem.

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
		Straße 10-14, 66121 Saarbrücken, Germany						
2.10	Internal line between Brunsbüttel-Großgartach and Wilster-Grafenrheinfeld (DE) to increase capacity at northern and southern borders [currently known as "Suedlink"]	TenneT TSO GmbH (DE), TransnetBW GmbH (DE)	Planned, but not yet in permitting	2025	On time		6500	The figure is redacted because it is deemed sensitive information by the promoter
2.13.1	Ireland-United Kingdom Interconnection between Woodland (IE) and Turleenan (UK – Northern Ireland)	In Ireland (IE): EirGrid plc, The Oval, 160 Shelbourne Road, Ballsbridge, Dublin 4 In UK - Northern Ireland: SONI Ltd, 12 Manse Road, Belfast, Co. Antrim, BT6 9RT	Permitting	2021	Delayed (repeatedly)	Delays due to lawsuits and court proceedings	286	9.5
2.13.2	Interconnection between Srananagh (IE) and Turleenan (UK)	EirGrid plc and SONI Ltd	Planned, but not yet in permitting	2029	Rescheduled (repeatedly)	Changes on the generation side (in relation to new renewable-based generation)	412	0.8
2.14	Interconnection between Thusis/Sils (CH) and Verderio Inferiore (IT) [currently known as "Greenconnector"]	Greenconnector Srl Greenconnector AG	Permitting	2022	Delayed (repeatedly)	Delays due to environmental problems	600	1.9

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
2.15.1	Interconnection between Airolo (CH) and Baggio (IT)	Terna - Rete Elettrica Nazionale SpA, Swissgrid	Permitting	2025	On time		The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted due to lack of promoter's consent to allow its publishing
2.16.1	Internal line between Pedralva and Sobrado (PT), formerly designated Pedralva and Alfena (PT)	Rede Eléctrica a Nacional, S.A:	Planned, but not yet in permitting	2023	Rescheduled	The commissioning date depends on the progress of approval of the NDP, and the progress of the environmental and engineering studies[107]	28.5	0.17
2.16.3	Internal line between Vieira do Minho, Ribeira de Pena and Feira (PT), formerly designated Frades B, Ribeira de Pena and Feira (PT)	Rede Eléctrica Nacional, S.A.	Planned, but not yet in permitting	2021	Ahead of schedule		74.9	
2.17	Portugal — Spain interconnection between Beariz — Fontefría (ES),	Red Eléctrica de España SAU, Rede Eléctrica Nacional S.A.	Permitting	2021	Delayed (repeatedly)	Delays due to environmental problems	128	1.27

[107] Agency's classification based on the project promoters' description of the reason for rescheduling.

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
	Fontefria (ES) — Ponte de Lima (PT) (formerly Vila Fria / Viana do Castelo) and Ponte de Lima — Vila Nova de Famalicão (PT) (formerly Vila do Conde) (PT), including substations in Beariz (ES), Fontefría (ES) and Ponte de Lima (PT)							
2.18	Capacity increase of hydro-pumped electricity storage in Kaunertal, Tyrol (AT)	TIWAG-Tiroler Wasserkraft AG	Permitting	2034	On time		The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted due to lack of promoter's consent to allow its publishing
2.2.1	Interconnection between Lixhe (BE) and Oberzier (DE)	Amprion GmbH Elia System Operator NV/SA	Under construction *(last year: Permitting)*	2020	On time		453.39	The figure is redacted because it is deemed sensitive information by the promoter

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
2.2.4	Second interconnection between Belgium and Germany	AMPRION;ELIA	Under consideration	2028	Delayed[108]		500	The figure is redacted because it is deemed sensitive information by the promoter
2.23	Internal lines at the Belgian north border between Zandvliet and Lillo-Liefkenshoek (BE),and between Liefkenshoek and Mercator, including a substation in Lillo (BE)[currently known as "BRABO II + III"]	Elia	Permitting	2023	On time		120	0.3
2.24	Internal Belgian Backbone West between Horta-Mercator (BE)	Elia	Under construction *(last year: Permitting)*	2019	On time		The figure is redacted due to promoter's request	The figure is redacted due to lack of promoter's consent to allow its publishing

[108]Although the promoter stated in its annual report 2018 that the commissioning date was not shifted, the commissioning date provided in the 2017 PCI selection was 2025 while the one provided in the promoter's annual report was 2028. Hence, the Agency concludes that the PCI is delayed.

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
2.27.1	Interconnection between Aragón (ES)and Atlantic Pyrenees (FR)	Réseau de Transport d'Electricité and Red Eléctrica de España SAU	Planned, but not yet in permitting	2027	Rescheduled (repeatedly)	Further socio-economic feasibility study is required to assess the CBA of the project[109]	The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted because it is deemed sensitive information by the promoter
2.27.2	Interconnection between Navarra (ES) and Landes (FR)	Réseau de Transport d'Electricité and Red Eléctrica de España SAU	Planned, but not yet in permitting	2027	Rescheduled (repeatedly)	Further socio-economic feasibility study is required to assess the CBA of the project [110]	The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted because it is deemed sensitive information by the promoter
2.28.1	Hydro-pumped electricity storage Mont-Negre (ES)	Ingenieria Pontificia S.L.	Permitting	2020	On time		1634	122
2.28.2	Hydro-pumped electricity storage Navaelo (ES)	CDR TREMOR S.L.	Permitting	2024	Delayed	National law changes affecting permitting	258	62.71
2.28.3	Hydro-pumped electricity storage Girones & Raïmats (ES)	JOSE ANTONIO ROMERO POLO, S.A.U.	Permitting	2025	On time		1900	97.87

[109] Agency's classification based on the project promoters' description of the reason for delay.
[110] Idem.

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
2.4	Interconnection between Codrongianos (IT), Lucciana (Corsica, FR) and Suvereto (IT) [currently known as "SACOI 3"]	Terna	Planned, but not yet in permitting	2023	On time		The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted due to lack of promoter's consent to allow its publishing
2.5.1	Interconnection between Grande Ile (FR) and Piossasco (IT) [currently known as "Savoie-Piemont"]	Terna - Rete Elettrica Nazionale SpA, and RTE - Réseau de Transport d'Electricité	Under construction	2019	On time		The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted because it is deemed sensitive information by the promoter
2.7	Interconnection between Aquitaine (FR) and the Basque country (ES) [currently known as "Biscay Gulf"]	Réseau de Transport d'Electricité and Red Eléctrica de España SAU	Permitting *(last year: Planned, but not yet in permitting)*	2025	On time		The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted because it is deemed sensitive information by the promoter
2.9	Germany internal line between Osterath and Philippsburg (DE) to	Amprion GmbH (DE), TransnetBW GmbH (DE)	Planned, but not yet in permitting	2023	Delayed (repeatedly)	Delay due to environmental problems[111]	1070	The figure is redacted because it is deemed sensitive

[111] Agency's classification based on the project promoters' description of the reason for delay.

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
	increase capacity at Western borders							information by the promoter
3.1.1	Interconnection between St. Peter (AT) and Isar (DE)	TenneT TSO GmbH; Austrian Power Grid AG	Permitting	2022	Delayed (repeatedly) (less than 6 months)	National law changes affecting permitting	The figure is redacted due to promoter's request	The figure is redacted due to promoter's request
3.1.2	Internal line between St. Peter and Tauern (AT)	Austrian Power Grid AG	Permitting	2023	On time		The promoter refused to provide cost estimation	N/A
3.1.4	Internal line between Westtirol and Zell-Ziller (AT)	AMPRION;APG;TENNET-DE	Under consideration	2024	Rescheduled	Project is still at an initial stage and depends on other more mature projects (and their delays)	The promoter refused to provide cost estimation	N/A
3.10.1	Interconnection between Hadera (IL) and Kofinou (CY)	EuroAsia Interconnector Ltd	Permitting *(last year: Planned, but not yet in permitting)*	2022	Rescheduled (repeatedly)	Changes due to priority given to other transmission investments	The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted because it is deemed sensitive information by the promoter

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
3.10.2	Interconnection between Kofinou (CY) and Korakia, Crete (EL)	EuroAsia Interconnector Ltd	Permitting *(last year: Planned, but not yet in permitting)*	2022	On time[112]		The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted because it is deemed sensitive information by the promoter
3.10.3	Internal line between Korakia, Crete and Attica region (EL)	EuroAsia Interconnector Ltd	Permitting *(last year: Planned, but not yet in permitting)*	2022	Delayed[113]		The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted because it is deemed sensitive information by the promoter
3.11.1	Internal line between Vernerov and Vitkov (CZ)	CEPS, a.s. - The transmission system operator of the Czech Republic	Permitting	2025	Delayed	National law changes affecting permitting	The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted because it is deemed sensitive information by the promoter

[112] The assessment of the progress of this PCI is based on the recent call for tenders issued by the promoter for the procurement of the equipment of the project, according to which the project cannot be constructed earlier than 2022, which is the same date that was indicated by the promoter in their 2017 annual report. The commissioning date provided by the promoter in the annual report 2018 was 2021.

[113] The assessment of the progress of this PCI is based on the recent call for tenders issued by the promoter for the procurement of the equipment of the project, according to which the project cannot be constructed earlier than 2022, which is later than the date indicated by the promoter in their 2017 annual report. The commissioning date provided by the promoter in the annual report 2018 was 2020.

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
3.11.2	Internal line between Vitkov and Prestice (CZ)	CEPS, a.s. - The transmission system operator of the Czech Republic	Permitting	2021	On time		The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted because it is deemed sensitive information by the promoter
3.11.3	Internal line between Prestice and Kocin (CZ)	CEPS, a.s. - The transmission system operator of the Czech Republic	Under construction *(last year: Permitting)*	2028	On time		The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted because it is deemed sensitive information by the promoter
3.11.4	Internal line between Kocin and Mirovka (CZ)	CEPS, a.s. - The transmission system operator of the Czech Republic	Under construction *(last year: Permitting)*	2025	On time		The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted because it is deemed sensitive information by the promoter
3.11.5	Internal line between Mirovka and line V413 (CZ)	CEPS, a.s. - The transmission system operator of the Czech Republic	Permitting	2019	Ahead of schedule		The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted because it is deemed sensitive information

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
								by the promoter
3.12	Internal line in Germany between Wolmirstedt and Bavaria to increase internal North-South transmission capacity	50Hertz Transmission GmbH; TenneT TSO GmbH	Planned, but not yet in permitting	2025	On time		2800	The figure is redacted because it is deemed sensitive information by the promoter
3.14.2	Internal line between Krajnik and Baczyna (PL)	Polskie Sieci Elektroenergetyczne S.A	Permitting	2021	On time		37.8	0.75
3.14.3	Internal line between Mikułowa and Świebodzice (PL)	Polskie Sieci Elektroenergetyczne S.A	Planned, but not yet in permitting	2024	Rescheduled (repeatedly)	Changes due to complementarity with other rescheduled transmission investments	The figure is redacted because it is deemed sensitive information by the promoter	
3.14.4	Internal line between Baczyna and Plewiska (PL)	Polskie Sieci Elektroenergetyczne S.A.	Planned, but not yet in permitting	2025	Delayed	Not specified	90	
3.16.1	Interconnection Hungary – Slovakia between Gabčikovo (SK) and Gönyű (HU) and Veľký Ďur (SK)	Slovenská elektrizačná prenosová sústava, a.s., MAVIR Hungarian Independent Transmission Operator Company Ltd.	Permitting	2020	On time		82	1.42
3.17	Interconnection Hungary – Slovakia	MAVIR Hungarian Independent Transmission	Permitting	2020	On time			

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
	between Sajóvánka (HU) and Rimavská Sobota (SK)	Operator Company Ltd. and Slovenská elektrizačná prenosová sústava, a.s.						
3.2.2	Internal line between Lienz and Obersielach (AT)	Austrian Power Grid AG	Planned, but not yet in permitting	2026	Rescheduled	Project was still at an initial stage and previous implementation plan was preliminary	The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted because it is deemed sensitive information by the promoter
3.21	Italy — Slovenia interconnection between Salgareda (IT) and Divača — Bericevo region (SI)	ELES, d.o.o., sistemski operater prenosnega elektroenergetskega omrežja Terna S.p.A. - Rete Elettrica Nazionale	Under consideration	2025	Rescheduled (repeatedly)	Project was still at an initial stage and previous implementation plan was preliminary[114]	870	4
3.22.1	Interconnection between Resita (RO) and Pancevo (RS)	CNTEE TRANSELECTRICA & ELEKTROMREZA SRBIJE	Under construction	2018	Delayed (repeatedly) (less than 3 months)	National law changes affecting permitting	176	1.09
3.22.2	Internal line between Portile de Fier and Resita (RO)	CNTEE TRANSELECTRICA SA	Under construction	2021	Delayed	Delays related to acquisition of or access to land		
3.22.3	Internal line between Resita and Timisoara/Sacalaz (RO)	CNTEE TRANSELECTRICA SA	Permitting	2023	On time			

[114] Agency's classification based on the project promoters' description of the reason for rescheduling.

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
3.22.4	Internal line betwee Arad and Timisoara/Sacalaz (RO)	CNTEE TRANSELECTRICA SA	Planned, but not yet in permitting	2027	Delayed	Delays due to correlation with other delayed infrastructure investments (for transmission PCIs)		
3.22.5	Interconnection between Villanova (IT) and Lastva (ME)	CGES;TERNA	Under construction	2019/ 2026	On time		The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted due to lack of promoter's consent to allow its publishing
3.23	Hydro-pumped electricity storage in Yadenitsa	NATSIONALNA ELEKTRICHESKA KOMPANIA EAD	Permitting	2025	Delayed (repeatedly)	Delays due to lawsuits and court proceedings	176	N/A
3.24	Hydro-pumped electricity storage in Amfilochia (EL)	TERNA ENERGY S.A.	Permitting	2023	Delayed (repeatedly)	Delays due to environmental problems[115]	502	100.3
3.27	Interconnection between Sicily (IT) and Tunisia node (TU) [currently known as "ELMED"]	TERNA	Planned, but not yet in permitting	2025	Rescheduled	Project was still at an initial stage and previous implementation plan was preliminary	The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted due to lack of promoter's consent to allow its publishing

[115] Agency's classification based on the project promoters' description of the reason for delays.

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
3.4	Austria — Italy interconnection between Wurmlach (AT) and Somplago (IT)	Alpe Adria Energia S.p.A.	Permitting	2021	Delayed	Delays due to environmental problems	60	0.64
3.7.1	Interconnection between Maritsa East 1 (BG) and N. Santa (EL)	Elektroenergien Sistemen Operator EAD, Bulgaria and Independent Power Transmission Operator (IPTO) S.A., Greece	Permitting	2023	Rescheduled	Project was still at an initial stage and previous implementation plan was preliminary	188.2	0.1
3.7.2	Internal line between Maritsa East 1 and Plovdiv (BG)	Elektroenergien sistemen operator (ESO) EAD	Permitting	2020	On time			
3.7.3	Internal line between Maritsa East 1 and Maritsa East 3 (BG)	Elektroenergien sistemen operator (ESO) EAD	Permitting	2020	Delayed (repeatedly)	Delays related to acquisition of or access to land		
3.7.4	Internal line between Maritsa East 1 and Burgas (BG)	Elektroenergien sistemen operator (ESO) EAD	Permitting	2021	On time			
3.8.1	Internal line between Dobrudja and Burgas (BG)	Elektroenrgien sistemen operator (ESO) EAD	Permitting	2021	On time		189	1.01
3.8.4	Internal line between Cernavoda and Stalpu (RO)	CNTEE TRANSELECTRICA SA	Permitting	2021	Delayed	National law changes affecting permitting		
3.8.5	Internal line between Gutinas and Smardan (RO)	CNTEE TRANSELECTRICA SA	Permitting	2022	Delayed	National law changes affecting permitting		

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
3.9.1	Interconnection between Žerjavenec (HR)/Hévíz (HU) and Cirkovce (SI)	ELES, d.o.o., sistemski operater prenosnega elektroenergetskega omrežja	Permitting	2021	Delayed	Delays due to environmental problems	345	3
4.1	Denmark — Germany interconnection between Ishøj/ Bjæverskov (DK) and Bentwisch (DE) via offshore windparks Kriegers Flak (DK) and Baltic 1 and 2 (DE) [currently known as "Kriegers Flak Combined Grid Solution"]	Energinet.dk, 50 Hertz Transmission GmbH	Under construction *(last year: Permitting)*	2018	On time		350	The figure is redacted because it is deemed sensitive information by the promoter
4.10.1	Interconnection between northern Finland and northern Sweden	FINGRID;SVK	Planned, but not yet in permitting	2025	On time		150	0.24
4.10.2	Internal line between Keminmaa and Pyhänselkä (FI)	Fingrid Oyj!	Permitting	2024	N/A[116]		50	N/A
4.2.1	Interconnection between Kilingi-Nõmme (EE) and	Latvian TSO "Augstsprieguma tikls" AS, Estonian TSO "Elering" AS and Latvian transmission	Permitting	2020	On time		176	0.37

[116] The Agency could not carry out an analysis of the current progress of this PCI due to the missing reference commissioning date.

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
	Riga CHP2 substation (LV)	system owner "Latvijas elektriskie tīkli" AS						
4.2.2	Internal line between Harku and Sindi	Elering AS	Under construction *(last year: Permitting)*	2020	On time			
4.2.3	Internal line between Riga CHP 2 and Riga HPP (LV)	Augstsprieguma tikls	Permitting	2020	On time			
4.4.1	Internal line between Ventspils, Tume and Imanta (LV)	"Augstsprieguma tikls"AS, "Latvijas elektriskie tikli" AS	Under construction	2019	On time		277	0.38
4.4.2	Internal line between Ekhyddan and Nybro/Hemsjö (SE)	Affärsverket svenska kraftnät	Permitting	2023	On time			
4.5.2	Internal line between Stanisławów and Ostrołęka (PL)	Polskie Sieci Elektroenergetyczne S.A.	Planned, but not yet in permitting	2023	Rescheduled	Changes due to complementarity with other rescheduled transmission investments	The figure is redacted because it is deemed sensitive information by the promoter	The figure is redacted due to lack of promoter's consent to allow its publishing
4.6	Hydro-pumped electricity storage in Estonia	Energiasalv Pakri OÜ	Permitting	2028	Rescheduled (repeatedly)	Rescheduled due to environmental problems[117]	330	61

[117] Agency's classification based on the project promoters' description of the reason for rescheduling.

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
4.7	Capacity increase of hydro-pumped storage in Lithuania - Kruonis	Lietuvos energija, UAB	Under consideration	2024	Delayed[118]		160	15.52
4.8.1	Interconnection between Tartu (EE) and Valmiera (LV)	Augstsprieguma tikls (LV), Elering (EE)	Planned, but not yet in permitting	2023	On time		285	N/A
4.8.2	Internal line between Balti and Tartu (EE)	Elering AS	Planned, but not yet in permitting	2023	On time			N/A
4.8.3	Interconnection between Tsirguliina (EE) and Valmiera (LV)	Augstsprieguma tikls AS (LV) and Elering AS (EE)	Planned, but not yet in permitting	2024	On time			N/A
4.8.4	Internal line between Viru(EE) and Tsirguliina(EE)	Elering AS	Planned, but not yet in permitting	2025	On time			N/A
4.8.5	Internal line between substation in Lithuania and state border (LT)	Litgrid AB	Planned, but not yet in permitting	2025	On time			N/A
4.8.7	Internal line between Paide and Sindi (EE)	AST;ELERING;LITGRID	Under consideration	2022	Ahead of schedule			N/A
4.8.8	Internal line between Vilnius and Neris (LT)	AST;ELERING;LITGRID	Planned, but not yet in permitting	2025	On time			N/A
4.8.9	Further infrastructure aspects	AST;ELERING;LITGRID	Under consideration	2025	On time			N/A

[118] Although the promoter stated in its annual report 2018 that the commissioning date was not shifted, the commissioning date provided in the 2017 PCI selection was 2020 while the one provided in the promoter's annual report was 2024. Hence, the Agency concludes that the PCI is delayed.

PCI Code	PCI Name	Project promoter(s)	Current status	Expected year of commissioning	Current progress[100]	Reason for delay or rescheduling (if applicable)	Investment cost at commissioning date (m€)	Annual life cycle cost (m€)
	of the synchronisation of the Baltic States' electricity system with the European networks							

Annex V: Reported investment costs vs. reference values – gas

Figure 21 - Summary of assumptions

Parameter / Variable	Assumption in this Report	Comment
- Compressor drive technology (gas / electric)	Gas engine drive for all compressor stations.	Gas engine drive was the most common technology in the sample used for the UIC report
- Type of compressor (new / expansion)	New compressor stations only	Most compressor power is installed at new stations, although some PCIs are expansions of existing stations
- Treatment of offshore pipelines	UIC reference values are available for onshore pipelines only	Approx. 73% of the total length (km) of new PCI pipelines are on-shore, 8% are partially offshore, and 18% are offshore (from 2017 PCI monitoring report). The cost per km of offshore pipelines is generally higher, although strongly dependent on depth and seabed features (offshore pipelines in shallow waters are not necessarily more expensive per km than on-shore pipelines of similar diameter).
- Use of nominal/ indexes reference values	Use of "indexed" (inflation-adjusted) values	In the UIC report, "nominal" ("as observed" values or "indexed", i.e. inflation-adjusted) values are provided. For reference UIC values, the inflation-adjusted values to 2014 are considered to be a better cost proxy.
- Use of inflation since 2014	Reference values from UIC report (inflated until 2014)[119]	HICP[120] inflation rate during years 2014-2017 in EU was low (0.5% in 2014, 0% in 2015, 0.3% in 2016 and 1.7 in 2017), as published by Eurostat. Inflation was not considered for 2014-2017 due to these low values observed. Moreover, there is no compelling evidence of a strong correlation among general inflation and the price levels for gas infrastructure projects.
- Non-normalised diameters	Approximation to immediately higher normalised diameter size	UIC are available for pipes of diameters measured in inches, while promoters provided this info in millimetres. In case of a mismatch or non-existence of a "normalised" diameter in inches, the closest higher value in inches was used.

[119] In the UIC report, cost values of the collected sample of historic cost of gas infrastructure (from years 2005 to 2014) were converted to year 2014 values by using general consumer price index.
[120] Harmonised Indices of Consumer Prices as published by Eurostat.

Annex VI: PCIs without any activity in 2017 – gas

PCI Code / TYNDP code	PCI Name[121]	Status vs. schedule
6.10 / TRA-F-137	Interconnection Bulgaria - Serbia	Delayed
6.20.3 / TRA-N-1092	South Kavala UGS facility and ***metering and regulating station (EL)***	On time
6.20.3 / UGS-N-385	***South Kavala UGS facility*** and metering and regulating station (EL)	Rescheduled
6.26.1 / TRA-N-094	Cluster Croatia — Slovenia — Austria at Rogatec, including: - Interconnection Croatia — Slovenia (Lučko — Zabok - Rogatec) - ***Compressor station Kidričevo, 2nd phase of upgrade (SI)*** - Compressor stations 2 and 3 at the Croatian gas transmission system - GCA 2015/08: Entry/Exit Murfeld (AT) - Upgrade of Murfeld/Ceršak interconnection (AT-SI) - Upgrade of Rogatec interconnection	Rescheduled
6.26.1 / TRA-N-389	Cluster Croatia — Slovenia — Austria at Rogatec, including: - Interconnection Croatia — Slovenia (Lučko — Zabok - Rogatec) - Compressor station Kidričevo, 2nd phase of upgrade (SI) - Compressor stations 2 and 3 at the Croatian gas transmission system	Rescheduled

[121] A single PCI code may refer to several investment items, each one with a unique TYNDP code. Where a PCI includes several such items, for some of which work has been performed while for others no work has been carried out, the item(s) on which no work is reported is indicated in ***bold italic***. Information about one PCI is not included in the table as it was indicated as confidential by the project promoter.

PCI Code / TYNDP code	PCI Name[121]	Status vs. schedule
	- GCA 2015/08: Entry/Exit Murfeld (AT) - Upgrade of Murfeld/Ceršak interconnection (AT-SI) - Upgrade of Rogatec interconnection	
6.8.1 / TRA-N-128	Interconnection Greece — Bulgaria [currently known as "IGB"] between Komotini (EL) and Stara Zagora (BG) and ***compressor station at Kipi (EL)***	On time
6.9.1 / TRA-N-1090	LNG terminal in northern Greece ***Metering and Regulating Station at Alexandroupoli***	On time
7.1.3 / TRA-N-971	Gas pipeline from Greece to Italy via Albania and the Adriatic Sea [currently known as “Trans-Adriatic Pipeline” (TAP)], including metering and regulating station and ***compressor station at Nea Messimvria***	On time
7.3.1 / TRA-N-1091	Pipeline from the East Mediterranean gas reserves to Greece mainland via Crete [currently known as "EastMed Pipeline"], with ***metering and regulating station at Megalopoli***	Rescheduled

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Annex VII: PCI specific information - gas

2017 PCI number	2017 PCI name	2017 TYNDP code(s)	Project promoter(s)	Current status	Expected commissioning year	Current PCI progress	Total investment costs in 2018 (million €)
5.1.1	Physical reverse flow at Moffat interconnection point (IE/UK)	TRA-N-1064; TRA-N-829	GNI (UK) Limited	Under consideration	2022	On time	440
5.1.2	Upgrade of the SNIP (Scotland to Northern Ireland) pipeline to accommodate physical reverse flow between Ballylumford and Twynholm	TRA-N-027	Premier Transmission; Mutual Energy Limited	Under consideration	2021	On time	60
5.1.3	Development of the Islandmagee Underground Gas Storage (UGS) facility at Larne (Northern Ireland)	UGS-N-294	Infrastrata PLC	Permitting	2022	Delayed	350
5.10	Reverse flow interconnection on TENP pipeline in Germany	TRA-F-208	Open Grid Europe GmbH; Fluxys TENP GmbH	Permitting	2019	On time	Not listed[122]
5.11	Reverse flow interconnection between Italy and Switzerland at Passo Gries interconnection point	TRA-F-214	Snam Rete Gas	Under construction	2018	On time	Not listed
5.19	Connection of Malta to the European gas network — pipeline interconnection with Italy at Gela	TRA-N-031	Ministry for Energy and Water Management (MT)	Permitting	2024	Ahead of schedule	350.5
5.21	Adaptation low to high calorific gas in France and Belgium	TRA-N-429; TRA-N-500	GRTgaz; Storengy France; Fluxys Belgium SA/NV	Planned but not yet in permitting	2026	On time / Rescheduled	181
5.3	Shannon LNG Terminal and connecting pipeline (IE)	LNG-N-030	Shannon LNG Ltd	Permitting	2022	On time	Not listed
5.4.1	Interconnection ES-PT (3rd interconnection) – 1st phase	TRA-N-283; TRA-N-168	REN Gasodutos, SA; Enagás Transporte, S.A.U.	Planned but not yet in permitting	2024	Delayed / Rescheduled	189.4

[122] Data requested by the project promoter to be treated in confidence.

2017 PCI number	2017 PCI name	2017 TYNDP code(s)	Project promoter(s)	Current status	Expected commissioning year	Current PCI progress	Total investment costs in 2018 (million €)
5.4.2	Interconnection ES-PT (3rd interconnection) – 2nd phase	TRA-N-284; TRA-N-729; TRA-N-285	REN Gasodutos, SA; Enagás Transporte, S.A.U.	Under consideration	2028	Delayed / Rescheduled	581.5
5.5.1	South Transit East Pyrenees [currently known as "STEP"]	TRA-N-161; TRA-N-252	Enagás Transporte, S.A.U.; TIGF	Under consideration	2022	On time / Rescheduled	442
5.5.2	Eastern Gas Axis Spain — France — interconnection point between Iberian Peninsula and France, including the compressor stations at St-Avit, Palleau and St. Martin de Crau [currently known as "Midcat"]	TRA-N-727; TRA-N-256	Enagás Transporte, S.A.U.; TIGF; GRTgaz	Under consideration[123]	2024	On time / Rescheduled	3068.7
6.10	PCI Gas interconnection Bulgaria — Serbia [currently known as "IBS"]	TRA-F-137	Ministry of Energy of Bulgaria	Planned but not yet in permitting	2022	Delayed	48
6.2.1	Poland — Slovakia interconnection	TRA-N-190; TRA-N-275	Eustream; Operator Gazociagów Przesylowych Gaz-System S.A.	Permitting	2021	On time / Delayed	287
6.2.10	Poland – Czech Republic interconnection [currently known as "Stork II"]	TRA-N-273	Operator Gazociagów Przesylowych Gaz-System S.A.	Permitting	2022	On time	Not listed
6.2.11	North – South Gas Corridor in Western Poland	TRA-N-247	Operator Gazociagów Przesylowych Gaz-System S.A.	Under construction	2020	On time	Not listed
6.2.12	Tvrdonice-Libhošť pipeline, including upgrade of CS Břeclav (CZ)	TRA-N-136	NET4GAS; Operator Gazociagów Przesylowych Gaz-System S.A.	Permitting	2022	On time	257.14

[123] Reported as “Planned, but not yet in permitting” by the project promoter. Status indicated as suggested by the Spanish NRA.

2017 PCI number	2017 PCI name	2017 TYNDP code(s)	Project promoter(s)	Current status	Expected commissioning year	Current PCI progress	Total investment costs in 2018 (million €)
6.2.13	Increase of the transmission capacity at the Slovakia – Hungary interconnection	TRA-N-636; TRA-N-524	Magyar Gáz Tranzit Zrt.	Under consideration	2022	On time	34.64
6.2.14	Enhancement of the Hungarian transmission system between Vecsés and Városföld required for the increased capacity at the Slovakia-Hungary interconnection	TRA-N-831	Magyar Gáz Tranzit Zrt.	Under consideration	2022	On time	64
6.2.2	North – South Gas Corridor in Eastern Poland	TRA-N-245	Operator Gazociagów Przesylowych Gaz-System S.A.	Permitting	2022	Delayed	Not listed
6.20.2	Chiren UGS expansion (BG)	UGS-N-138	Bulgartransgaz EAD	Permitting	2024	Delayed	226.399
6.20.3	South Kavala UGS facility and metering and regulating station (EL)	TRA-N-1092; UGS-N-385	Hellenic Gas Transmission System Operator S.A.; Hellenic Republic Asset Development Fund S.A.	Under consideration	2023	On time / Rescheduled	Not listed
6.20.4	Depomures storage in Romania	UGS-N-233	ENGIE Romania	Under construction	2023	Delayed	87
6.20.6	Sarmasel underground gas storage in Romania	UGS-N-371	S.N.G.N. ROMGAZ S.A.	Under consideration	2024	Rescheduled	136.15
6.23	Hungary – Slovenia interconnection (Nagykanizsa — Tornyiszentmiklós (HU) — Lendava (SI) – Kidričevo)	TRA-N-112; TRA-N-325	Plinovodi d.o.o.; FGSZ Ltd.	Under consideration	2023	Delayed / Rescheduled	154.682

2017 PCI number	2017 PCI name	2017 TYNDP code(s)	Project promoter(s)	Current status	Expected commissioning year	Current PCI progress	Total investment costs in 2018 (million €)
6.24.1	ROHUAT/BRUA – 1st phase, including: - Romanian-Hungarian reverse flow: Hungarian section 1st stage compressor station at Csanádpalota - Development of the transmission capacity in Romania from Podişor to Recas, including, a new pipeline, metering station andthree new compressor stations in Podisor, Bibesti and Jupa - GCA Mosonmagyarovar compressor station (development on the Austrian side)	TRA-N-358; TRA-N-423, TRA-N-286	SNTGN Transgaz SA; GAS CONNECT AUSTRIA GmbH; FGSZ Ltd.	Planned but not yet in permitting	2022	On time / Rescheduled	643.69
6.24.10	ROHUAT/BRUA – 3rd phase, including: - Enhancement of the Romanian transmission system between Onesti-Isaccea and reverse flow at Isaccea - Enhancement of the Romanian transmission system between Onesti – Nadlac - Extension of the Romanian transmission system for taking over gas from the Black Sea shore	TRA-N-964; TRA-N-139; TRA-N-959	SNTGN Transgaz SA	Under consideration	2023	Not listed	Not listed

2017 PCI number	2017 PCI name	2017 TYNDP code(s)	Project promoter(s)	Current status	Expected commissioning year	Current PCI progress	Total investment costs in 2018 (million €)
6.24.4	ROHUAT/BRUA –2nd phase, including: - Városföld-Ercsi– Győr pipeline (HU) - Ercsi-Százhalombatta pipeline (HU) - Városföld compressor station (HU) - Expansion of the transmission capacity in Romania from Recas to Horia towards Hungary up to 4.4 bcm/a and expansion of the compressor stations in Podisor, Bibesti and Jupa - Black Sea shore — Podișor (RO) pipeline for taking over the Black sea gas - Romanian-Hungarian reverse flow: Hungarian section 2nd stage compressor station at Csanádpalota or Algyő (HU)	TRA-N-362; TRA-N-018; TRA-N-061; TRA-N-377; TRA-N-123	SNTGN Transgaz SA; FGSZ Ltd.	Under consideration	2024	On time / Rescheduled	735.874
6.25.1	Pipeline system from Bulgaria via Romania and Hungary to Slovakia [currently known as "Eastring"]	TRA-N-654; TRA-N-628; TRA-N-656; TRA-N-655	Bulgartransgaz EAD; Eastring B.V.; Eustream; FGSZ Ltd.; SNTGN Transgaz SA	Under consideration	2028	On time / Rescheduled	2054.41
6.25.4	Infrastructure to allow the development of the Bulgarian gas hub	TRA-N-592; TRA-N-593; TRA-N-594	Bulgartransgaz EAD	Under consideration	2022	On time	1771.59

2017 PCI number	2017 PCI name	2017 TYNDP code(s)	Project promoter(s)	Current status	Expected commissioning year	Current PCI progress	Total investment costs in 2018 (million €)
6.26.1	Cluster Croatia — Slovenia — Austria at Rogatec, including: - Interconnection Croatia — Slovenia (Lučko — Zabok - Rogatec) - Compressor station Kidričevo, 2nd phase of upgrade (SI) - Compressor stations 2 and 3 at the Croatian gas transmission system - GCA 2015/08: Entry/Exit Murfeld (AT) - Upgrade of Murfeld/Ceršak interconnection (AT-SI) - Upgrade of Rogatec interconnection	TRA-N-094; TRA-N-361; TRA-F-86; TRA-N-389; TRA-N-390; TRA-N-1057	Plinovodi d.o.o.; GAS CONNECT AUSTRIA GmbH; Plinacro Ltd	Under consideration	2022	Rescheduled	256.21
6.4	PCI Bidirectional Austrian — Czech interconnection (BACI) between Baumgarten (AT) – Reinthal (CZ/AT) — Břeclav (CZ), with capacity up to 6.57 bcm/a	TRA-N-133; TRA-N-021	NET4GAS, s.r.o.; GAS CONNECT AUSTRIA GmbH	Planned but not yet in permitting	2021	Rescheduled	198.5
6.5.1	Development of a LNG terminal in Krk (HR) up to 2.6 bcm/a– Phase I and connecting pipeline Omišalj – Zlobin (HR)	LNG-N-082; TRA-N-90	LNG Hrvatska d.o.o.; Plinacro Ltd	Permitting	2019	On time	385
6.5.5	"Compressor station 1" at the Croatian gas transmission system	TRA-F-334	Plinacro Ltd	Permitting	2019	On time	25
6.5.6	Expansion of LNG terminal in Krk (HR) above 2.6 bcm/a – Phase II and evacuation pipelines Zlobin – Bosiljevo – Sisak – Kozarac – Slobodnica (HR)	TRA-N-075; TRA-N-1058	Plinacro Ltd	Permitting	2023	On time	282.15

2017 PCI number	2017 PCI name	2017 TYNDP code(s)	Project promoter(s)	Current status	Expected commissioning year	Current PCI progress	Total investment costs in 2018 (million €)
6.8.1	Interconnection Greece — Bulgaria [currently known as "IGB"] between Komotini (EL) and Stara Zagora (BG) and compressor station at Kipi (EL)	TRA-N-957; TRA-N-128; TRA-F-378	Hellenic Gas Transmission System Operator S.A.; ICGB a.d.	Under consideration	2020	On time / Delayed	292
6.8.2	Rehabilitation, modernization and expansion of the Bulgarian transmission system	TRA-N-298	Bulgartransgaz EAD	Permitting	2021	Delayed	339.588
6.9.1	LNG terminal in northern Greece	TRA-N-063; LNG-N-062; TRA-N-1090	GASTRADE SA; Hellenic Gas Transmission System Operator S.A.	Under consideration	2020	On time / Delayed	Not listed
7.1.1	Gas pipeline to the EU from Turkmenistan and Azerbaijan, via Georgia and Turkey, [currently known as the combination of "Trans-Caspian Gas Pipeline" (TCP), "South-Caucasus Pipeline FutureExpansion" (SCPFX) and "Trans Anatolia Natural Gas Pipeline" (TANAP)]	TRA-N-339; TRA-F-221; TRA-N-1138	W-Stream Caspian Pipeline Company Limited; State Oil Company of the Republic of Azerbaijan (SOCAR); SOCAR Midstream Operations Ltd.	Under consideration	2023	On time / Delayed / Rescheduled	Not listed
7.1.3	Gas pipeline from Greece to Italy via Albania and the Adriatic Sea [currently known as "Trans-Adriatic Pipeline" (TAP)], including metering and regulating station and compressor station at Nea Messimvria	TRA-N-971; TRA-F-051; TRA-N-941	Hellenic Gas Transmission System Operator S.A.; Trans Adriatic Pipeline AG	Permitting	2022	On time	Not listed

2017 PCI number	2017 PCI name	2017 TYNDP code(s)	Project promoter(s)	Current status	Expected commissioning year	Current PCI progress	Total investment costs in 2018 (million €)
7.3.1	Pipeline from the East Mediterranean gas reserves to Greece mainland via Crete [currently known as "EastMed Pipeline"], with metering and regulating station at Megalopoli and dependent on it the following PCIs:	TRA-N-330; TRA-N-1091	Natural Gas Submarine Interconnector Greece-Italy Poseidon S.A; Hellenic Gas Transmission System Operator S.A.	Under consideration	2025	Rescheduled	5207.5
7.3.3	Offshore gas pipeline connecting Greece and Italy [currently known as "Poseidon Pipeline"]	TRA-N-010	Natural Gas Submarine Interconnector Greece-Italy Poseidon S.A	Planned but not yet in permitting	2022	Rescheduled	1050
7.3.4	Reinforcement of the South-North internal transmission capacities in Italy [currently known as "Adriatica Line"]	TRA-N-007	Snam Rete Gas	Under consideration	2025	Rescheduled	Not listed
7.5	Development of gas infrastructure in Cyprus [currently known as "Cyprus Gas2EU"]	TRA-N-1146	MECIT - Ministry of Energy,Commerce, Industry and Tourism	Permitting	2019	Not listed	Not listed
8.1.1	Interconnection Estonia - Finland [currently known as “Balticconnector”]	TRA-N-928; TRA-N-895	Baltic Connector Oy; Elering AS	Under construction	2019	On time	259.5
8.2.1	Enhancement of Latvia — Lithuania interconnection	TRA-N-382; TRA-N-342	JSC Conexus Baltic Grid; AB Amber Grid	Under consideration	2021	Rescheduled	92.9
8.2.2	Enhancement of Estonia — Latvia interconnection	TRA-N-915	Elering AS	Permitting	2019	On time	36.4
8.2.4	Enhancement of Inčukalns Underground Gas Storage (LV)	UGS-N-374	JSC Conexus Baltic Grid	Permitting	2025	On time	132.9
8.3.1	Reinforcement of Nybro — Poland/Denmark Interconnection	TRA-N-780	Energinet.dk	Permitting	2022	On time	629

2017 PCI number	2017 PCI name	2017 TYNDP code(s)	Project promoter(s)	Current status	Expected commissioning year	Current PCI progress	Total investment costs in 2018 (million €)
8.3.2	Poland–Denmark interconnection [currently known as “Baltic Pipe”]	TRA-N-271; TRA-N-428	Operator Gazociagów Przesylowych Gaz-System S.A.; Energinet.dk	Permitting	2022	On time	784
8.5	Poland-Lithuania interconnection [currently known as “GIPL”]	TRA-N-212; TRA-N-341	Operator Gazociagów Przesylowych Gaz-System S.A.; AB Amber Grid	Permitting	2021	On time	497
8.6	Gothenburg LNG terminal in Sweden	LNG-N-032	Swedegas	Permitting	2022	Delayed	Not listed
8.7	Capacity extension of Świnoujście LNG terminal in Poland	LNG-N-272	Operator Gazociagów Przesylowych Gaz-System S.A.	Permitting	2023	On time	Not listed

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