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# **CONSOLIDATED REPORT**

## **ON THE PROGRESS OF ELECTRICITY AND GAS PROJECTS OF COMMON INTEREST**

**Ljubljana  
30 June 2017**

## Contents

1	Summary .....	4
1.1	Legal basis and background .....	4
1.2	Main findings .....	4
1.2.1	Fulfilment of the reporting obligations and quality of the reports .....	4
1.2.2	Consistency of the 2015 PCI list with the TYNDPs and NDPs .....	5
1.2.3	PCI status and progress .....	5
1.2.4	Costs and benefits .....	5
1.2.5	Regulatory treatment .....	6
2	Volume 1: ELECTRICITY PROJECTS .....	7
2.1	Introduction .....	8
2.1.1	Fulfilment of the reporting obligations .....	8
2.1.2	Completeness, consistency and adequacy of the submitted data .....	8
2.2	Overview of the electricity PCIs .....	9
2.2.1	General statistics of the PCIs .....	9
2.2.2	Presence of the PCIs in the TYNDP and NDPs .....	11
2.3	PCI status and progress .....	12
2.3.1	Current PCI status .....	12
2.3.2	Progress of works .....	15
2.3.3	Expected commissioning dates .....	16
2.3.4	Progress of PCI implementation .....	19
2.3.5	Reasons for rescheduling, delays and difficulties encountered by the project promoters .....	23
2.3.6	Duration of implementation .....	25
2.4	Progress of costs and benefits .....	27
2.4.1	Investment costs .....	27
2.4.2	Life-cycle costs .....	31
2.4.3	Expected benefits .....	33
2.5	Regulatory treatment and financial support to the projects from public sources .....	36
2.5.1	Investment requests and decisions .....	36
2.5.2	Risks and incentives .....	37
2.5.3	Exemptions .....	38
2.5.4	Financial support to the projects from public sources .....	39
3	Volume 2: GAS PROJECTS .....	42
3.1	Introduction .....	43

3.1.1	Fulfilment of the reporting obligations .....	43
3.1.2	Completeness, consistency and adequacy of the submitted data .....	43
3.2	Overview of the gas PCIs .....	45
3.2.1	General statistics of the PCIs .....	45
3.2.2	Presence of the PCIs in the NDPs .....	46
3.3	PCI status and progress .....	48
3.3.1	Current PCI status .....	48
3.3.2	Progress of works .....	50
3.3.3	Expected commissioning dates .....	52
3.3.4	Progress of PCI implementation .....	56
3.3.5	Reasons for rescheduling, delays and difficulties encountered by the project promoters .....	59
3.3.6	Duration of implementation .....	60
3.4	Progress of costs and benefits .....	62
3.4.1	Investment costs .....	62
3.4.2	Reported investment costs vs. reference values .....	65
3.4.3	Life-cycle costs .....	71
3.4.4	Expected benefits .....	71
3.5	Regulatory treatment and financial support to the projects from public sources .....	73
3.5.1	Investment requests and decisions .....	73
3.5.2	Risks and incentives .....	74
3.5.3	Exemptions .....	75
3.5.4	Overview of the financial support to the projects from public sources .....	76
Annexes	.....	78
Annex I:	PCIs not included in the TYNDP 2016 and NDPs – electricity .....	78
Annex II:	Technical modifications – electricity .....	80
Annex III:	Transfer capacity increase – electricity .....	81
Annex IV:	Measures to solve delays and difficulties - electricity .....	85
Annex V:	PCI specific information - electricity .....	91
Annex VI:	PCIs not included in NDPs - gas .....	117
Annex VII:	Reported investment costs vs. reference values – gas .....	118
Annex VIII:	PCI specific information - gas .....	119

## 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 NRAs cooperating in the framework of the Agency. The present Report represents the results of the third instance of the Agency's annual monitoring of the PCIs' progress. The Report covers the period from 1 February 2016 until 31 January 2017<sup>1</sup>.

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 national regulatory authorities (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 the 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

A generally positive trend is evident regarding the quality and the quantity of the data submitted by project promoters. At the same time, the input to certain parts of the reporting form<sup>2</sup> continues to be missing or be provided of inadequate quality, and regarding some data, availability even worsened. The areas where further improvement is necessary in terms of the quality and coverage of data include, in particular, the monetised benefits and the expected life-cycle costs of the projects. In view of the need to have a proper understanding of the costs and the benefits which the projects are expected to involve and to bring, the Agency will continue to follow up with the European Networks of Transmission System Operators (ENTSOs) for electricity and gas, in order to improve the cost-benefit analysis (CBA) methodologies, in the context of their regular update<sup>3</sup>.

The Agency will continue the development of the reporting tools in cooperation with NRAs, in pursuit of assuring that the right information is submitted by the project promoters, while

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<sup>1</sup> In this case, the 2015 PCI list. (Cf. Commission Delegated Regulation (EU) 2016/89 of 18 November 2015).

<sup>2</sup> In electricity, a survey form was used for collecting data for the purpose of the 2017 PCI monitoring. In gas, the prototype of the Agency's infrastructure information system was used to collect data from the promoters.

<sup>3</sup> In the field of electricity, the Agency has provided its opinion on ENTSO-E's updated cost-benefit analysis methodology (cf. Opinion of the Agency No 05/2017). In gas, an update of the cost-benefit analysis methodology by ENTSG is underway at the time of this Report.

also striving to reduce the administrative burden and assure the consistency of the reporting process.

### **1.2.2 Consistency of the 2015 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.

### **1.2.3 PCI status and progress**

The Agency takes note of the possible natural change of certain technical features of the projects over time, which is generally due to project adaptations in response to changing circumstances. In some instances however, the reported changes in technical characteristics (e.g., the way of technical realisation, the location of project elements, substantial change in capacity, etc.) appear to significantly alter the level of benefits which the projects would bring, and hence their cost-benefit ratio. After incurring such significant technical changes, a project may only in name resemble the original concept at the time when it was included in the PCI list. The Agency finds it essential that Regional Groups keep track of major technical changes and require project promoters to justify these changes.

The Agency recognizes the positive development that 20 electricity and gas PCIs advanced their status compared to 2016, in most instances by entering the permit granting process after completing earlier project development stages. At this time, the largest number of PCIs are in permitting. Despite the advancement in status though, the commissioning dates for half of the PCIs have again been shifted by 1-2 years into the future compared to the previously planned schedules. During the two-year period from February 2015 to January 2017, approximately only one-third of the PCIs managed to maintain their original time schedule. The remaining two-thirds of the projects were delayed or rescheduled at least once during this two-year period.

For 17 electricity and for 13 gas PCIs, no works or activities were reported to have been carried out during 2016. Out of these projects, 10 electricity and 4 gas PCIs did not report any work or activity being done at all over the entire two-year period since 2015. The Agency strongly encourages Regional Groups thoroughly to examine the merits of those PCI candidates in the ongoing PCI selection process for which no evidence of implementation efforts can be observed since their inclusion in the 2015 PCI list.

### **1.2.4 Costs and benefits**

The investment costs, as assessed and reported by the promoters, amount to €49.8 billion for electricity PCIs and €52.7 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 reported cost of the PCIs often differ from the ones reported in 2016, with variations in the level of anticipated costs mainly due to better cost estimates in electricity and to changes in the scope or in the technical characteristics of the projects in gas.

Since 2015, promoters have spent approximately €6 billion on gas and €4.3 billion on electricity PCIs. Regarding the benefits which the projects would bring, in electricity the reported monetised benefits amount to €66.1 billion. The assessment of the benefits of the gas PCIs faced serious difficulties and the Agency lacked comprehensive monetised benefits data reported for gas projects.

The Agency reiterates its view that projects should always have a realistic cost and benefit estimate in order to become a PCI.

### **1.2.5 Regulatory treatment**

The interest of the promoters in using the available regulatory tools<sup>4</sup> in Regulation (EU) No 347/2013 and exemptions<sup>5</sup> remained on a relatively low level. The submission of investment requests and the resulting issuing of cross-border cost allocation (CBCA) decisions<sup>6</sup> are the tools most frequently used by the promoters. The actual and the planned filing of applications for both risk-related incentives<sup>7</sup> and exemptions appears to be occurring only in exceptional cases.

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<sup>4</sup> Cf. Article 12 of Regulation (EU) No 347/2013 on enabling investments with cross-border impacts and Article 13 of Regulation (EU) No 347/2013 regarding the provision of incentives in case the project promoter incurs higher risks for the development, construction, operation or maintenance of a PCI.

<sup>5</sup> Cf. Articles 32, 33, 34 and Article 41(6), (8) and (10) of Directive 2009/73/EC pursuant to Article 36 of Directive 2009/73/EC.

<sup>6</sup> Available for PCIs which reached a sufficient level of maturity.

<sup>7</sup> For projects that incur higher risks for the development, construction, operation or maintenance of a project than the risks normally incurred by a comparable infrastructure project.

## **2 Volume 1: ELECTRICITY PROJECTS**



## 2.1 Introduction

### 2.1.1 Fulfilment of the reporting obligations

By the legal deadline of 31 March 2017, the Agency received reports for all but two of the PCIs<sup>8</sup>. In one instance, the project promoter submitted the report after the legal deadline<sup>9</sup>, but the Agency could still take into account in its assessment. In the other instance the project promoter did not submit a report at all, notifying the Agency that the project had been cancelled.<sup>10</sup> In order better to understand the barriers to their implementation - and in the present case, the reasons of the cancellation -, the Agency recalls that promoters are obliged to submit an annual report of their PCI each year following the year of inclusion of the project in the PCI list and the failure to submit such an annual report represents a breach of Regulation (EU) No 347/2013.

The Agency used the online EUSurvey tool to collect the information from the promoters. On 15 February 2017, the single contact appointed by the project promoters for each PCI was invited to submit the PCI reports by filling in the Agency's templates<sup>11</sup>.

### 2.1.2 Completeness, consistency and adequacy of the submitted data

The Agency checked the completeness and consistency of the received data and sent project promoters over 250 clarification questions or further data requests regarding 94 PCIs. The Agency notes that the quality and the completeness of the **information is generally increasing over time. However, the Agency also notes some data provision aspects worsening compared to the previous reporting period, in particular regarding the benefits, the life-cycle costs and the commissioning dates**<sup>12</sup>. The PCIs with the missing data greatly overlap with the projects from last year<sup>13</sup>. The main reasons provided by project promoters to justify the missing data are: uncertainties regarding the projects, availability of the benefit data at a cluster level only, information already included in the ENTSO-E TYNDP 2016<sup>14</sup>. The projects with missing discounted benefits or cost data were excluded from certain parts of the monitoring exercise to avoid distorted results in the findings regarding the progress of costs and benefits<sup>15</sup>. The cases where the project promoters provided the overall costs and/or benefits

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<sup>8</sup> PCI 2.2.3 “*New substation in Zutendaal (BE)*” was already commissioned in 2015 (i.e. before the submission of the annual PCI report in 2016) and the project promoter confirmed that all the data is still valid. Therefore, for this PCI last year's report is considered.

<sup>9</sup> The report for PCI 1.1.2 “*Internal line between the vicinity of Richborough and Canterbury (UK)*” was submitted to the Agency on 19 April 2017.

<sup>10</sup> PCI 10.1 “*North Atlantic Green Zone Project (Ireland, United Kingdom/Northern Ireland) aims at lowering wind curtailment by implementing communication infrastructure, enhanced grid control and interconnection and establishing (cross-border) protocols for Demand Side Management*”.

<sup>11</sup> The template for the PCI monitoring reports was consulted with competent authorities and project promoters.

<sup>12</sup> Monetised benefits are missing for 36 PCIs compared to 28 PCIs last year. Life cycle costs are missing for 32 PCIs compared to 24 PCIs last year and commissioning dates are missing for 7 PCIs compared to 2 PCIs last year.

<sup>13</sup> Data was not provided in any of the 2 years regarding benefits for 25 PCIs, regarding life-cycle costs for 17 PCIs and commissioning date for 2 PCIs.

<sup>14</sup> On 20 December 2016, ENTSO-E published its Ten-Year Network Development Plan 2016. Available under the following link: <http://tyndp.entsoe.eu/>

<sup>15</sup> In 6 instances, while the discounted investment costs were not available, the project promoters reported undiscounted investment costs and a commissioning date (or a date range). For these cases, the Agency calculated the discounted investment costs with the assumption that all investment costs are incurred at the most optimistic commissioning date.

of a cluster of projects without disaggregation of these benefits per PCI were handled with special caution by the Agency to avoid double-counting of the costs and/or benefits.

The Agency notes that the guidance in the Agency’s template regarding the calculation of costs and benefits is generally followed by the project promoters<sup>16</sup>. This helped improve the quality of the data and the consistency of the reports<sup>17</sup>. The Agency also identified that, in some cases, further guidance should be provided by the Agency to make sure that the project promoters’ calculations are consistent<sup>18</sup>.

#### Key findings and recommendations:

- The Agency notes the improvement of the quality of the reported information over time in the PCI monitoring exercise. However, there are several instances where essential information (such as costs, benefits and the project’s commissioning date) is missing. **The Agency discourages listing as PCIs, projects which do not provide such information or cannot reliably justify that the project benefits outweigh their costs.**
- In some cases the project promoters claimed that the benefits and costs can be provided only for a TYNDP cluster which includes other investments beyond the PCI. **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)**<sup>19</sup>.

## 2.2 Overview of the electricity PCIs

### 2.2.1 General statistics of the PCIs<sup>20</sup>

The 2015 PCI list includes 111 electricity PCIs, (equal to 112 projects)<sup>21</sup>. Out of these, 100 are transmission projects, 3 are smart grid projects and 9 are storage projects. Of the transmission projects, 46 are interconnectors and 54 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 North-South electricity interconnections in Western Europe (“NSI West”), Northern Seas offshore grid (“NSOG”) and the Baltic Energy Market Interconnection Plan (“BEMIP”). Because of the relatively low number of electricity storage and smart grid PCIs, some assessments focused only on

<sup>16</sup> E.g. for costs and benefit calculations the promoters were required to use the discount parameters of 25 years of operation, 4% real discount rate, and zero residual value, in line with the ENTSO-E CBA methodology.

<sup>17</sup> E.g. it allowed clarifying several cases which provided undiscounted values for the investment and life-cycle costs in last year’s monitoring report.

<sup>18</sup> E.g. further guidance is required regarding the cost elements to be considered by the project promoters in the life cycle costs of the hydro-pump storage projects.

<sup>19</sup> Cf. 2016 PCI monitoring report of the Agency, p. 18

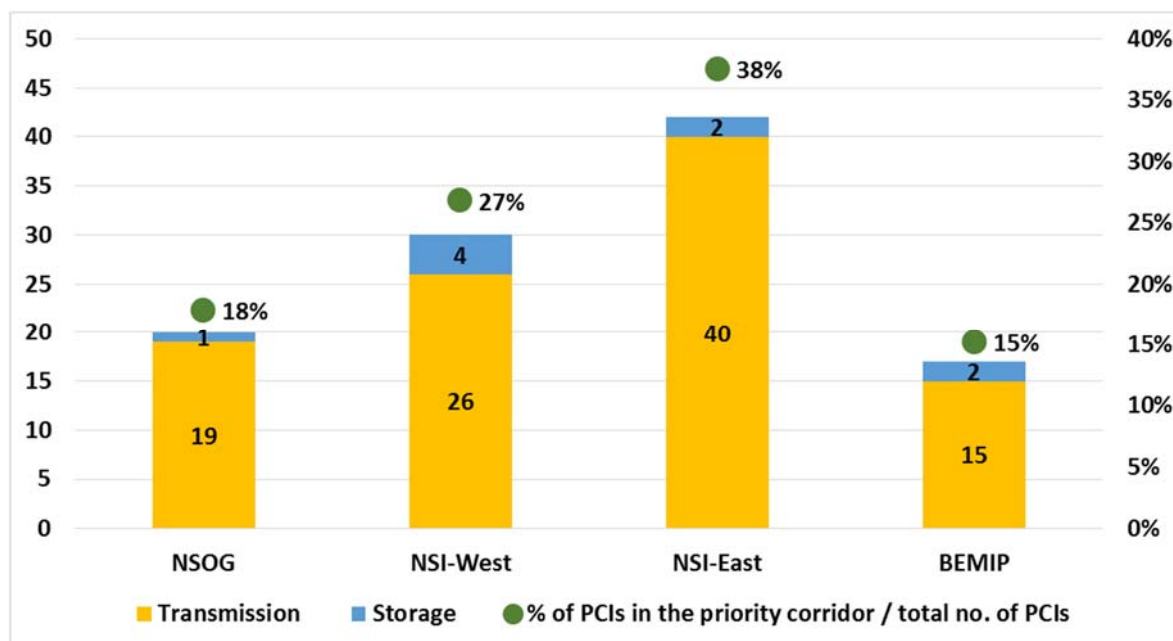
[http://www.acer.europa.eu/official\\_documents/acts\\_of\\_the\\_agency/publication/consolidated%20report%20on%20the%20progress%20of%20electricity%20and%20gas%20projects%20of%20common%20interest%20for%20the%20year%202015.pdf](http://www.acer.europa.eu/official_documents/acts_of_the_agency/publication/consolidated%20report%20on%20the%20progress%20of%20electricity%20and%20gas%20projects%20of%20common%20interest%20for%20the%20year%202015.pdf)

<sup>20</sup> Please note that a more detailed presentation of the general statistics of PCIs on the 2015 PCI list can be found in the 2016 PCI monitoring report of the Agency, pp. 19-26

<sup>21</sup> PCI 1.10 includes two projects with different project promoters. For both of them, the annual report was submitted.

transmission projects. An analysis per priority corridor is given so that the report is informative for the Regional Groups.

**Figure 1 - Distribution of PCIs per priority corridor**



*Note: 3 PCIs (equivalent to 2% of all PCIs) are smart grids and they are not presented in the figure.*

### *Technical changes*

Regarding the technical description of the PCIs, the Agency notes that 12 changes were reported by the project promoters compared to last year. These changes relate to various technical parameters, including changes in:

- The length of the transmission line (4 instances);
- The voltage level (3 instances);
- The PCI category (2 instance);
- The location of the PCI (1 instance);
- The installed generation power, installed generation capacity and net pumping power (1 instance);
- The corresponding substation (1 instance).

The Agency notes that the changes in two instances resulted in an updated PCI description which does not fully correspond to the PCI description as it appears in the 2015 PCI list. The PCIs with technical changes in most cases also reported changes in the benefits and/or the costs.

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

### *Expected increase of interconnection transfer capacity*

In line with the practice of the TYNDP 2016<sup>22</sup>, the Agency requested project promoters to provide the expected transfer capacity increase values in both 2020 and 2030. For 8 PCIs no transfer capacity increase was reported for any of the 2 study years. There are 5 internal lines for which the expected transfer capacity increase is reported to be lower than 500 MW<sup>23</sup>. In this regard, the Agency notes that for several PCIs the transfer capacity increase is provided by the project promoters for a project cluster including more PCIs and/or other investments, which raises doubts about the reliability of the assessment of the expected transfer capacity increase by individual PCIs.

The expected increase in transmission capacity for transmission PCIs, per project and impacted border, as provided by the project promoters, is presented in Annex III.

### 2.2.2 Presence of the PCIs in the TYNDP and NDPs<sup>24</sup>

In the 2016 PCI monitoring report, the Agency observed that, with the exception of one transmission PCI, all transmission and storage PCIs were included in the ENTSO-E TYNDP 2014. **This time, one transmission PCI and one storage project are not in the TYNDP 2016, which is used as the basis for the selection of the 2017 PCI list<sup>25</sup>.**

The Agency notes that, compared to last year, the number of non-included or only partially included PCIs in the relevant<sup>26</sup> NDPs has been significantly reduced<sup>27</sup>. The project promoters' annual reports indicate that **3 PCIs do not appear in any of the relevant NDP(s)<sup>28</sup>**. Out of those 3 projects, one is a merchant transmission line and two are private storage projects. **For 7 PCIs, the project promoters reported that the PCI is included in only some, but not all of the relevant NDPs and for 3 PCIs the promoters reported that not all investment items of the PCI are included in the relevant NDPs.** These PCIs are typically in an early stage of their development (their status is either “under consideration” or “planned, but not yet in permitting”). The Agency also notes that, in most instances, the PCI is not included in the relevant NDP even though the respective NDP was issued after the adoption of the 2015 PCI list<sup>29</sup>.

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<sup>22</sup> The TYNDP 2016 includes updated values for the transfer capacity increase in 2030 based on the adjusted future scenarios and, where applicable – i.e. for projects to be commissioned before 2020 –, the expected transfer capacity increase in 2020.

<sup>23</sup> Pursuant to Article 4(1) of Regulation (EU) No 347/2013, an electricity transmission PCI which is located on the territory of one Member State is considered to have a significant cross-border impact, if it increases the grid transfer capacity, or the capacity available for commercial flows at the border of that Member State with one or several other Member States, or at any other relevant cross-section of the same transmission corridor by at least 500 MW compared to the situation without commissioning of this PCI.

<sup>24</sup> In order to provide relevant information, in this section only those PCIs which are neither cancelled nor commissioned are assessed.

<sup>25</sup> The TYNDP 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.

<sup>26</sup> For the purpose of this Report, the relevant NDPs correspond to the NDP of the countries or jurisdictions which are hosting the PCI.

<sup>27</sup> In the 2016 PCI monitoring report, the Agency identified 14 fully and 26 partially absent PCIs in the relevant NDPs.

<sup>28</sup> Pursuant to Article 3(6) of Regulation (EU) No 347/2013 PCI included on 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.

<sup>29</sup> The 2015 PCI list was adopted on 18 November 2015.

For further details regarding the reasons for non or partial inclusion in the TYNDP 2016 and the relevant NDPs, please refer to Annex I.

**Key findings and recommendations:**

- The Agency notes that 12 PCIs reported changes regarding the technical description of the PCI. In two instances, the changes resulted in an updated PCI description which do not fully correspond to the PCI description as it appears on the adopted 2015 PCI list. **The Agency emphasises the importance of keeping track of all substantial technical changes of the PCIs which may also change the costs and/or benefits of the projects. The Agency invites the Regional Groups to examine the new technical description of the PCIs and require promoters to justify these changes.**
- 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 been reduced. **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<sup>30</sup>

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 conservative as some of the investment items included in the PCI might be in a more advanced implementation stage. To ensure consistency in the assessment, in 3 instances, the Agency considered the status differently from what was provided by the project promoter<sup>31</sup>.

**One electricity PCI was commissioned between 1 February 2016 and 31 January 2017, which means that in total 2 PCIs of the 2015 PCI list have been commissioned so far.**

Besides the commissioned PCI, **12 PCIs (11%) indicated progress in their status between 1 February 2016 and 31 January 2017<sup>32</sup>** – 4 PCIs advanced from the “planned but not yet in

<sup>30</sup> 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 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.

<sup>31</sup> In these instances, the data provided by the project promoters was changed in order to fit the definitions of the statuses as described by the Agency. These changes are highlighted in Annex V.

<sup>32</sup> 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 implementation schedule and the reports on the work carried out provides a full overview of the actual progress of the project.

permitting” to the “permitting” status, while another 4 entered into the “construction” status from “permitting”. 2 PCIs progressed from “under consideration” to “planned, but not yet in permitting” and 2 PCIs went from “under consideration” to “permitting”.

In contrast, in 3 instances, the projects regressed from “planned, but not yet in permitting” to “under consideration”. In addition, there are 5 PCIs which only seemingly regressed as the change of status appears to be a result of data correction compared to last year’s reporting<sup>33</sup>. 87 PCIs did not change their status.

**Overall, the Agency notes that the share of projects which are in permitting or have a more advanced status is 64%**, which represents a slight increase compared to last year (i.e. 60%)

**3 PCIs were cancelled** within the last 2 years<sup>34</sup>. The reason for cancellation was provided for two of them. In one instance, it was due to a re-prioritisation of the project’s implementation against other investments of the project promoter, whilst, in the other instance, the PCI was replaced by a different project, deemed as more appropriate following additional analysis carried out by the project promoter.

The current status of the PCIs (as of 31 January 2017) is shown in Figure 2.

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

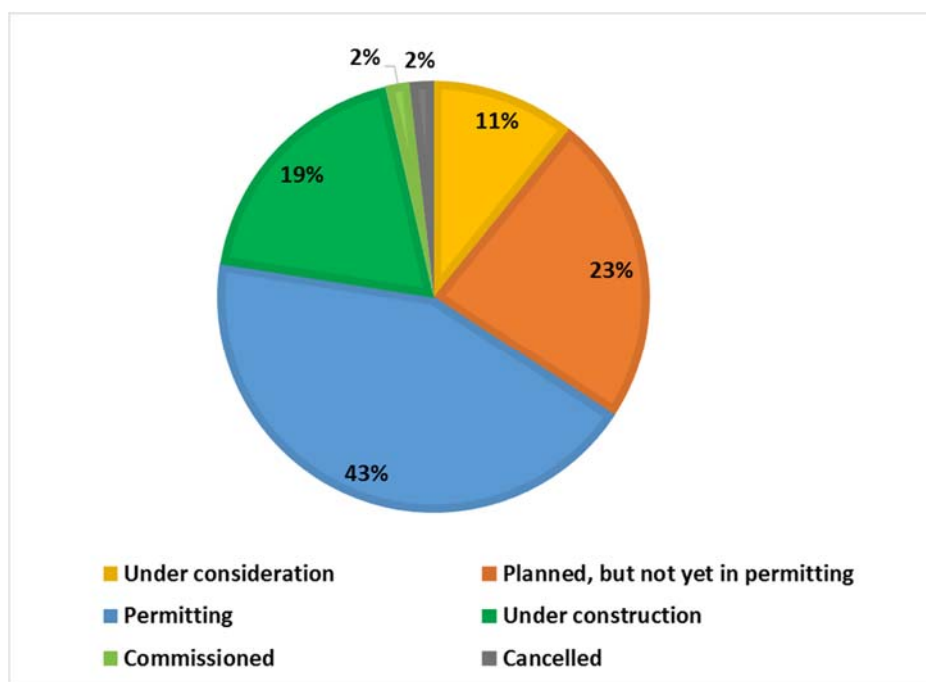


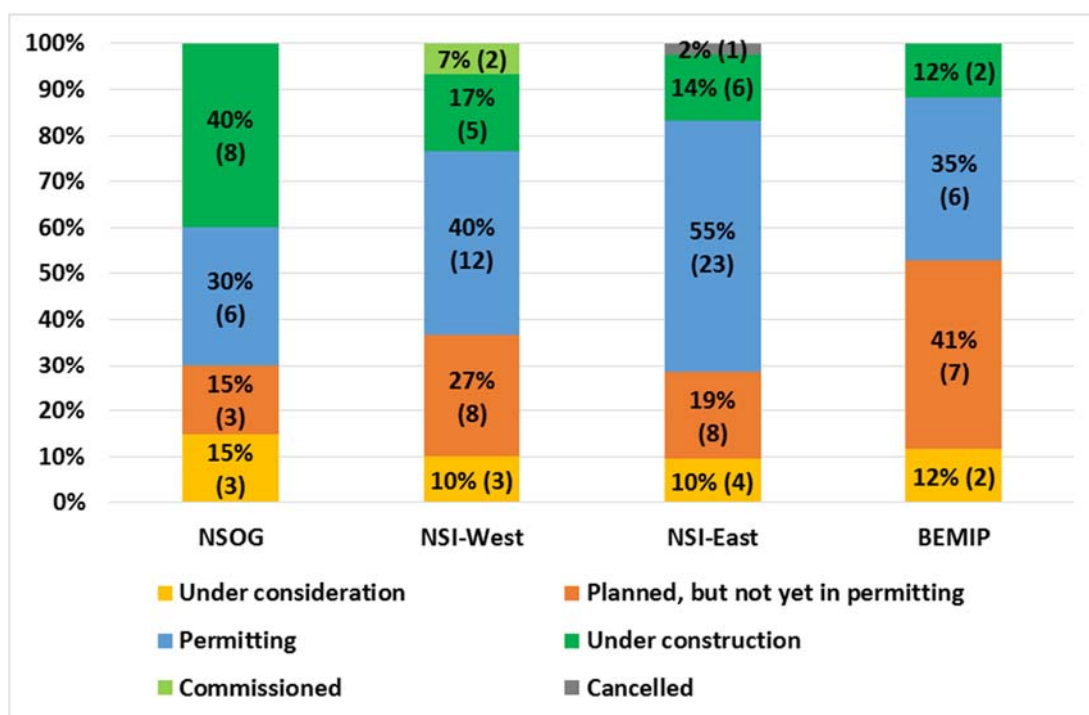
Figure 3 below presents the status of projects in the different priority corridors. While both commissioned PCIs are in the NSI West priority corridor, **the PCIs of the NSOG corridor**

<sup>33</sup> For more information, please refer to Annex V.

<sup>34</sup> While there was no PCI report submitted for PCI 10.1, the Agency has been informed by the project promoter that the PCI was cancelled.

are the most advanced, similar to last year. It has the highest share of PCIs “under construction” (40%), while the share of PCIs “under construction” is significantly lower in the other priority corridors (17-12%). The share of PCIs “in permitting” is the highest in the NSI East priority corridor (55%) and varies between 30-40% 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 (53%).

Figure 3 - Breakdown of PCIs by status in the priority corridors



Note: Out of 3 smart grid PCIs 2 are cancelled and 1 is in permitting.

#### ***A historic overview – evolution of the status of PCIs between 2015 and 2017***

There are 106 PCIs for which information on their status have been available in both rounds of PCI monitoring since 2015<sup>35</sup>. The Agency examined how the status of these PCIs changed over the last 3 years to provide a picture on PCIs’ progress over a longer period. Figure 4 shows the starting point (in the vertical axis) and the current status (horizontal axis). PCIs progressed mostly in the less advanced categories (i.e. they moved to a more mature category from “under consideration” and from “planned but not yet in permitting”). The majority of those who were in permitting back in 2015 are still there and only 9 managed to proceed into construction while one was commissioned. There were a few projects which appear to have a reverse progress, some of them due to data correction.

<sup>35</sup> For 89 projects the information on the PCI status has been reported in both years by the project promoters. Additionally, there are 17 projects for which only the status of 2017 was reported by the project promoters, while the status of 2015 was taken from the ENTSO-E TYNDP 2014 (December 2014). In the statistics, for these PCIs the ENTSO-E TYNDP 2014 status “planning” was interpreted as “planned, but not yet in permitting” and “design and permitting” was changed to “permitting”. The cancelled projects and those for which the information was not available neither in the 2015 PCI monitoring report nor in the TYNDP 2014 are excluded from this assessment.

Figure 4 - Evolution of the PCI status (2015-2017)

From (2015) / to (2017)	Under consideration	Planned, but not yet in permitting	Permitting	Under construction	Commissioned
Under consideration	41% (7 PCIs)	47% (8 PCIs)	12% (2 PCIs)		
Planned, but not yet in permitting	15% (5 PCIs)	48% (16 PCIs)	30% (10 PCIs)	6% (2 PCIs)	
Permitting			78% (35 PCIs)	22% (9 PCIs)	2% (1 PCI)
Under construction		9% (1 PCI)		82% (9 PCIs)	9% (1 PCI)

### 2.3.2 Progress of works

The project promoters were invited to indicate the type of works and activities which were carried out between 1 February 2016 and 31 January 2017.

The promoters' responses are indicated in Figure 5 for each project status separately. **Most of the project promoters reported to have been active in obtaining permits<sup>36</sup>**, which seems logical given that this activity requires a significant amount of the total time needed to implement a project. This is followed by activities related to the preparation of technical and socio-economic feasibility studies.

When comparing the consistency of the reported works and activities to the implementation schedule of the PCIs, the Agency notes that, in some cases, the project promoters seem to have listed all the works or activities performed until 2017 and not only those performed over the last year, which limits the reliability of the findings regarding the progress of works in 2016.

Figure 5 - Works and activities carried out by project promoters in 2016

Type of works, activities performed	No of relevant PCIs under consideration <sup>37</sup>	No of relevant PCIs planned, but not yet in permitting <sup>38</sup>	No of relevant PCIs in permitting <sup>39</sup>	No of relevant PCIs under construction <sup>40</sup>	Commissioned PCI
STUDY: environmental	3	13	25	3	
STUDY: spatial planning	2	13	23	1	
STUDY: technical feasibility	1	14	20	1	
STUDY: socio-economic feasibility	2	12	21	3	
Identification of alternative solutions / site identification		10	21	1	
Public consultation		7	29	3	

<sup>36</sup> These activities include both the preparations for the process (e.g. collecting the necessary documentation), negotiations with landowners and land acquisition and the to-dos related to the undergoing process itself.

<sup>37</sup> Out of the 12 PCIs "under consideration", 6 reported works or activities performed.

<sup>38</sup> Out of the 26 PCIs "planned, but not yet in permitting", 24 reported works or activities performed.

<sup>39</sup> Out of the 48 PCIs in "permitting", 40 reported works or activities performed.

<sup>40</sup> Out of the 21 PCIs "under construction", 20 reported works or activities performed.



Preparation of permitting files, contracts and other documents		6	35	6	
Negotiation with landowners and land acquisition		4	23	8	
Detailed technical design		3	19	9	
Tendering		1	11	9	
Preparatory works for construction			1	14	
Construction				20	
Commissioning				1	1
Other	2	3	1	2	

**For 17 PCIs<sup>41</sup> (14 transmission projects, 2 storage and 1 smart grid project), the promoters did not report any work or activity during 2016 related to the implementation<sup>42</sup>.** Most of them (11 PCIs) belong to the NSI East priority corridor, while the rest is evenly distributed among the other corridors. In 7 instances, the PCI is “on time” compared to last year’s schedule even in the absence of any actual work.

**Further, the Agency notes that there are 10 PCIs for which absolutely no work or activity was reported since the inclusion in the 2015 PCI list, 5 of them are reported to be “on time” since 2015.**

### 2.3.3 Expected commissioning dates

Figure 6 shows the change of the project promoters’ expectations regarding the commissioning date of their PCIs between 2016 and 2017<sup>43</sup>. The bars with the different colours mark the shorter or longer shifts in the commissioning date<sup>44</sup>.

The Agency notes the persistent trend (identified in previous reports) of shifting the expected commissioning date of PCIs to a later point. **Half of the PCIs for which, last year, the project promoters expected the commission to take place in 2016 or 2017 are now shifted 1 year later.** The exposure to the shift of the commissioning date seems to decrease over time.

<sup>41</sup> The cancelled PCIs and the PCI which was commissioned in 2015 are not included in the calculation.

<sup>42</sup> In the 2016 PCI monitoring report, promoters reported 20 cases where no works or activities were performed.

<sup>43</sup> Please note that only those cases of delays and rescheduling in which the commissioning year changes are indicated here. The PCIs which are several months behind schedule but still within the same year do not appear in these graphs.

<sup>44</sup> The graph indicates in green the number of PCIs, for which the expected commissioning year was reported to be the same in 2017 and in 2016 and in dark green those for which the expected commissioning date was one year later in 2016. The red bars show the number of PCIs which were planned to be commissioned one or more years earlier than the current expectations (the darker the red means the longer shift).

Figure 6 - Number of PCIs to be commissioned as reported in 2017 and as planned in 2016<sup>45</sup>

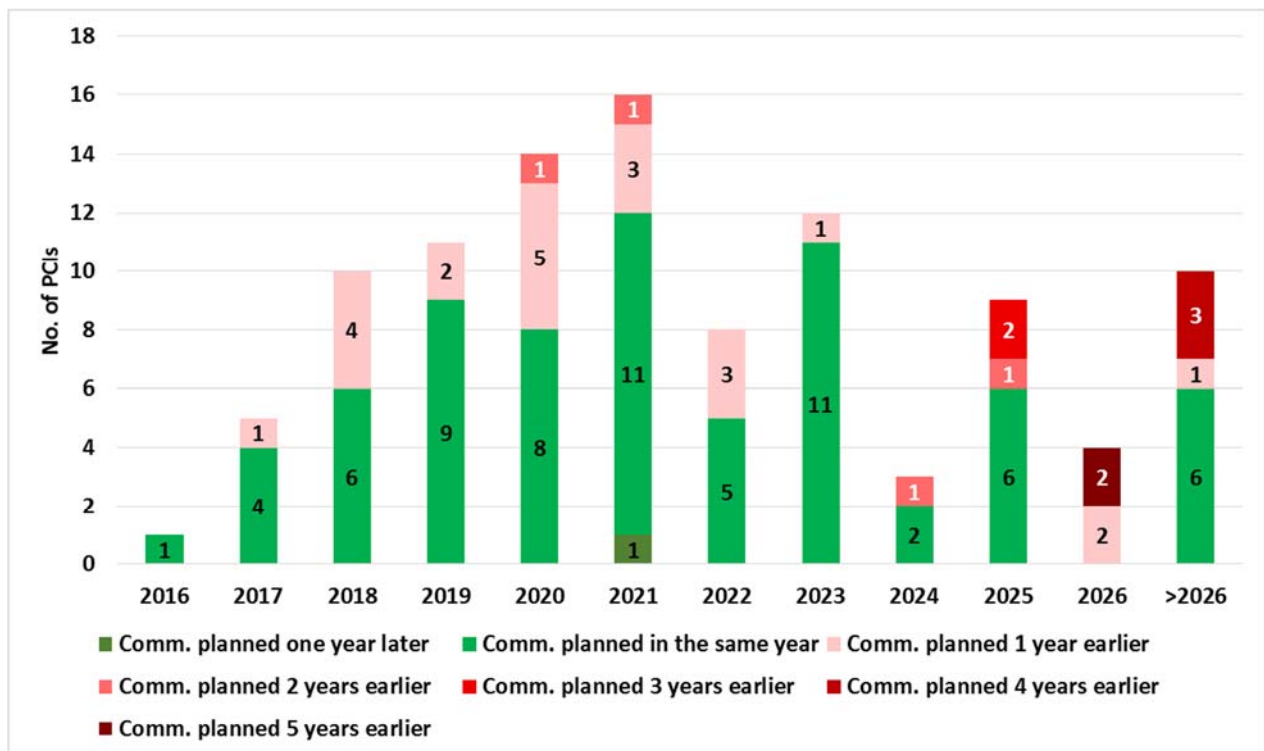
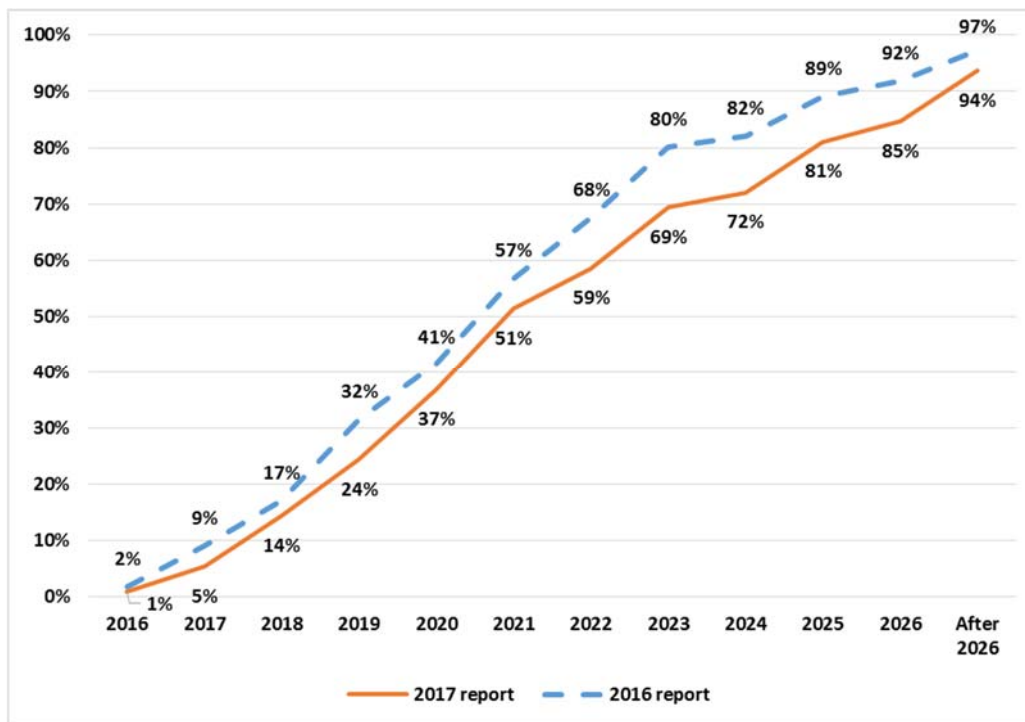


Figure 7, compares, the expected share, as of January 2016 and January 2017, of commissioned PCIs for each year. The cumulative share of commissioned PCIs is constantly lower over the next ten years than what was expected a year ago.

<sup>45</sup> 103 projects were taken into account in the assessment because 3 projects are cancelled, 4 did not provide any commissioning date and 1 did not provide a commissioning date last year which does not allow a comparison this year while 1 was commissioned in 2015. For 3 PCIs the project promoters did not provide any commissioning date but later clarified that, in two cases, the expected commissioning date was in a range between 2030 and 2035 (therefore the most optimistic date was chosen for the assessment i.e. 2030), while, in the third case, the commissioning date was after 2025 (and therefore the most optimistic commissioning date of 2026 was chosen).

Figure 7 - Cumulative share of PCIs to be commissioned per year<sup>46</sup>



Beyond the expected commissioning dates, the Agency also compared other milestones in the implementation plans of the PCIs as of January 2016 and January 2017 and notes that the expectations regarding the implementation of the PCIs were overly optimistic in 2016 in about 40% of the cases, where certain milestones set for the period between 1 February 2016 and 31 January 2017 were not achieved.

Figure 8 - Planned vs. achieved milestones between 1 February 2016 and 31 January 2017

	Planned (in January 2016) <sup>47</sup>	Achieved (by January 2017)
Planning approval start	8	6
Planning approval end	7	4
Preliminary design studies start	2	1
Preliminary design studies end	9	3
Permit granting start	15	11
Permit granting end	5	1
Tendering for construction start	15	10 <sup>48</sup>
Tendering for construction end	8	4 <sup>49</sup>
Construction start	6	6
Construction end	1	0

<sup>46</sup> For the 2016 curve, 108 projects were taken into account and for the 2017 curve, only 104 projects were taken into account, as PCIs which are cancelled, commissioned in 2015, or did not provide any commissioning date (or date range) are not considered.

<sup>47</sup> Based on the 2016 PCI monitoring report of the Agency.

<sup>48</sup> Additionally, 2 PCIs did not provide a date in 2017.

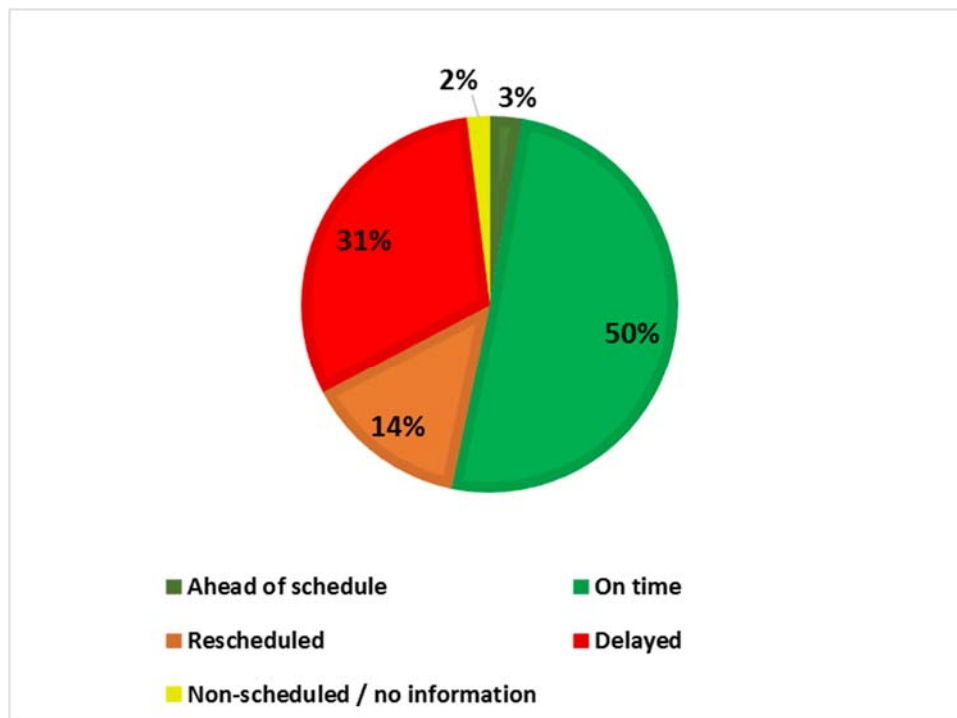
<sup>49</sup> Additionally, 2 PCIs did not provide a date in 2017.

### 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 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.<sup>50</sup>.

The results of the current year-on-year analysis are similar to those in the 2016 PCI monitoring report. However, the share of delayed projects increased against the “on time” ones. **Roughly half of the PCIs are “on time” or “ahead of their schedule”, whereas the other half is behind last year’s schedule.** 33 PCIs (31%) encountered delay within a year and 15 PCIs (14%) were rescheduled. 2 PCIs were considered by the Agency as “non-scheduled” or “on hold” as the project promoters did not provide information on the expected commissioning date (or a date range) for the PCIs; therefore it cannot be assessed whether the PCI is on track or not.

**Figure 9 - Progress of PCI implementation (2016-2017)**<sup>51</sup>



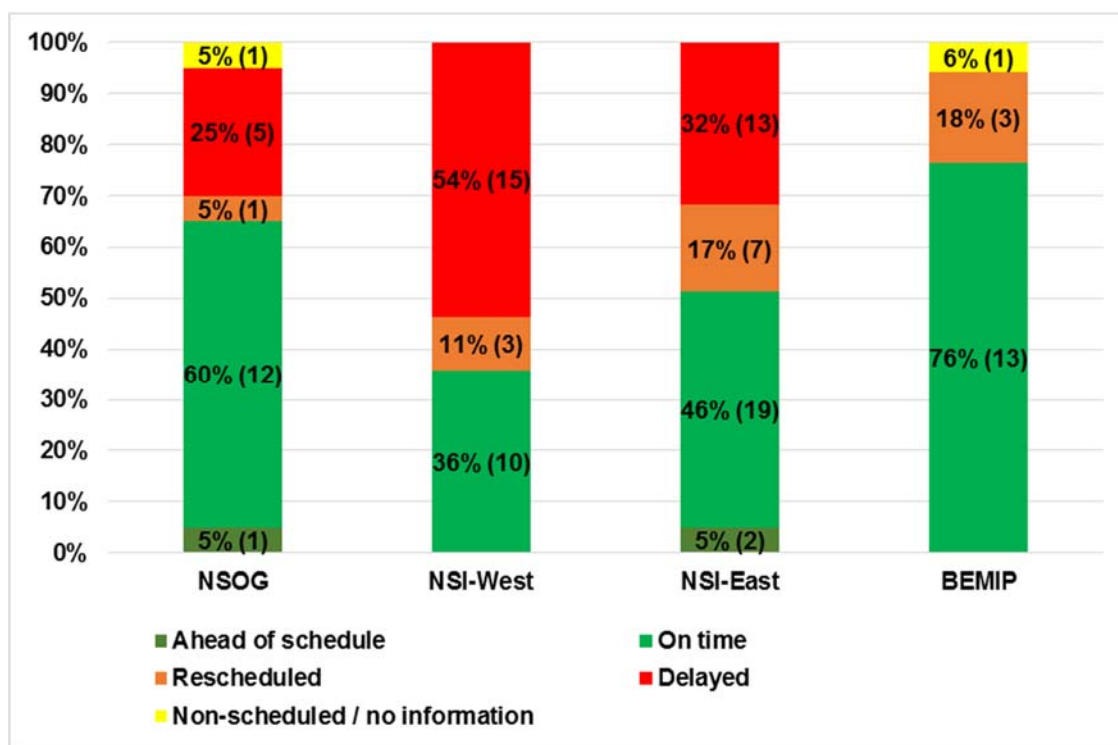
<sup>50</sup> Cf. Section 5 of the Agency’s Opinion No 16/2014.

<sup>51</sup> The assessment includes 107 PCIs as the commissioned and cancelled PCIs are not included. In 2 instances, the project promoters did not indicate neither a range of the commissioning date / data range, nor whether the project was behind schedule or not. Therefore, these 2 PCIs are included in the “non-scheduled” / “no information” category.

When examining the performance per project category, the last year’s trend that **the vast majority of the storage projects are either “rescheduled” or “delayed”** is confirmed. In 2016, only 1 out of 9 storage PCIs managed to keep its planned schedule, 6 are delayed, 1 rescheduled and 1 is “non-scheduled”. The transmission PCIs are performing better: 56 out of 97 are “on time” or “ahead of schedule.”

Figure 10 depicts the PCIs’ schedules in each priority corridor compared to January 2016. The **share of PCIs which are “on time”, compared to the expectations in 2016, is significantly higher in the BEMIP and NSOG corridors (76% and 60%), than in the NSI East and NSI West corridors (46% and 36%),** which confirms the previous patterns noted in former monitoring reports of the Agency. **The highest number of the delayed PCIs is in the NSI West priority corridor, followed by NSI East, while most rescheduled PCIs belong to the NSI East priority corridor.** In the BEMIP corridor, there is no delayed PCI at all.

Figure 10 - Progress of PCI implementation per priority corridor (number of projects and %)<sup>52</sup>



Note: 1 smart grid PCI is rescheduled by 3 months.

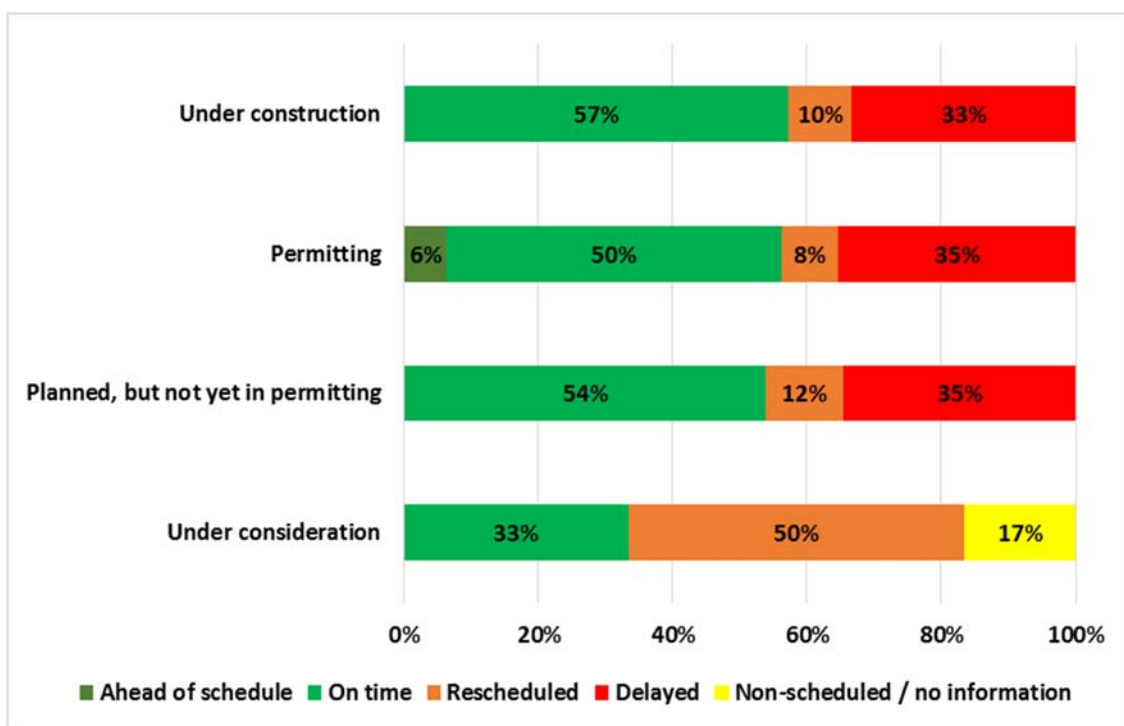
Figure 11 confirms last year’s finding that rescheduling occurs most often for PCIs which are “under consideration” (50% of the PCIs “under consideration” are rescheduled and 40% of the rescheduled PCIs are “under consideration”) and delays are typical for PCIs in “permitting” (35% of the PCIs in “permitting” are delayed and half of the delayed PCIs are in “permitting”). This seems reasonable as, for projects in the study phase, the commissioning dates are subject to various technical and economic variable factors. Similarly, the projects are more exposed to

<sup>52</sup> Idem.

delays (e.g. due to public opposition or prolonged administrative procedures) when the project is going through the permit granting process.

The Agency notes that the share of delayed projects among the PCIs which are “planned, but not yet in permitting” also increased (from 21% to 35%). The reason for the relatively high share of delayed projects among the PCIs, which are “planned, but not yet in permitting”, is not straightforward, but noting the reasons for delays in Section 2.3.5, it appears that, in most cases, it is related to permitting (e.g. national law changes, uncertainty of regulatory decisions, public opposition).

**Figure 11 - Breakdown of PCIs per status and progress<sup>53</sup>**



Besides the overview of the annual progress, the Agency also examined how the priority projects managed to keep to their originally reported deadlines throughout the 2-year lifetime of the 2015 PCI list, as presented in Figure 12.

Based on the above assessment, the Agency finds the following:

- **38 PCIs (36%) managed to maintain their initial commissioning date (i.e. at the time of the applications for the 2015 PCI list)<sup>54</sup>.** These projects have not been rescheduled or delayed since the inclusion in the 2015 PCI list;

<sup>53</sup> Idem.

<sup>54</sup> For those PCIs which were already present in the 2013 PCI list, the Agency considered the commissioning date as of January 2015. For those PCIs, which received the PCI label only in 2015, the Agency used the expected commissioning date in the TYNDP 2014 (December 2014).

- **48 PCIs (44%) fell behind schedule once over the last two years**, meaning that the rescheduling or the delay occurred only in one of the assessed periods<sup>55</sup>;
- **21 PCIs (20%) are reported to be repeatedly behind schedule since 2015**, 15 PCIs have been delayed and 3 PCIs have been rescheduled during both reporting periods. 3 PCIs encountered both delays and rescheduling over the past 2 years.

This grouping shows that **it is not necessarily the same set of PCIs, which are delayed or rescheduled, as most of the delayed or rescheduled PCIs were indicated as “on time” in the previous year, while also many of the previously delayed or rescheduled PCIs managed to keep their schedule in 2016**<sup>56</sup>.

**Figure 12 - Breakdown of PCIs per status and timing**<sup>57</sup>

<b>2016 progress</b>	<b>On time</b>	<b>Delayed</b>	<b>Rescheduled</b>
<b>2015 progress</b>			
<b>On time</b>	36% (38 PCIs)	15% (16 PCIs)	12% (13 PCIs)
<b>Delayed</b>	9% (10 PCIs)	14% (15 PCIs)	1% (1 PCIs)
<b>Rescheduled</b>	8% (9 PCIs)	2% (2 PCIs)	3% (3 PCIs)

#### *Average duration of delays and rescheduling*

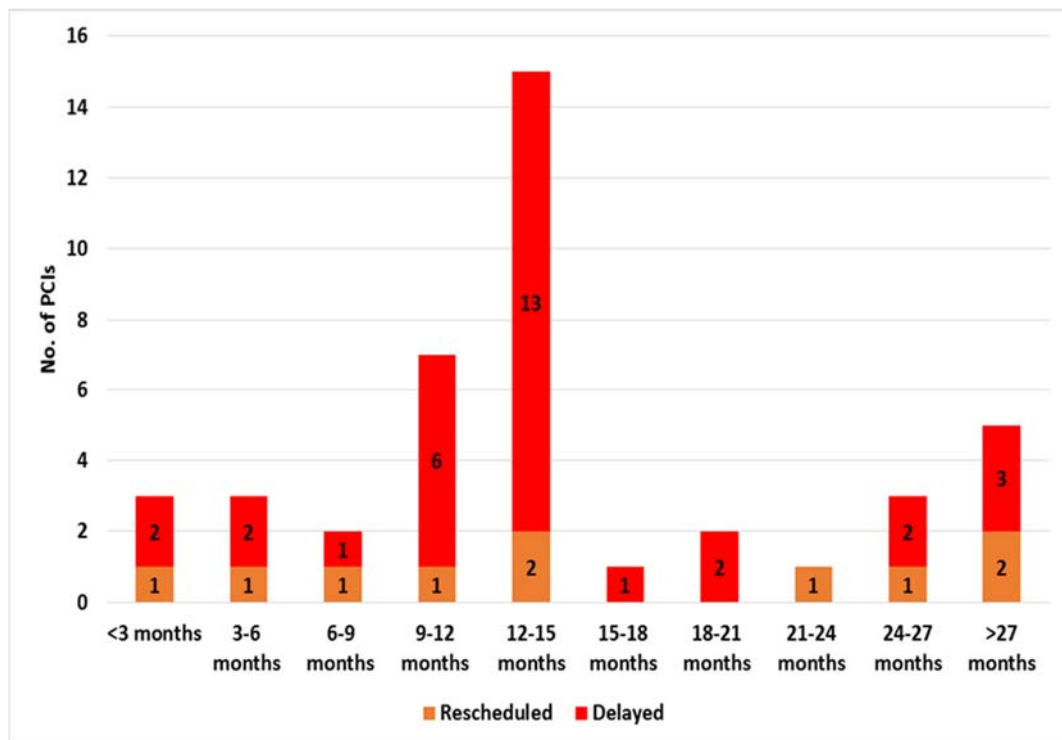
The duration of delay and rescheduling varies significantly across the projects: the shortest duration of delay is 2 months; the longest is 72 months, while the average delay is 16 months. Similarly, the length of rescheduling of the PCIs ranges from 2 months to 61 months and the average rescheduling is 19 months. As shown in Figure 13, the most typical duration of delay is around 12 months. For 4 delayed and 2 rescheduled PCIs, the shift is less than 6 months.

<sup>55</sup> I.e. were either rescheduled or delayed during 2015 but were on time in 2016, or projects that were on time in 2015, but fell behind schedule in 2016.

<sup>56</sup> 29 out of the 50 PCIs which were delayed or rescheduled (or “non-scheduled”) between 2016-2017, were “on time” between 2015-2016 and 19 out of 41 PCIs which were delayed or rescheduled between 2015-2016, were “on time” between 2016-2017.

<sup>57</sup> The table presents a breakdown of the PCIs into various groups depending on their progress between 2015 and 2016, as well as between 2016 and 2017. The rows show the possible progress options between 2015 and 2016 and the columns show the possible progress options between 2016 and 2017. If a PCI was “on time” in both 2015 and 2016, it is counted in the first cell of the table. The sum of PCIs in the table adds up to the total number of the relevant PCIs (i.e. 107), excluding the cancelled PCIs and the commissioned PCIs. For the purpose of the table, the category “on time” also includes PCIs which are “ahead of schedule” and the category “rescheduled” includes the “non-scheduled” PCIs.

Figure 13 - Duration of delay and rescheduling<sup>58</sup>



Note: 11 PCIs are delayed by 12 months and 2 PCIs are rescheduled by 12 months.

The shortest average length of delays is in the NSOG priority corridor (10 months), followed by NSI East (15 months) and NSI West (20 months)<sup>59</sup>. The average length of rescheduling is not presented per priority corridor, given the relatively small samples for each of them.

#### *A historic overview – changes in the commissioning dates between 2012 and 2017*

On the basis of the available information, the Agency compared the planned commissioning dates for 68 PCIs in the period between 2012 and 2017. There are only 13 PCIs which still foresee the original commissioning date as back in 2012. The remaining PCIs are lagging behind by a minimum of 3 months and a maximum of 8 and a half years, on average 2 years and 9 months compared to 2013. More than half of the PCIs are behind the initial schedule by more than 2 years. There are 8 PCIs which are delayed by at least 5 years (3 of them by 8 years).

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

#### 2.3.5.1 Rescheduling

Project promoters were invited to indicate the main reasons for rescheduling. While no outstanding reason for rescheduling could be identified, the Agency notes that the rescheduling in 5 out of 15 instances was **in relation to other investments**: for 3 PCIs, the implementation

<sup>58</sup> The assessment is based on 32 out of 33 delayed projects, as 1 did not provide a commissioning date last year, and 10 out of 15 rescheduled PCIs, as 5 did not provide an expected commissioning date.

<sup>59</sup> In BEMIP, none of the PCIs encountered delays between 2016 and 2017.



was re-prioritised against other transmission investments, while for the other 2 PCIs, the implementation depends on the other rescheduled (complementary) investments. In 3 instances, the project promoters decided to reschedule the PCI to a later date due to **changes in overall planning data**<sup>60</sup>.

The remaining reasons, which were mentioned only for one or two PCIs, are:

- Changes on the generation side<sup>61</sup>;
- Ongoing studies;
- Application for CBCA;
- Relocation of the project;
- Optimisation of the project's schedule.

A comparison with the reasons indicated in the 2016 and 2015 PCI monitoring reports shows some similarities (e.g. reprioritisation of other transmission investment, changes in the generation data or the overall planning data, etc.), but no prevailing reason for rescheduling can be identified, which might also be explained by the relatively small sample.

### 2.3.5.2 Delays

Similarly to rescheduling, promoters were asked to indicate the main reason for delays. **The most frequently mentioned reason is related to permit granting** (for 20 out of 33 delayed PCIs), which confirms last year's finding. Most frequently, the permit granting is longer than expected due to national law changes (6 instances), environmental problems (4 instances) or the involvement of several countries (3 instances). Further reported reasons for delays (either related to permit granting or due other reasons) are diverse and applicable only to one or two PCIs:

- Finalisation of agreements across borders;
- Technological reasons;
- Correlation with other delayed investments;
- Construction works;
- Risks related to the national regulatory framework or uncertainty of regulatory decisions;
- Lawsuits and court proceedings;
- Preparation of studies;
- Discussions with local authorities and communities on the location of an investment item.

In 10 instances, the promoters reported further reasons for delays, which, beyond the above mentioned ones, also include financing and political reasons. In one instance, the promoter indicated that the delays occurred due to major obstacles beyond the control of project promoters, but the reason was not specified.

The analysis of the reasons for delays in the different priority corridors does not conclude on any clear trend over time, as well as no prevailing reason for delay in any of the priority corridors is identified.

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<sup>60</sup> The term "change in overall planning data" pertains to changes of the overall data taken into account while considering a project, which is not driven by a change of a single planning data, e.g. generation.

<sup>61</sup> The PCI is strongly related to a future nuclear power station.

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

In 16 instances, the promoters already took measures to solve the delays encountered. In most cases, these efforts proved to be successful. For more details on the type of measures and their consequences, please refer to Annex IV.

### **2.3.5.3 Difficulties**

16 PCIs reported difficulties, which did not result in delays or rescheduling of the commissioning date. Some of the PCIs listed several difficulties, therefore the total number of occurrences is higher than the number of PCIs impacted by them. **The most frequent difficulty was reported in relation to permit granting** (8 occurrences). The project promoters often faced difficulties in the permit granting process due to the involvement of several EU Member States<sup>62</sup> or non-EU countries (e.g. Norway and Iceland), but difficulties in the permit granting process also occurred if only one Member State was involved<sup>63</sup>. Difficulties in permitting processes due to environmental problems were also mentioned in 2 instances. The other most frequently mentioned difficulty was related to the **tendering process** (3 occurrences). The rest of the difficulties were reported only for one or two PCIs:

- Difficulties due to risks related to the national regulatory framework or uncertainty of regulatory decisions;
- Difficulties due to lawsuits and court proceedings;
- Difficulties in the preparation of necessary application files by the project promoter;
- Difficulties related to acquisition of or access to land;
- Lack of political commitment;
- Difficulties in construction works;
- Limited number of specialist suppliers of HVDC cables and converters and European manufacturing capacity heavily committed to ongoing constructions.

In 13 instances, the promoters took or at least planned some measures on how to address the difficulties encountered. In most cases, these efforts proved to be successful. For more details on the types of measures and their consequences, please refer to Annex IV.

### **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<sup>64</sup> and the commissioning date. **The average (expected) implementation duration of the PCIs is about 10 years**<sup>65</sup>, which confirms last year's finding. The shortest implementation duration is less than 2 years, while the longest is over 24 years. Only 14% of the PCIs are implemented in less than 6 years, 41% between 6-10 years and about **45% of the PCIs are expected to be commissioned more than 10 years after their planning started**.

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<sup>62</sup> E.g. the Competent Authorities had a different interpretation of the requirements and the manuals of procedures were available only in national language.

<sup>63</sup> E.g. due to unpredictability and different interpretation of the laws of respective authorities or unexpectedly long evaluation process of the Environmental Impact Assessment.

<sup>64</sup> 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.

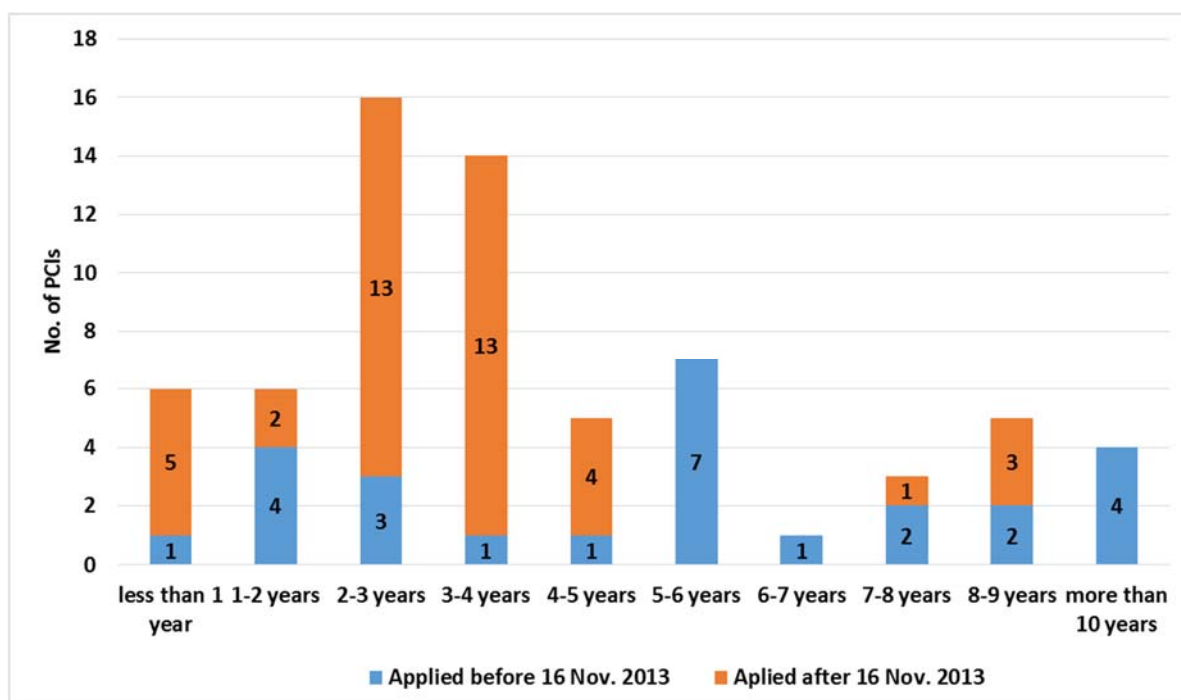
<sup>65</sup> Includes in total 73 PCIs for which the expected date for start of planning and the commissioning date were available.

The duration of implementation does not show a remarkable difference when looking at the different investment categories<sup>66</sup>, however, it must be flagged that the sample of PCIs with available data is rather small for most of the categories. In general, the Agency notes that more complex technical solutions require longer implementation, but, within the same project category, the expected implementation duration vary a lot (e.g. for AC transmission lines between 2-19 years, with an average of 9 years<sup>67</sup>).

### *Duration of permitting*

The Agency notes that the average duration of permitting is 4.1 years<sup>68</sup>. However, the expected duration of the permit granting for most of the PCIs is less than 4 years, typically between 2 and 4 years<sup>69</sup>. For 4 PCIs, the duration of the permit granting exceeds 10 years<sup>70</sup>. The Agency also confirms its previous year's finding that those PCIs which applied for permit granting after 16 November 2013 are in general more optimistic about the expected duration of the permit granting than those which applied before. The average duration of the permit granting is 3.5 years and 5.5 years respectively.

**Figure 14 - Duration of permit granting<sup>71</sup>**



<sup>66</sup> PCI investment categories include AC transmission line, DC transmission line, On-shore AC transmission cable, On-shore DC transmission cable, Off-shore DC transmission cable, Phase shifting transformer, Combined investments, Smart grids and Storage.

<sup>67</sup> Based on 25 out of 32 AC transmission line PCIs.

<sup>68</sup> The assessment includes 26 out of 35 projects who applied before 16 November 2013, and 41 out of 74 projects who applied after 16 November 2013.

<sup>69</sup> 42% of the PCIs reported an expected duration of permitting within this timeframe, 19% reported less, 39% reported more.

<sup>70</sup> In one instance, however, the project promoters clarified that in one of the hosting countries the permitting was already completed 3 years ago.

<sup>71</sup> 35 projects who applied for permit granting before 16 November 2013, 26 were taken into consideration. For the 74 projects who applied after 16th November 2013 only 41 were taken into consideration.

### Key findings and recommendations

- The commissioning dates of the PCIs continue to be shifted to the more distant future. In 2016, an additional PCI was commissioned and 12 PCIs indicated progress in their status over the last year (most of them from “planned” into “permitting” or from “permitting” into “construction”), while for a few PCIs backward progress was identified and 3 PCIs were cancelled.
- The Agency notes that a higher number of project promoters indicated that works or activities have been performed in the course of 2016 compared to the previous reporting period. However, there are 10 PCIs for which no activity was reported over the last 2 years. **The Agency recommends that the Regional Groups thoroughly scrutinise the merits of PCIs which re-apply for a PCI label, whilst they did not make any implementation effort during their presence on the 2015 PCI list.**
- Similar to last year, half of the PCIs are on track, the other half is either delayed (33 PCIs) or rescheduled (15 PCIs). A more detailed analysis found that every fifth PCI is repeatedly delayed or postponed over the last two-year.
- The most frequently mentioned reason for delay is related to permit granting, while there are no consistently recurring reasons visible for rescheduling. **The Agency deems it useful that Regional Groups and Competent Authorities investigate in more details the permit granting hurdles hampering the timely implementation of the PCIs reported by the project promoters.**
- An insight into the PCIs’ progress per implementation milestone shows that projects are falling behind schedule not only on the basis of their commissioning date but also in the various stages of their implementation. **The Agency highlights the importance closely to monitor the achievement of the main implementation stages by the individual projects. Such a monitoring would allow a better understanding of the real progress of the PCIs, a better identification of the implementation stage and the specific difficulties projects are confronted with.**

## 2.4 Progress of costs and benefits

Similar to last year, the Agency reviewed the progress of costs and benefits for the PCIs compared to the expected values a year before. When calculating the costs and the benefits, promoters were required to discount the costs and benefit indicators to the present and express in 2017 values. In line with the ENTSO-E CBA methodology, promoters were expected to use the discount parameters of 25 years of operation, 4% discount rate (real) and zero residual value.

### 2.4.1 Investment costs

In 2017, project promoters reported, in several instances, changes in the investment costs and in the PCI implementation schedule. The modification of these two components results in a remarkably different picture mapping the maximum potential investment costs in the various years. Further, in several cases, it has been clarified that, last year, undiscounted cost figures had been provided which distorted last year’s results.

The indicated total amount of (discounted) investment costs for all PCIs is **€49.8 billion (€46.7 billion for transmission projects, almost €3.1 billion for storage projects)**<sup>72</sup>. The Agency notes, however, that there are less PCIs which provided discounted total investment costs in 2017 than in 2016<sup>73</sup>. If the comparison is limited only to the PCIs for which the data is available in both years, **the expected aggregated total investment costs decrease by 4%**<sup>74</sup>.

The reduction in the investment costs is a net result of the reported cost changes. **22 PCIs reported increases and 33 reported decreases in the investment costs**, 50 PCIs reported no change<sup>75</sup>. **Better cost estimation is the most common reason for the deviations in the investment costs.** The second most frequent reason is the change in the investment costs due to exchange rate variations. The list of indicated reasons and the number of PCIs for which each reason was reported are indicated below.

**Reported reasons for the increase in investment costs:**

- Better cost estimation (10 PCIs);
- Difference in distribution of the investment costs over the years (5 PCIs);
- Exchange rates variations (2 PCIs);
- Changes in the prices of raw material and/or equipment used for the project (1 PCI);
- New technical solution due to law amendments (1 PCI).

3 PCIs reported other reasons, which were unclear<sup>76</sup>.

**Reported reasons for the decrease in investment costs:**

- Better cost estimation (13 PCIs);
- Exchange rates variations (10 PCIs);
- Changes in project scope or technical characteristics not related to permit granting (4 PCIs);
- Changes in the actual / expected prices of raw material and/or equipment used for the project (3 PCIs);
- Difference in distribution of the investment costs over the years (1 PCI);
- An investment is not part of the PCI anymore (1 PCI);
- Relocation of the project (1 PCI).

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<sup>72</sup> For the total investment costs figure, 96 transmission PCIs, 8 storage PCIs, and one smart grid PCI were taken into account. The assessment excludes cancelled PCIs and those PCIs which did not provide a discounted total investment cost figure and those which did not provide a commissioning date (or a date range). In 6 instances, while the discounted investment costs were not available, the PCIs reported undiscounted investment costs and a commissioning date (or a date range). For these cases, the Agency took into account the investment costs with the assumption that all investment costs will be incurred at the most optimistic commissioning date. The investment costs for the smart grid PCI are not presented separately.

<sup>73</sup> This year's assessment includes 105 PCIs compared to 109 PCIs last year.

<sup>74</sup> I.e. from €51.8 billion in 2016 to €49.8 billion in 2017.

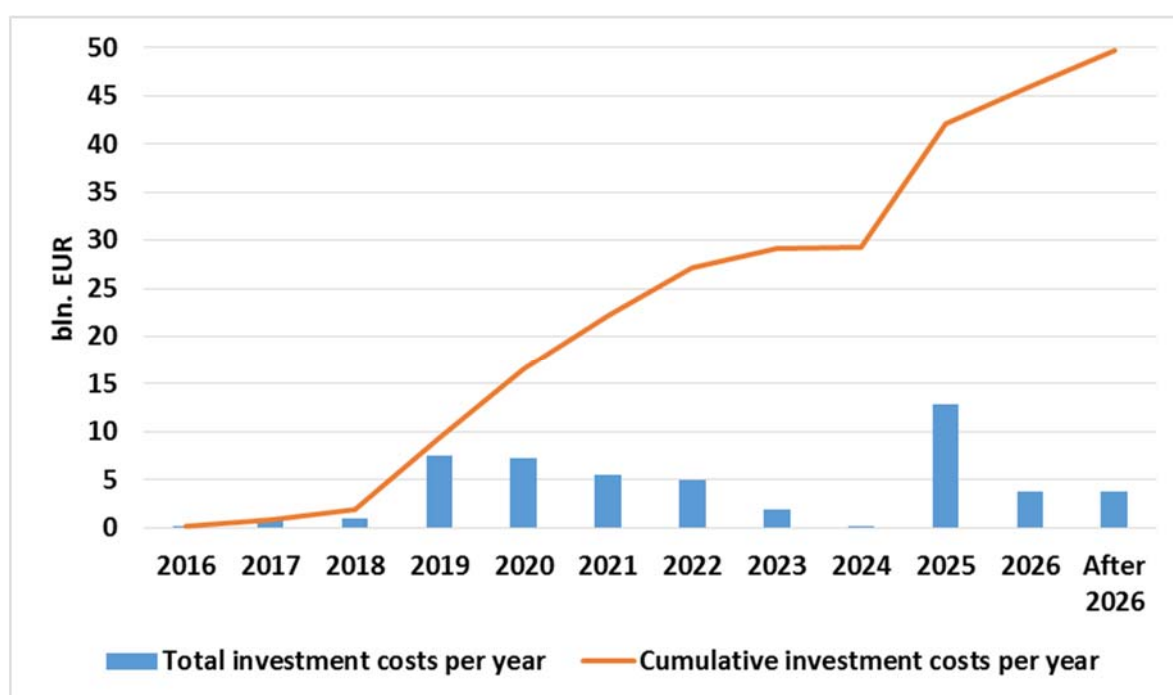
<sup>75</sup> For these PCIs, the difference in the investment costs is only due to the different year of discounting.

<sup>76</sup> In 2 cases, the project promoters referred to reasons, which do not clearly explain the difference in the estimation of the total investment costs (e.g. due to use of the TYNDP 2016 cost figures). In one case, the reason for change is "other", without further explanation.

***Expected investment costs over the coming years<sup>77</sup>***

The Agency notes that the distribution of the investment costs over the coming years has also changed compared to last year’s expectations. **For each year between 2016 and 2019, the annual investment cost is significantly lower than what was expected a year ago.** These annual decreases in the expected amount of investments result in €9.4 billion of cumulated total investment costs by 2019 compared to last year’s estimation of €16.4 billion. Although in certain years, in particularly in 2020, the expected annual investment cost is higher than what was expected last year, the cumulative investment costs remain below last year’s expectation until 2025, when it reached cumulative investment costs of €42.2 billion<sup>78</sup>.

**Figure 15 - Total investment costs of PCIs**



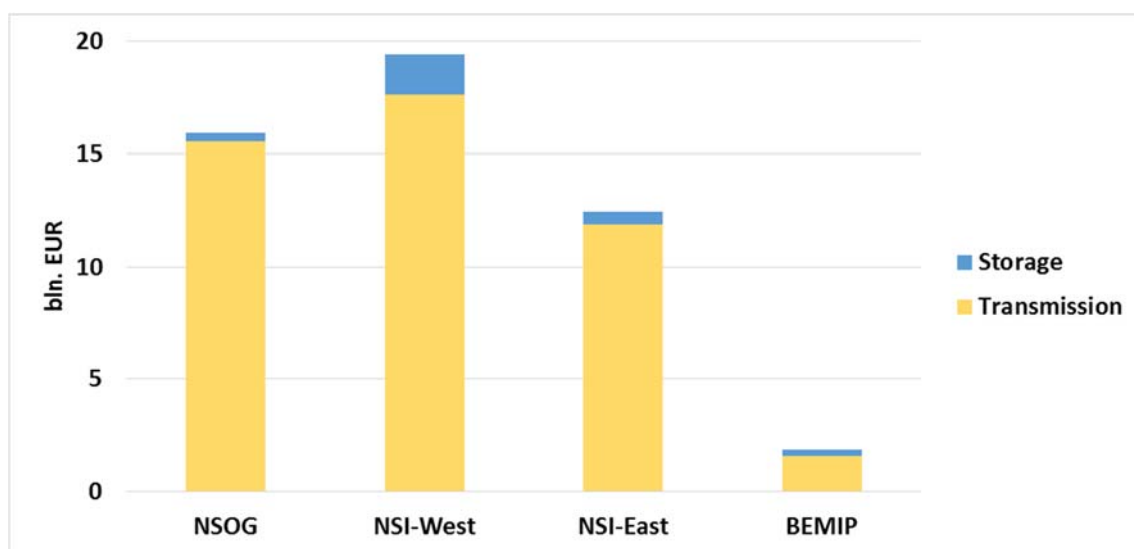
The geographical analysis shows that the NSI West priority corridor continues to represent the largest share of the investment costs among the priority corridors with 39%, followed by the NSOG (32%) and the NSI East (25%) corridors. The BEMIP corridor has the smallest share in the investment costs among the corridors (4%). Figure 16 presents the aggregated amount of investment costs in each priority corridor and project type and shows close similarity with the results of the 2016 PCI monitoring report of the Agency.

<sup>77</sup> For the purpose of this specific assessment, the Agency used a conservative assumption that 100% of the indicated investment costs are realised in the year of 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 they are planned.

<sup>78</sup> This finding is in line with the Agency’s previous finding about the shift in the commissioning dates as described in Section 2.3.3 (i.e. the later implementation of several PCIs substantially changed the expected investment costs for the coming years).

In all priority corridors, except in the BEMIP, the expected investment costs decreased, compared to the 2016 data<sup>79</sup>. In the BEMIP, the investment costs increased by 8%<sup>80</sup>. The decrease is the largest in the NSI West priority corridor (-7%), and the smallest is in the NSI East priority corridor (-1%). In the NSOG the decrease is about 3%.

**Figure 16 - Investment costs per priority corridor and project type**



Tracking the **actual level of spending** until now also provides a useful insight into the progress of PCIs. Similar to last year, the Agency invited promoters to report the total amount of capital which has been spent on the project until the end of 2016. The difference between this figure and the amount indicated by project promoters last year represents the actual investments costs incurred in 2016.

In 2016, ca. **€2 billion investment costs were incurred**<sup>81</sup>. This figure constitutes a significant increase compared to the sum of the incurred investment costs in 2015, which amounted to ca. €1.2 billion and before 2015, which amounted to ca. €1.1 billion. This means that, in total, **€4.3 billion have been invested by promoters in the projects of the second PCI list. In addition, €3.2 billion are contracted**<sup>82</sup>.

The majority of the spending took place in the NSI East and NSOG priority corridors.

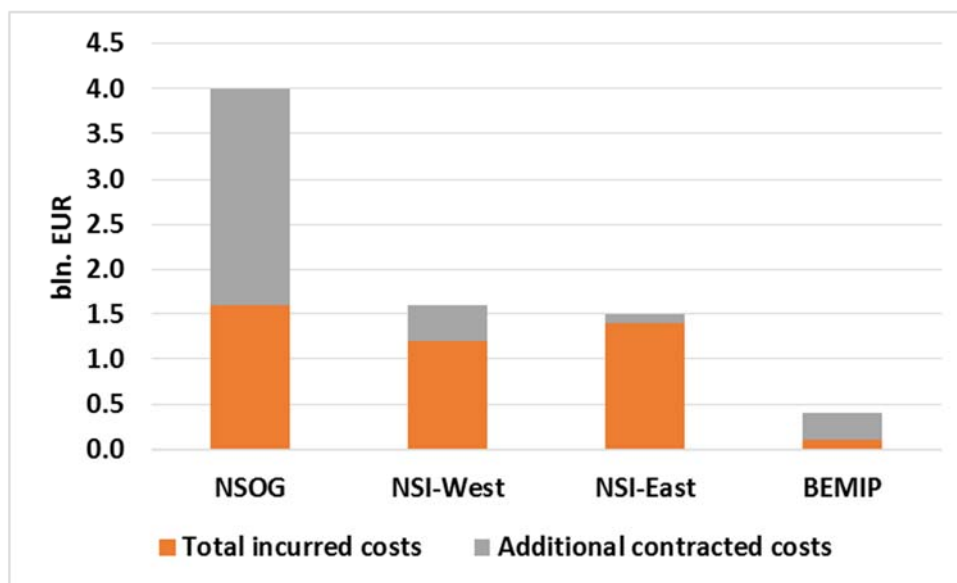
<sup>79</sup> Using only the PCIs which reported (discounted) investment costs both in 2016 and in 2017, which amounted to 105 PCIs.

<sup>80</sup> The increase in 2017 is the effect of a drastic rise (by 2.8 times) in the investment costs of a single project. If taken out of the assessment, the overall investment costs in the BEMIP priority corridor decreased by 10% compared to last year.

<sup>81</sup> The Agency defines the “Incurred Investment Costs” as all the costs allocated to the project, for which an invoice (or other accounting document which proves the recognition of the cost) has been issued (for the purchase of materials or provided services).

<sup>82</sup> 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.

Figure 17 – Incurred and additional contracted investment costs until 2016 per corridor<sup>83</sup>



#### *Variation in the estimated investment costs*

The expected variations in the estimated investment costs were almost identical to last year's figures. **For all PCIs, the average downward expected variation is -12% (compared to -11% reported last year), while the average upward expected variation is 14% (the same as last year).**

The main **drivers behind the reported variations** in investment cost estimations are the same as the ones reported last year. **Procurement and/or construction cost uncertainties were mentioned as the most frequent reasons for cost variations<sup>84</sup>**, while many reported “uncertainty of costs due to low maturity of projects” and “possible changes in the project scope compared to initial planning” and “impact of regulatory arrangements”<sup>85</sup>.

#### **2.4.2 Life-cycle costs**

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.

Regarding storage projects, the Agency notes that the promoters did not follow a consistent approach for the calculation of the life-cycle costs (e.g. for some storage projects, the costs of the energy required for pumping was missing from the cost figure). Due to the small number of storage projects and the concerns about the comparability of the data, the assessment of the life-cycle costs focuses on the transmission PCIs only.

<sup>83</sup> The promoters reported on incurred costs for 88 PCIs. For the remaining PCIs, no information was provided.

<sup>84</sup> This reason is reported in 39% of the cases.

<sup>85</sup> Based on 79 PCIs, which reported reasons for the variation in the investment costs this year.



**In 2017, the aggregated expected life-cycle costs for all transmission PCIs are €6.3 billion<sup>86</sup>.** The Agency notes, however, that there are differences between the PCIs which provided life-cycle costs in 2016 and those which provided them in 2017<sup>87</sup>.

If we compare the same sample of PCIs (i.e. those 66 PCIs which provided a life-cycle cost figure in both years), **the expected aggregated life-cycle costs decreased by 6.5%<sup>88</sup>.**

42 out of the 66 PCIs reported that there is no difference in the expected life-cycle costs<sup>89</sup>, while the remaining PCIs reported the following reasons (mainly related to uncertainties, improvements in the calculations or better cost estimations):

- Project is in consideration stage, and cost estimates are rather uncertain (5 transmission PCIs);
- Uncertainties regarding extra costs due to safety, environmental or legal requirements imposed during permit grating process (4 transmission PCIs);
- Improvement in the calculation (4 transmission PCIs);
- Better cost estimation (3 transmission PCIs);
- Change in the project scope (2 transmission PCIs);
- Different types of poles, cost of materials (2 transmission PCIs);
- An investment is not part of the PCI anymore (1 transmission PCI).

In 3 instances, the reason for the differences in the life-cycle costs remains unclear.

As shown in Figure 18, **the average life-cycle costs of the transmission PCIs is by far the highest in the NSOG corridor (€197 million)<sup>90</sup>** followed by the NSI West corridor (€69 million)<sup>91</sup>, the NSI East corridor (€55 million)<sup>92</sup> and the is lowest in the BEMIP corridor (€24 million)<sup>93</sup>.

In all priority corridors, the expected life-cycle costs decreased, compared to the 2016 data<sup>94</sup> (the decrease is the highest in the NSI West priority corridor by 15%; in the other priority corridors, the decrease is between 4-6%).

#### ***Variation in the estimated life-cycle costs***

The expected variations in the estimated life cycle costs for transmission projects were similar to last year's results. **For transmission PCIs, the average downward expected variation is -11%, while the average upward expected variation is 15%.**

<sup>86</sup> Based on 71 transmission PCIs.

<sup>87</sup> 8 transmission PCIs provided the expected life-cycle costs in 2017, but not in 2016, while 14 provided them in 2016, but not in 2017. 17 transmission PCIs did not provide life-cycle costs in any of the 2 years.

<sup>88</sup> I.e. € 6.2 billion in 2017 compared to € 6.6 billion reported in 2016.

<sup>89</sup> For these PCIs, the difference in the investment costs is only due to the different year of discounting.

<sup>90</sup> Out of the 19 transmission PCIs in NSOG, 17 PCIs were included, as 2 project promoters did not provide the (discounted) life-cycle costs.

<sup>91</sup> Out of the 26 transmission PCIs in NSI-West, only 22 projects were included, as 4 project promoters did not provide the (discounted) life-cycle costs.

<sup>92</sup> Out of the 40 transmission PCIs in NSI-East, only 22 PCIs were included, as 1 project is cancelled and 17 project promoters did not provide the (discounted) life-cycle costs.

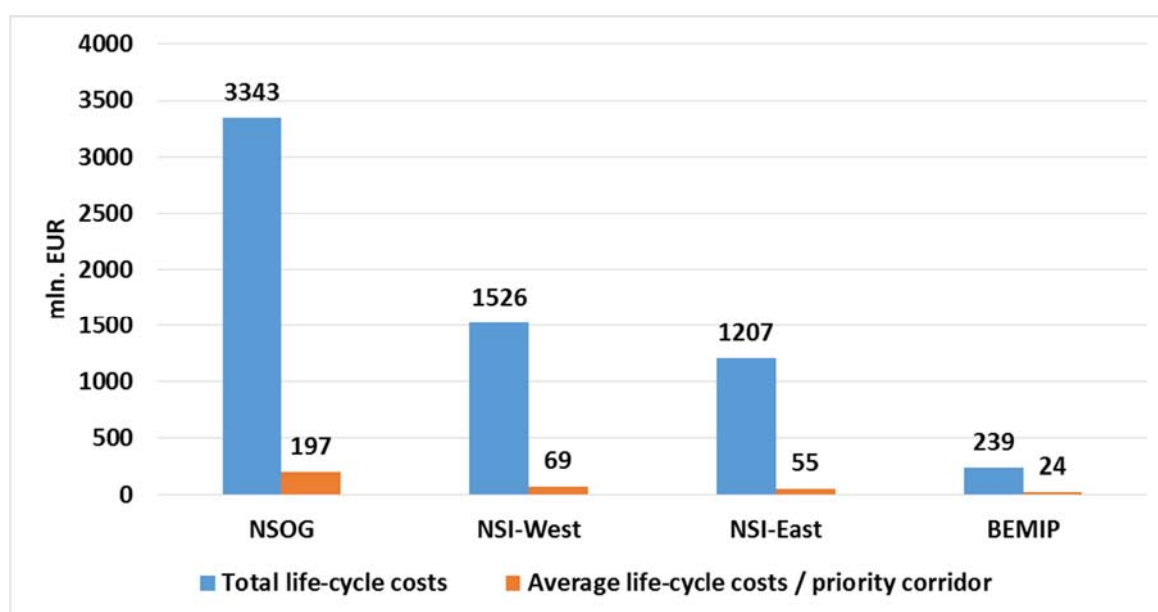
<sup>93</sup> Out of 15 transmission PCIs in BEMIP, only 10 PCIs were included, as 5 project promoters did not provide the (discounted) life-cycle costs.

<sup>94</sup> Using only the PCIs for which life-cycle costs were reported both in 2016 and 2017, which amounted to 66 PCIs (8 in BEMIP, 21 NSI East, 20 in NSI West and 17 in NSOG corridors).

The main **drivers behind the reported variations** are similar to the ones reported last year. The majority referred to the high uncertainties accompanying new technologies or long-term predictions. Other reasons for variations of life-cycle costs include uncertainty regarding extra costs due to safety, environmental or legal requirements imposed during permitting or possible change of the project scope.

Based on the 71 transmission PCIs for which both investment costs and life-cycle costs data is available, the Agency notes that the **discounted life-cycle costs represent 16% of the discounted total investment costs of the corresponding projects**<sup>95</sup>.

**Figure 18 - Expected life-cycle costs of transmission PCIs and average life-cycle cost per priority corridor**



### 2.4.3 Expected benefits

In the Agency's questionnaire, promoters were asked to report on the expected benefits of their projects. Promoters were free to use any study available to them for the calculation of the benefits (TYNDP or other studies). However, they were asked to use the discounting parameters (i.e. 25 years of operation, 4% discount rate and zero residual value) and other rules provided by the ENTSO-E CBA methodology for the yearly calculation of benefits and their subsequent discounted value (i.e. net present value) in 2017.

In 2017, the aggregated expected benefits for all PCIs amount to **€66.1 billion**<sup>96</sup>, resulting from **€7 billion of Social Economic Welfare benefit (SEW)**, **€1.4 billion of Security of Supply (SoS) benefit**, a negative benefit of **€4.6 billion (increased losses)** and **€2.3 billion**

<sup>95</sup> The aggregated total expected investment costs (for the selected sample) are €40.2 billion and the aggregated total expected life cycle costs (for the same sample) are €6.3 billion.

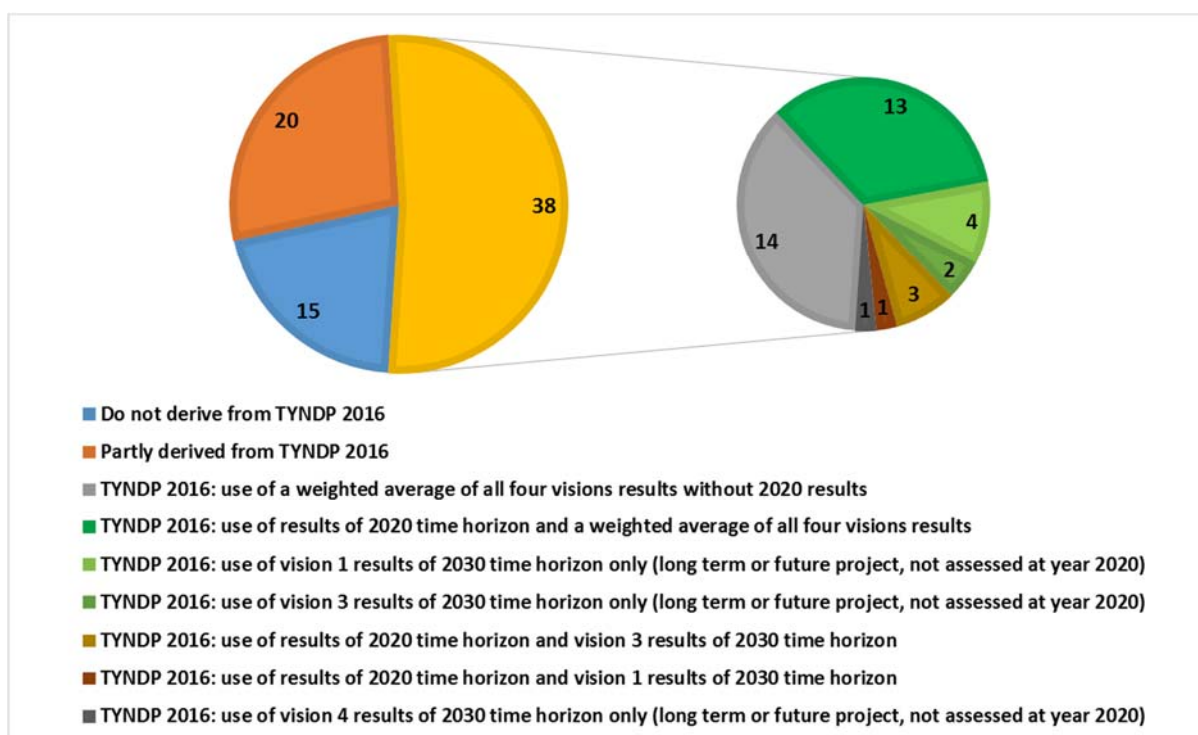
<sup>96</sup> The assessment takes into account 71 PCIs for which monetised benefits are reported. For some of the missing PCIs, the project promoters indicated that the benefits were available in the TYNDP 2016 which could not be taken into account in the assessment, as they were not provided in the requested format.

of other benefits<sup>97</sup>. The Agency notes, however, that there are differences among PCIs which provided benefits information in 2016 and those which provided it in 2017<sup>98</sup>.

If we compare the same sample of PCIs (i.e. the 67 PCIs which provided monetised benefits in both years), the aggregated **expected amount of benefits is decreased by 38 % compared to last year<sup>99</sup>**. This decrease is mainly triggered by the decrease of the Social Economic Welfare benefits and the increase of losses, while benefits related to Security of Supply have increased. **The changes in the expected benefits appear to be explained to a great extent by the recalculation of the project's benefits in the TYNDP 2016 using revised scenarios.** In this regard, the Agency underlines its considerations in the 2016 PCI monitoring report that there is a considerable uncertainty on the benefits indicated by the promoters as they significantly depend on the input scenarios and assumptions used for their calculations.

Regarding the source of calculation of the benefits, promoters of 38 PCIs (52%) reported that they used exclusively the ENTSO-E TYNDP 2016 benefit analysis. Promoters of 20 PCIs reported that they used partially the ENTSO-E TYNDP 2016 and partially other sources of benefit calculation. While promoters of 13 PCIs used other sources of calculation (e.g. TYNDP 2014). The share of each of the chosen benefit calculation methodologies is shown in Figure 19.

**Figure 19 - Benefit calculation methods used by the project promoters**



<sup>97</sup> Only the indicated “other” benefits related to additional Security of supply, like additional adequacy margin or benefits related to system stability (e.g. voltage or frequency stability), are included in this figure. The rest of the reported “other benefits” (i.e. about €10 billion) are not taken into account due to double-counting, internal transfers among electricity market stakeholders or because they are not related to European electricity consumers.

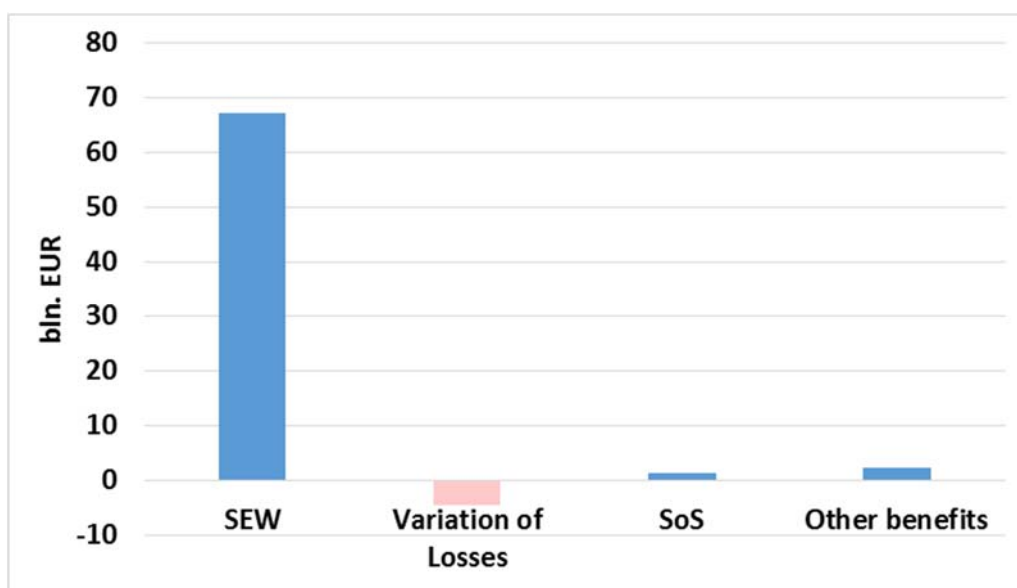
<sup>98</sup> 67 PCIs provided monetised benefits in both 2016 and 2017. 3 PCIs provided the expected benefits in 2017, but not in 2016, while 12 PCIs provided them in 2016, but not in 2017. Also, there are 25 PCIs which did not provide in any of the 2 years.

<sup>99</sup> I.e. from €104 billion in 2016 to €65 billion in 2017.

The average downward expected variation of all PCIs for which this information was available is -33%, while the average upward expected variation is 30%<sup>100</sup>.

Similar to the 2016 PCI monitoring report, the Agency compared the total costs and benefits for these projects. Taking into account the aggregated investment and life-cycle costs and the aggregated total benefits, the Agency concludes that the **overall cost-benefit ratio for these PCIs is over 1.2**.<sup>101</sup> However, the Agency also notes that, for some PCIs, the expected costs are higher than the reported monetised benefits<sup>102</sup>.

Figure 20 - Expected benefits in 2017



In all priority corridors, with the exception of BEMIP, the expected benefits decreased compared to the 2016 data<sup>103</sup> (the largest decrease is in the NSI East priority corridor (48%), followed by NSOG (38%) and the NSI West priority corridor (24%). In the BEMIP corridor, the expected benefits increased by 31% compared to the 2016 data.

#### Key findings and recommendations:

- The cost and/or benefit data changed for most of the PCIs compared to last year, resulting in an overall decrease in the costs and in the benefits. The indicated total amount of investment costs is €49.8 billion, while the total amount of monetised benefits is approximately €66.1 billion.

<sup>100</sup> Figures calculated for 60 PCIs for which the data was available.

<sup>101</sup> The assessment includes 64 PCIs who reported all of the following: discounted investments costs, at least one benefit, and discounted life-cycle costs. The assessment includes only transmission PCIs as the life-cycle costs for storage PCIs were not assessed.

<sup>102</sup> Based on 68 PCIs which provided a figure for discounted investment costs and life-cycle costs as well as figures for monetised benefits to allow a full and complete comparison of the costs to the benefits, the Agency notes that there are 16 PCIs where the reported monetised benefits do not outweigh the costs.

<sup>103</sup> Using only the PCIs which reported benefits both in 2016 and 2017 which amounted to 67 PCIs.

- Better cost estimation is the most common reason for the deviations in the costs. The changes in the expected benefits seem to be triggered by the recalculation of the benefits for the TYNDP 2016. In this regard, the Agency notes that benefits strongly depend on scenarios and are significantly based on the future assumptions which are chosen for the calculation.
- The discounted total life-cycle costs for transmission PCIs amount to more than €6 billion, which corresponds to 16% of the total investment costs of the same project sample. Based on its findings, **the Agency considers that life-cycle costs constitute a significant part of the total costs and they should be properly taken into account for the cost-benefit analysis for infrastructure development.**
- Promoters reported to have spent €4.3 billion on the current PCIs by end of 2016 (€2 billion in 2016 and €2.3 billion before).

## 2.5 Regulatory treatment and financial support to the projects from public sources

Regulation (EU) No 347/2013 introduced new regulatory tools, namely the coordinated decisions on the investment requests and specific incentives in case of higher risks, to facilitate the implementation of the PCIs. This chapter gives an overview of the past and expected future use of these regulatory tools, as well as of the use of exemptions. As these tools are applicable only for transmission projects, storage and smart grid PCIs are not considered in this chapter.

### 2.5.1 Investment requests and decisions

Regulation (EU) No 347/2013 aims to facilitate PCI implementation by envisaging decisions by NRAs or by the Agency on the allocation of the costs of such projects across borders if project promoters submit an investment request including a request for cross-border cost allocation.

**Between 1 February 2016 and 31 January 2017, 6 electricity PCIs reported that the project promoters submitted an investment request**, which means that, in total, 10 PCIs in the 2015 PCI list applied for cross-border cost allocation decisions by the NRAs. In 7 out of the 10 cases, the PCI received the decision, while, for the remaining 3 PCIs, the decision was still ongoing at the time of submission of the PCI report<sup>104</sup>.

In 2017, the project promoters consider submitting an investment request for 7 additional projects and 32 have not decided yet.

The Agency notes that a project has to reach a sufficient level of maturity before the project promoter(s) can submit an investment request. Pursuant to the Agency's Recommendation<sup>105</sup>, a sufficiently mature project needs to meet a number of criteria related to sufficient certainty about project costs and benefits, project status at the time of the application, and expected

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<sup>104</sup> For the 3 PCIs, one investment request was submitted as they belong to the same cluster.

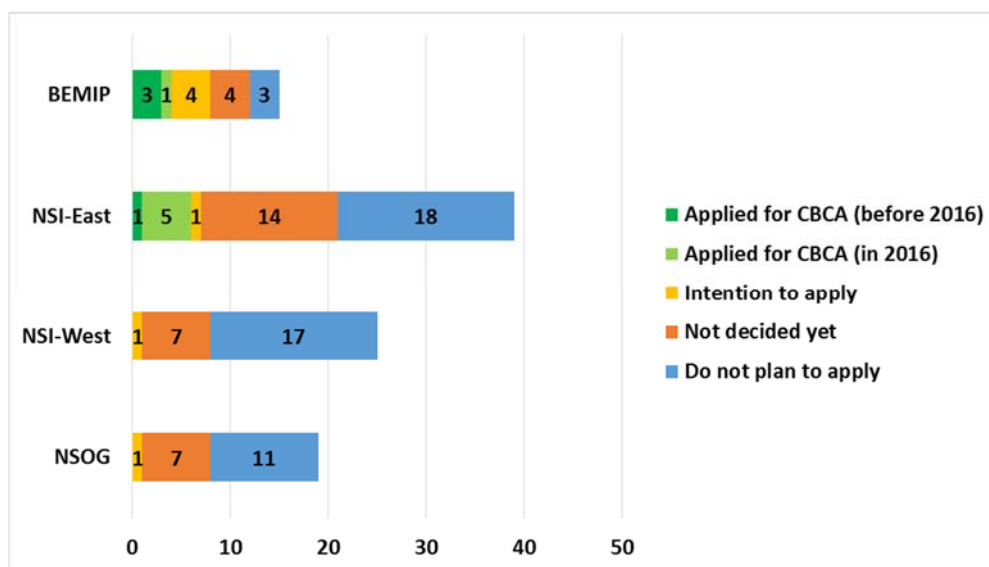
<sup>105</sup> Cf. the Agency's Recommendation No 05/2015 of 18 December 2015 on good practices for the treatment of investment requests, including cross-border cost allocation requests, for electricity and gas projects of common interest, pp. 3-4:

[http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Recommendations/ACER%20Recommendation%2005-2015.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Recommendations/ACER%20Recommendation%2005-2015.pdf)

commissioning date, which significantly reduce the number of projects potentially “eligible” for an investment request<sup>106</sup>.

Considering the small number of project promoters which submitted an investment request or plan to submit one in the future, there are serious limitations in drawing conclusions on different patterns at regional level. Nonetheless, it is noted, as shown in Figure 21, that interest in applying for cross-border cost allocation is considerably higher in the BEMIP priority corridor than in the other priority corridors.

**Figure 21 - Investment request per priority corridor<sup>107</sup>**



### 2.5.2 Risks and incentives

As a further regulatory tool, pursuant to Article 13(5) of Regulation (EU) No 347/2013, Member States and NRAs are required to provide appropriate incentives for PCIs deemed to incur higher risks as compared to the risks normally incurred by a comparable infrastructure project. **Between 1 February 2016 and 31 January 2017, only 2 PCI applied for specific incentives<sup>108</sup>** in addition to the other 3 PCIs which applied for such incentives in the past<sup>109</sup>. One PCI applied for incentives in both 2016 and before, but in different Member States in each

<sup>106</sup> For example, if we consider only the projects, which are at least in permitting status, the sample of transmission projects is already reduced by almost 40%.

<sup>107</sup> The information was available for 98 PCIs.

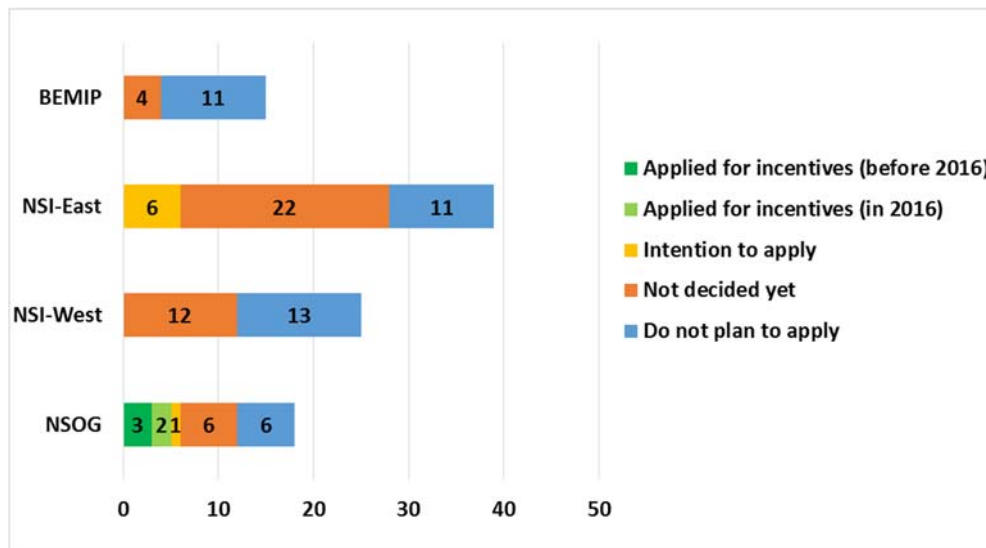
<sup>108</sup> Both received the incentive in the United Kingdom via the “Cap & Floor” regulatory regime. It is noted that the cap and floor regulatory regime is designed to consider and reflect the costs and risks of new subsea electricity interconnectors, although PCI status is not a precondition for approval under the regime (and as such the tool is not specific to PCIs).

<sup>109</sup> In one case, the incentive was regarding efficiency of the investment and a favourable incorporation in the international benchmark. In the other two cases, the project promoters applied for a cap and floor regulatory treatment in the UK.

year<sup>110</sup>. The interest in applying for such incentives seem to remain the same compared to last year (7 PCIs consider applying in 2017 compared to 7 in 2016).

Looking at the breakdown by priority corridor, one can note from Figure 22 that all past applications for specific incentives are in the NSOG priority corridor. However, 6 out of 7 PCIs, for which the project promoters intend to apply in the future are in the NSI East priority corridor.

**Figure 22 - Applications for specific incentives per priority corridor<sup>111</sup>**



### 2.5.3 Exemptions

The regulatory tool to be assessed is the exemption of projects from Article 16(6) of Regulation (EC) No 714/2009, from Article 32 and Article 37(6) and (10) of Directive 2009/72/EC pursuant to Article 17 of Regulation (EC) No 714/2009, or under Article 7 of Regulation (EC) No 1228/2003, which are basically exemptions related to third party access if some extraordinary conditions are met by the project.

**No project promoters applied for exemptions between 1 February 2016 and 31 January 2017.** However, for one PCI which received an exemption earlier, the project promoters submitted a request for prolongation of the exemption<sup>112</sup>. As shown in Figure 23, so far there are 4 PCIs of the 2015 PCI list for which the project promoters applied for an exemption. 2 PCIs intend to apply for exemptions, which is less than in 2016 (i.e. 5 PCIs).

As described in the 2016 PCI monitoring report, 2 of the submitted applications are in the NSI East priority corridor, 1 in the NSI West corridor and 1 in the NSOG corridor.

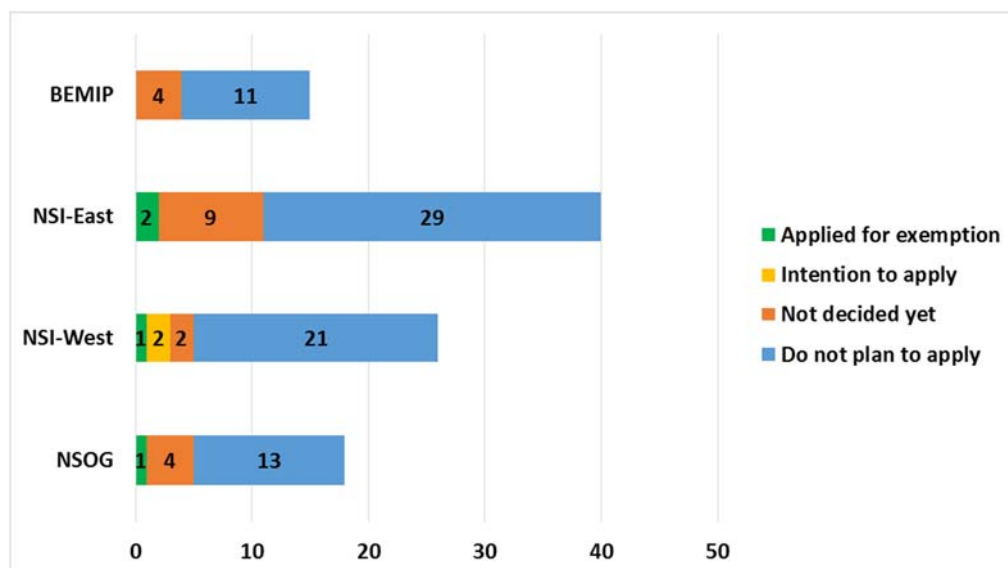
Based on the above, it seems that exemptions are still planned to be used only in exceptional cases.

<sup>110</sup> In 2016 the PCI applied and received incentives in France. Earlier the same PCI had already applied and received incentives in the United Kingdom (via the “Cap & Floor Scheme”).

<sup>111</sup> In order not to double-count, the PCI which applied for specific incentive both in 2016 and before is accounted for in the category “applied for incentives (before 2016)”.

<sup>112</sup> The request referred to postponement of the date by which the construction of the PCI should start and also the date the PCI should become operational.

**Figure 23 - Applications for exemptions per priority corridor**



#### 2.5.4 Financial support to the projects from public sources<sup>113</sup>

**38 out of 109 PCIs<sup>114</sup> (35%) applied for Connecting Europe Facility (CEF) grants at least once (either for studies and/or for works) over the past 2 years<sup>115</sup>.** In 2016, the number of applicants was 13, out of which, 9 already submitted an application before 2016 as well<sup>116</sup>.

As shown in Figure 24, **the highest number of applications comes from the NSI East priority corridor (18 applications, most of them before 2016),** followed by the NSOG (10), BEMIP and NSI-West (5 each). In relative terms, over the past two years, **NSOG is the priority corridor with the highest share of applications (50%) compared to the number of PCIs in the priority corridor,** followed by NSI East (43%), BEMIP (29%) and NSI West (17%).

<sup>113</sup> For detailed information about CEF applications and grants, please visit the website of the Innovation and Networks Executive Agency - <http://ec.europa.eu/inea/>

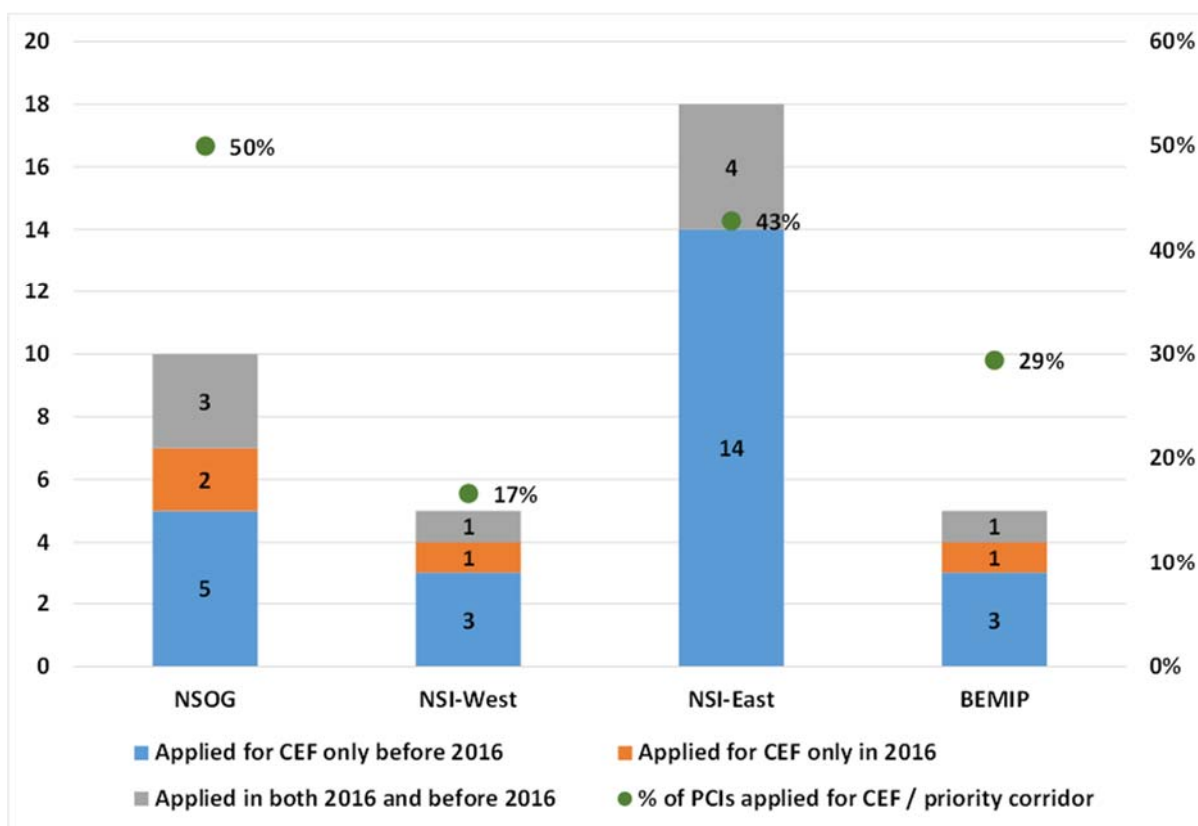
<sup>114</sup> The assessment does not cover the 2 smart grid projects as they are not eligible for CEF funds.

<sup>115</sup> In line with Article 14 of Regulation (EU) No 347/2017, all electricity PCIs are eligible for Union financial assistance in the form of grants for studies. However, hydro-pumped electricity storage PCIs are not eligible for grants for works.

<sup>116</sup> E.g. some of the project promoters applied for CEF for studies before 2016 and they submitted an application for grants for works in 2016.



**Figure 24 - Past applications to Connecting Europe Facility**



It is further to note that 11 respondents<sup>117</sup> indicated in this year's reports their intention to apply for CEF in 2017 and/or 2018 (4 for both studies and works, 2 only for works and 5 only for studies). For the rest, no decision is made yet by the promoters on whether they will apply for CEF funds within the next two years (52 respondents) or they do not plan to apply (41 respondents)<sup>118</sup>.

Regarding financial support from funding programmes other than CEF at European, regional or national level, 100 PCIs responded that they did not receive any support for any part or section of the PCI in 2016, and 5 PCIs reported that they received funds<sup>119</sup>. For details on the funds received from each programme before 2016, please refer to the 2016 PCI monitoring report of the Agency<sup>120</sup>.

<sup>117</sup> Out of the PCIs that intend to apply in 2017 and/or 2018, 4 PCIs already applied in the past.

<sup>118</sup> Only transmission and storage PCIs which are not cancelled or commissioned are taken into account.

<sup>119</sup> The amount received from external funds in 2016 is not reported as out of the 5 relevant PCIs one has received a positive decision but did not receive the external funds yet, 2 reported the total amount received from external funds instead of the amount which was received for the year 2016 and for the remaining 2 PCIs the amount of the fund received was not indicated.

<sup>120</sup> Cf. 2016 PCI monitoring report of the Agency (Annex V).

**Key findings and recommendations:**

- Exemptions and the regulatory tools of Regulation (EU) No 347/2013 (risk-related incentives, investment requests including requests for cross-border cost allocation) have not been widely used by project promoters and project promoters have shown a limited interest to use them in the future. It could be relevant to examine the reasons why promoters do not use much and do not plan to avail themselves of the incentives provided for in Regulation (EU) No 347/2013.

### **3 Volume 2: GAS PROJECTS**

## 3.1 Introduction

### 3.1.1 Fulfilment of the reporting obligations

By the legal deadline of 31 March 2017, the Agency received reports for all but one<sup>121</sup> of the PCIs<sup>122</sup>. The Agency recalls 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.

To collect information needed for this Report from the promoters of gas PCIs, the Agency used an on-line tool pre-filled with the information submitted by the promoters for the previous PCI monitoring exercise. Promoters could confirm that the information is still valid or provide an update.

### 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**<sup>123</sup>. Most of the missing or incomplete information is related to the benefits expected to be provided by the projects and to changes in the benefits compared to earlier estimates. For 80% of the PCIs, benefits data suffered from such shortcomings. Similarly, **project life-cycle cost data were missing or incomplete for 50% of the PCIs**. Project promoters seem to have difficulties to identify or report these data. The Agency notes that cost and benefit data represented most of the instances of missing data in 2016 as well.

The Agency notes positively that for other data items missing in 2016, such as the description of the works performed and the implementation schedules at project level, the information provided by the promoters in 2017 is almost complete and comprehensive.

The Agency contacted the promoters of 59 PCIs to ask for clarifications of the submitted data. In the majority of the cases, these requests addressed inconsistencies in the amount of the reported incurred costs<sup>124</sup> and in the timing and the order of certain project implementation stages, in particular pre-application and statutory procedures in the context of the overall permitting process<sup>125</sup>.

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<sup>121</sup> No report was submitted to the Agency for PCI 6.8.3 “*Interconnection of the Northern ring of the Bulgarian gas transmission system with Podisor - Horia pipeline and expansion of capacity on Hurezani-Horia-Csanadpalota section*”. For this PCI, no report was submitted in 2016 either.

<sup>122</sup> 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.

<sup>123</sup> The Agency recalls that the exact elements of the promoters’ reports are not explicitly described in Article 5 of Regulation (EU) No 347/2013. So far, for each PCI monitoring round, the Agency compiled reporting forms, after consulting them with the Competent Authorities, the national regulatory authorities and the project promoters. The forms so compiled were used to collect the information.

<sup>124</sup> 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 in 2016 for the same PCI.

<sup>125</sup> Even with a direct reference to Article 10 of Regulation (EU) No 347/2013, several promoters did not appear to be aware of the sequence and the content of the pre-application and the statutory procedures, and of their overall place within the entire permit granting process.

Some PCIs include 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 at the same interconnection point), or in parallel (concurrently). Regardless of the order of these phases, they are essentially different project implementation stages, which foresee a different commissioning date for each “phase” and may be implemented on time or be postponed. The Agency points out that the information is generally reported for a PCI as a whole, and consequently the information provided in the promoters’ reports on phased projects may lack details regarding the degree to which separate “phases” have advanced.

The majority of the PCIs are transmission projects. Comparison and analysis per project infrastructure type – i.e., transmission, liquefied natural gas (LNG) or underground gas storage (UGS) projects – is not covered in this Report. The focus is on comparisons among priority corridors, in order to facilitate the work of the Regional Groups by providing information which may be of relevance to them.

#### **Key findings and recommendations**

- The Agency notes positively the improvement of the information reported in terms of quality and quantity, compared to previous PCI monitoring exercises.
- Several promoters seem to overlook Article 10(1) of Regulation (EU) No 347/2013, which deals with a pre-application procedure within the permit granting process. **The Agency recommends project promoters to work closely with the relevant Competent Authorities in order to ensure a full understanding of the details of the permit granting process.**
- **The Agency recommends that project promoters assess project life-cycle costs early in the project’s development, and in any case before applying for listing as a PCI.** The Agency notes that, while project cost estimates certainty will improve as the project matures and the estimates may vary over time, the lack of *any* estimate of a project’s cost may indicate that the project is fundamentally not ready to be subject of CBA, being more an idea rather than a project *per se*. In such a case, it should not be listed in the TYNDP to undergo CBA, let alone on the PCI list for which CBA is also required. For these reasons, **the Agency discourages the listing as PCIs of projects which lack any cost information**, even preliminary and possibly falling within a wide estimated cost range, and which have not provided such information already at the stage of developing the TYNDP.

## 3.2 Overview of the gas PCIs

### 3.2.1 General statistics of the PCIs<sup>126</sup>

The 2015 PCI list includes 77 projects in gas, mostly in transmission (64 projects), but also liquefied natural gas (LNG) regasification facilities (7 projects) and underground gas storage (UGS) (6 projects).

The Agency notes that one project – “Gas compressor station at Kipi” – appears in three instances on the 2015 PCI list with two different versions of the project’s essential features (capacity, total investment cost, etc.). The Agency treats each PCI individually and accordingly the three instances of this PCI are taken into account separately in the statistics of this report.

The Agency highlights that including the same project in the PCI list multiple times with different PCI codes, sometimes with identical and in other instances with different project features, can lead to ambiguities about the project’s identity and scope, as well as to difficulties in the analyses of the annual reports submitted by project promoters. The presence in the PCI list of such projects with multiple identities may also make the required CBA more difficult, both for the PCI list itself and for the CBA performed for subsequent investment requests for PCIs that may be competing with or complementary to a PCI which exists in multiple “embodiments”. Therefore, the Agency sees it more beneficial that the information for such projects is provided in one single instance.

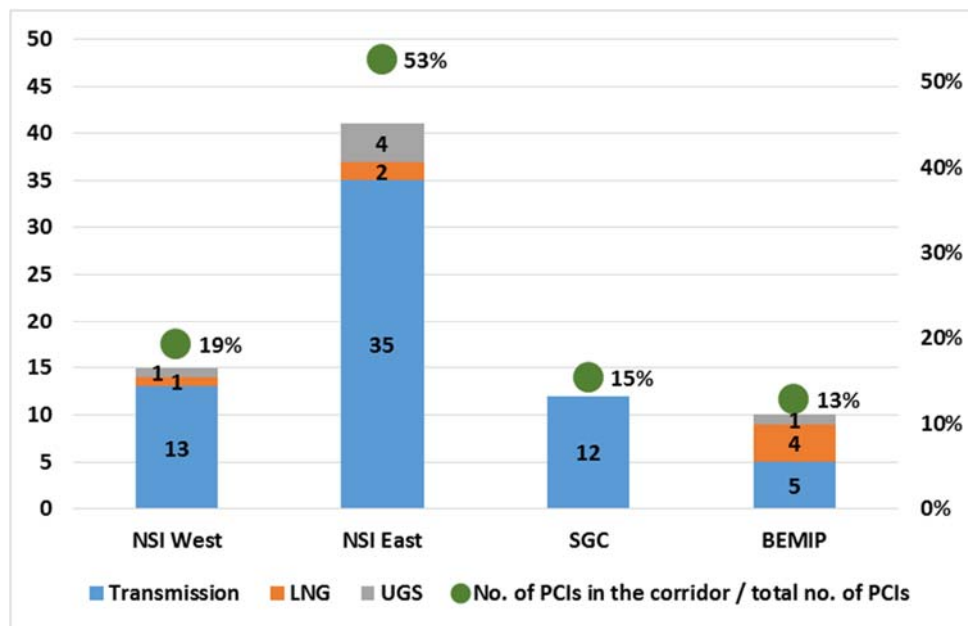
For PCI 7.1.1, a cluster of infrastructure aimed to bring new Caspian gas to the European Union, three separate reports for the main project sections (TCP, SCP-X and TANAP) were submitted to the Agency and included as individual projects in the present Report. **The graphs and the tables in the Report reflect the total number of individual report submissions (i.e., 78 reports) to the Agency.** PCI 7.1.1 appears in the Report as covered by three separate reports, unless otherwise indicated.

The geographical features of the PCIs – the hosting countries and their location in the priority corridors – remain unchanged from 2016 to 2017. As shown in Figure 25, 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”).

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<sup>126</sup> A more detailed presentation of the general statistics of PCIs which have not experienced any change between 2016 and 2017 can be found in the Agency’s 2016 PCI monitoring report. [http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Publication/CONSOLIDATED%20REPORT%20ON%20THE%20PROGRESS%20OF%20ELECTRICITY%20AND%20GAS%20PROJECTS%20OF%20COMMON%20INTERES-T%20for%20the%20year%202015.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/CONSOLIDATED%20REPORT%20ON%20THE%20PROGRESS%20OF%20ELECTRICITY%20AND%20GAS%20PROJECTS%20OF%20COMMON%20INTERES-T%20for%20the%20year%202015.pdf)

Figure 25 – Distribution of PCIs in the priority corridors



**Major technical changes** occurred in 2016 in fewer instances (ca. 15% of all PCIs) than in the previous reporting period (25%). Since there is no exact definition of the notion of a “major technical change”, the reported cases of “major technical change” reflect entirely the project promoters’ own judgement<sup>127</sup>.

Major technical changes are commonly due to changes in the scope of the project, i.e. the addition or removal of some investment items or sub-projects. Other types of major changes include changes in the technical and technological characteristics of the infrastructure or in the auxiliary equipment. 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 national development plans (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. For this reason, the listing of a LNG or UGS PCI with significant cross-border aspects 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.

Several NDPs have been updated in 2016<sup>128</sup>. Nevertheless, a similar number of PCIs to last year are still missing from the NDPs, either in all hosting countries or at least in one of them. **16 PCIs are not present in the NDP of any of the hosting countries.** This includes 8 transmission projects<sup>129</sup>, 4 LNG projects<sup>130</sup> and 4 UGS projects<sup>131</sup>. Furthermore, **5 PCIs which**

<sup>127</sup> Cf. the impact of changes in project scope on other attributes of the PCI in Section 3.4.1 below.

<sup>128</sup> Promoters indicated an update of the NDP in the following Member States: BG, CZ, EL, FR, HR, HU, IT, PL and SI. These indicate both plans which were approved by the national regulatory authority and plans which are TSO documents.

<sup>129</sup> In 2 of these cases, the project is hosted by only one country.

<sup>130</sup> LNG and UGS projects are hosted by a single country. In these cases, a project’s “absence from the NDP of each hosting Member State” means that it is not in the plan of only one country (the hosting one).

<sup>131</sup> *Idem*.

**are located in more than one country are missing from the NDP of at least one of the hosting countries.**

In a few cases, the project promoters indicated a reason for the absence of the project in the NDP. These reasons include the following:

- The NDP was prepared at an earlier date, is due for an update at a later date, and the project will be included in that updated NDP.
- The project is not developed by the TSO, but by an independent developer.
- No NDP exists in the country or the operators are not required to prepare and publish an NDP.

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 the relevant Competent Authorities.

The Agency recalls its recommendation provided in the 2016 PCI monitoring report, namely that the NRAs, the Competent Authorities and other authorities review and, if appropriate, revise the NDPs to include the relevant PCIs in a way which is consistent with the most recent PCI list, and take due account of all PCIs when elaborating the NDPs.

#### **Key findings and recommendations**

- The Agency finds it ambiguous that a PCI is included in the PCI list more than once with the same name, but with different main features. **The Agency strongly recommends that in future PCI lists each project be listed only once with a unique project code and a clearly defined scope.** Failure to do so leads to the risk of double-counting the CBA results of certain projects, as well as to ambiguities about the scope of such projects and their impact on other projects.
- **The Agency reiterates its earlier recommendation<sup>132</sup> that consistency is pursued to the maximum extent possible between the identity, the components and the scope of the projects in the TYNDP and in the PCI list,** to avoid ambiguities and enable effective monitoring. Should changes in project identity or scope be necessary, a justification and a clear definition of the scope and the impact of the changed project should be provided, in a way which ensures that there is no overlap and no potential ambiguity related to other projects.
- **The Agency emphasises the importance of keeping track of all substantial technical changes of the PCIs during the lifetime of the PCI list,** compared to the information provided by the project promoter in the application for listing as a PCI in the PCI

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<sup>132</sup> Cf. 2016 PCI monitoring report of the Agency



selection process<sup>133</sup>. **The Agency invites the Regional Groups to examine the new technical description of the PCIs and require promoters to justify these changes.**

- In spite of the legal obligation spelled out in Article 3(6) of Regulation (EU) No 347/2013, **21 PCIs are not present in the NDP of the hosting Member State(s)**. In certain cases, project promoters indicate reasons which appear to have objectively prevented the fulfilment of this obligation. **The Agency encourages all relevant stakeholders to pursue further consistency between the NDPs and the PCI list.**

### 3.3 PCI status and progress

#### 3.3.1 Current PCI status<sup>134</sup>

One of the main indicators of a project's progress is the advancement along the stages of its implementation. Project promoters are invited each year to indicate the 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.

A comparison with the Agency's 2016 PCI monitoring report enables a year-on-year overview of the projects' progress. For projects also included in the first PCI list (2013), an analysis over a longer time frame is provided (see box on page 50 for details).

In line with the promoters' planning, **no gas PCI was commissioned in 2016 or is expected to be commissioned in 2017**. One PCI will be split and developed further as two separate projects. The promoter of this PCI reported the project as "cancelled".

**8 PCIs indicated progress in their implementation status** – 5 PCIs advanced into the permitting process stage from being planned, 2 PCIs entered the construction phase after having finished permitting, and one project moved from the less mature "under consideration" status into the stage of "being planned"<sup>135</sup>.

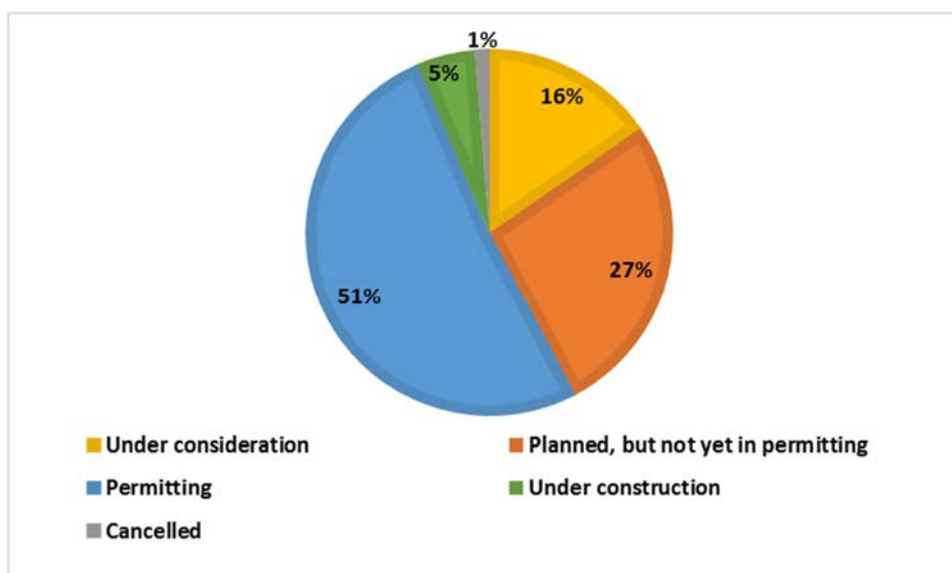
<sup>133</sup> Substantial technical changes may include, inter alia, change of a project's name (with or without change of the project's scope) or scope (with or without change of name), or the merger of two or more projects by one absorbing the other or by forming a new one, or the partial assignment of elements of a project to another PCI, etc.

<sup>134</sup> 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.

<sup>135</sup> Please note that the change of status (or the lack of it) gives information only about the PCI as a whole. A more detailed focus into the implementation schedule and the reports on works carried out provides a more thorough overview of the actual progress of the project.

**For 3 PCIs apparent “backwards progress” was reported**, i.e. they were reported to be in a less advanced implementation stage in 2017 than in 2016. In one instance, the project’s “regress” is the result of incorrect reporting in 2016, and in another instance the project underwent a significant change in its scope. The Agency was unable to identify any specific reason for the reversal of the project’s implementation progress in the third case.

**Figure 26 - Number of PCIs in various status categories**

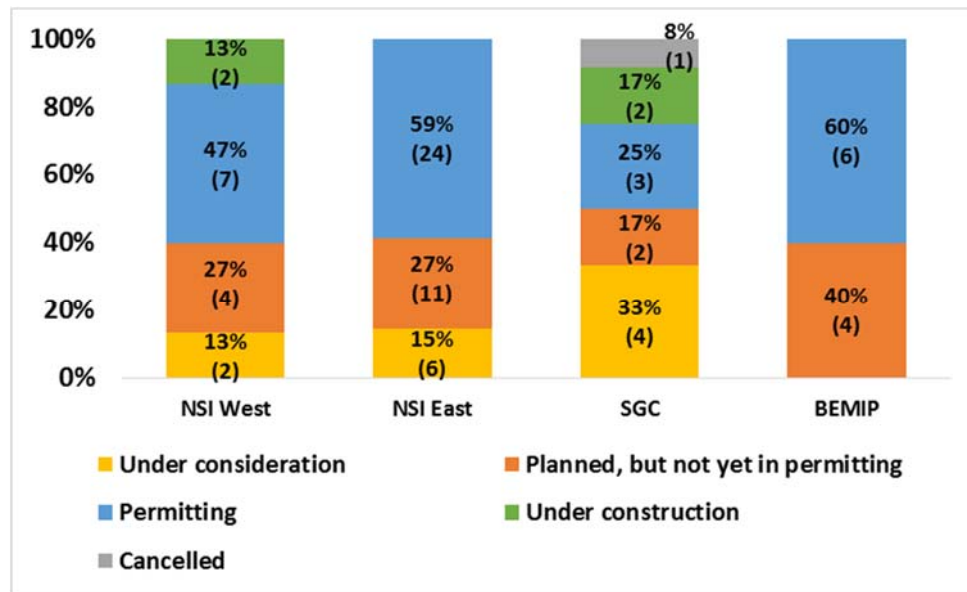


The share of PCIs which are in an implementation stage beyond planning<sup>136</sup> is roughly 60% in **NSI West, NSI East and BEMIP corridors**. In the two NSI corridors, the share of PCIs at a stage beyond planning has increased, while in BEMIP this share is identical to the one in 2016.

The **SGC** witnessed more changes than the other corridors. At the beginning of 2016, most of the SGC projects were at the stage of being “planned, but not yet in permitting”. During 2016, most of the PCIs in that corridor experienced a change in the implementation status. They progressed, regressed, or were cancelled.

<sup>136</sup> The projects beyond the planning stage are those in the permitting phase or under construction.

**Figure 27 - Breakdown of PCIs by status and priority corridor**



***A historic overview – evolution of the status of PCIs between 2015 and 2017***

49 PCIs participated in all rounds of PCI monitoring since 2015 and provided information on their status. The Agency examined how the status of these PCIs changed over the last 3 years, in order to provide a picture of the PCIs’ progress over a longer period of time. Figure 28 shows the starting point (on the vertical axis) and the current status (horizontal axis). PCIs progressed mostly while they were less mature (i.e., they moved to a more mature category from such categories as “under consideration” and “planned but not yet in permitting”). The majority of those PCIs which were in permitting back in 2015 are still there, and only two managed to proceed to construction. Very few projects registered a reversal of their advancement.

**Figure 28 - Evolution of the PCI status (2015-2017)**

From (2015) / to (2017)	Under consideration	Planned, but not yet in permitting	Permitting	Under construction
Under consideration	3	2	0	0
Planned, but not yet in permitting	2	10	8	0
Permitting	0	1	19	2
Under construction	0	0	0	2

**3.3.2 Progress of works**

Project promoters were invited to indicate the **types of works and activities which were carried out between 1 February 2016 and 31 January 2017**. Promoters could indicate more than one activity, therefore the sum of the replies does not coincide with the total number of PCIs. The promoters’ responses and the number of PCIs for which a specific activity was reported are illustrated in Figure 29 below.

The number of reports indicating that specific works have been carried out is much lower compared to the 2016 PCI monitoring round<sup>137</sup>. The most frequently reported type of activity is related to permitting, which includes both preparing for the permitting process (e.g., collecting necessary documentation) and performing the tasks related to the permitting process itself. Since most PCIs are reported to be in the permitting stage of implementation, it is not surprising that permitting activities dominated the project promoters' work agenda<sup>138</sup>.

The second most often cited type of works carried out in 2016-2017 belongs to activities related to the preparation of and/or the carrying out of a feasibility study.

Several promoters indicated that they had applied and/or received Union financial assistance from CEF.

Other kinds of works, such as carrying out an environmental impact assessment and the identification of alternative solutions / site identification, may also involve activities related to permitting.

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 Agency notes that the submitted information is generally consistent.

**Figure 29 – Works and activities carried out by project promoters in 2016**

Type of works, activities performed	No. of PCIs for which the activity is reported
Permitting	18
Activities related to a feasibility study	13
CEF funding	12
Environmental Impact Assessment (EIA) and environment	11
Identification of alternative solutions / site identification	8
Studies and basic documentation on engineering	7
Tendering for construction	6
Front-end Engineering and Design (FEED) related activities	5
Construction related	5
Cross-border cost allocation (CBCA)	4
Spatial planning study	4
Market test	3
Detailed tech design	2
Final Investment Decision (FID)	1
Commissioning	1

<sup>137</sup> This means that the number of promoters who selected a specific type of activity was lower than last year. This does not give any indication about the amount of work carried out by promoters in the reporting period, but merely shows that their activity was more focused on fewer areas of work.

<sup>138</sup> In comparison to 2016, some Member States have either updated or changed the regulatory framework of the PCI development process. Romania is a good example: the permitting process has been simplified thanks to the introduction of a new permit granting regime coordinated by a National PCI Authority within the Ministry of Energy, a new body that is now capable of issuing a comprehensive permitting decision for the entire PCI. This simplification allows for a future shortening of the permit granting period, such change is already visible in one of the PCIs where the permitting process (in 2016 expected to last almost 2.5 years) has been shortened to only 9 months, according to the estimate provided by the project promoter in 2017.

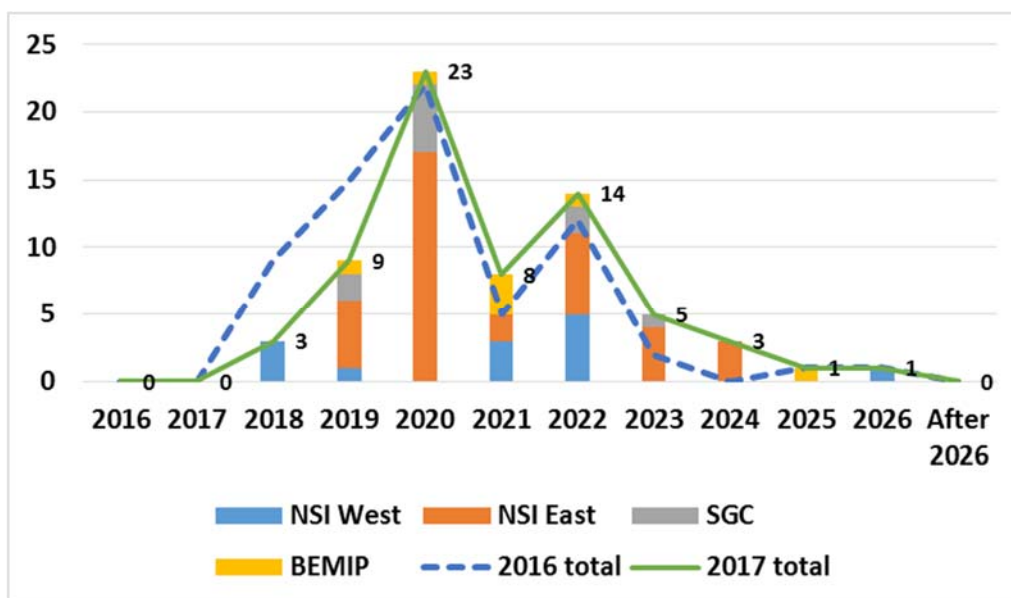
Promoters indicated that no work was performed or they did not provide an answer in the case of 12 transmission projects<sup>139</sup> and 1 LNG project. About half of the projects not reporting the carrying out of any works are located in the NSI East corridor and the other half are in the SGC (there is one such PCI in BEMIP corridor and one in NSI West corridor as well).

The Agency notes as a positive development in comparison to last year the fact that **promoters report for fewer PCIs that no work** have been carried out<sup>140</sup>. However, the Agency also notes that in half 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, given the absence of any actual reported work. Throughout the 2-year timeframe of the 2015 PCI list, for 4 PCIs<sup>141</sup> no works or activities were reported to the Agency.

### 3.3.3 Expected commissioning dates

The Agency notes the persistent trend (identified in previous reports) of shifting the expected commissioning date of PCIs to a later time. Figure 30 shows the number of projects expected to be commissioned per year, per priority corridor. A comparison with the 2016 PCI monitoring report shows that a substantially lower number of projects are expected to be commissioned in 2018 and 2019 than reported a year ago. In the post-2020 period, however, promoters currently plan to bring online more PCIs than planned in 2016.

Figure 30 - Number of PCIs to be commissioned (per year, per priority corridor)



The monitoring of the individual project timelines in the available sample<sup>142</sup> (cf. Figure 31) shows that the reported commissioning year for most PCIs (41 out of 61) remained the same

<sup>139</sup> Including one PCI for which the promoter informed the Agency that the project is under consideration.

<sup>140</sup> In 2016, promoters reported 17 PCIs where no works were performed.

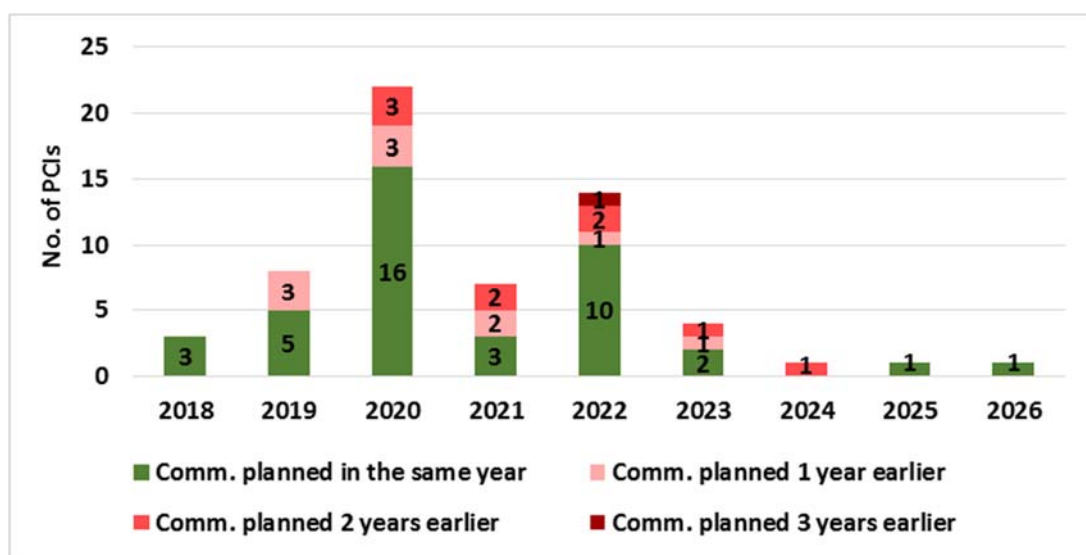
<sup>141</sup> One of these projects is reported as “cancelled”, one as “delayed”, and for two projects there is no commissioning date provided and hence it is impossible to determine whether the project is on track or not.

<sup>142</sup> Please note that this analysis does not include all PCIs, but only those for which a commissioning date was provided both in 2016 and in 2017.

in 2016 and 2017<sup>143</sup>. However, a large number of projects – 20 out of 61 – are now expected to be commissioned later than originally planned. For such projects, the reported commissioning dates have shifted into the future by 1-2 years in comparison to the 2016 schedule. The commissioning date of 1 PCI has been postponed by 3 years<sup>144</sup>.

From Figure 31 it is evident that the **period during which the highest number of projects is expected to be commissioned has shifted into the future by about a year, to 2019-2022**. This phenomenon is very similar to the findings of the Agency’s previous two PCI monitoring reports: a number of PCIs are pushed further into the upcoming five-year period compared to the previous year of reporting, and the likelihood of the commissioning date slipping into the future is higher for projects which were initially planned to be commissioned closer to the reporting date, i.e. the present. More than half of those PCIs which in 2016 were supposed to be commissioned during 2018 and 2019 are now (in 2017) reportedly expected to be commissioned 1 or 2 years later (i.e., in 2019-2021). The share of delayed or rescheduled projects generally decreases as the commissioning date recedes farther in time.

**Figure 31 – Number of PCIs to be commissioned as reported in 2017 and as planned in 2016**

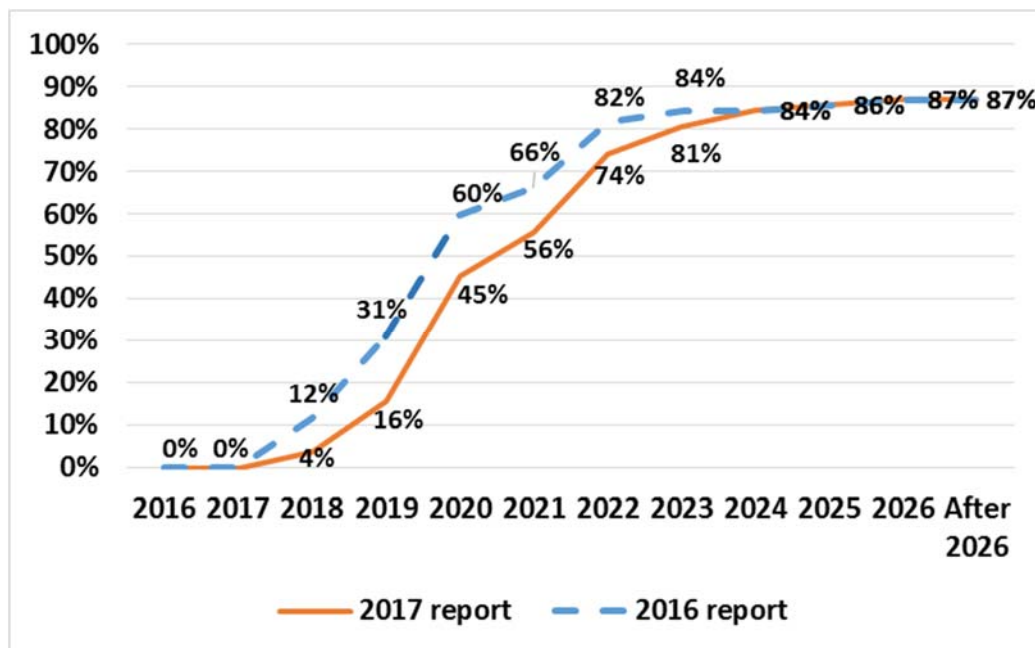


Similarly to previous reports, the Agency assessed the cumulative share of all PCIs to be commissioned in the years to come (cf. Figure 32).

<sup>143</sup> Please note that only those cases of delays and rescheduling in which the year of the commissioning is changed are indicated here. PCIs which are behind schedule several months but still within the same year, do not appear in these graphs.

<sup>144</sup> The graph in Figure 31 indicates in green the number of PCIs, for which the commissioning year was reported to be the same in 2017 and in 2016. The yellow bars show the number of PCIs which were planned to be commissioned one year sooner according to the 2016 PCI monitoring report, and the red bars indicate the projects, which were reported to be commissioned two years earlier than the current expectations.

Figure 32 - Cumulative share of PCIs to be commissioned per year<sup>145</sup>



Since the PCI implementation status presented in Section 3.3.1 refers to the least advanced part or investment item of the project, the Agency examined the reported dates by which major project implementation milestones are expected to be passed. This analysis, together with the data on works performed, aims at providing a better view of the PCIs' actual stage of implementation and of what was actually achieved during 2016.

The right-hand column of Figure 33 shows the number of PCIs which *actually entered* the relevant implementation phase during 2016<sup>146</sup>. The middle column indicates the number of projects for which promoters were *planning to enter* the relevant implementation phase according to information submitted to the Agency in the 2016 PCI monitoring report. The milestones appear in the approximate logical project implementation order<sup>147</sup>.

Figure 33 - Planned and achieved milestones in PCI implementation

Project implementation phase / milestone	Planned (January 2016)	Achieved (January 2017)
Feasibility study started	9	8
Feasibility study finished	5	6
Market test carried out	13	7
Permitting started	9	6
Permitting finished	8	3
FID taken	12	4
Tendering for construction started	12	3

<sup>145</sup> The absence of a reported commissioning date for a few PCIs means that a 100% coverage of all PCIs is not possible.

<sup>146</sup> These figures focus only on PCIs which have *reached and entered* the indicated stage. Projects which have already been (and continue to be) in the same implementation stage since before 2016 are not taken into account.

<sup>147</sup> Due to the heterogeneity of project implementation, there is no firm pre-defined order of steps which a promoter needs to follow during a project's implementation. The indicated order reflects a generalised picture based on the implementation statistics, and is without prejudice to individual project features.

Tendering for construction finished	10	5
Construction started	10	3
Construction finished	0	0

As several PCIs are lagging behind their previously reported schedule<sup>148</sup>, it comes as no surprise that certain milestones were reached by fewer projects than originally planned. The **expectations to carry out early stage and preparatory activities**, such as feasibility studies, **appear to be on track**, but **for subsequent implementation stages**, starting from the completion of a market test, **the achieved progress is generally behind the planned schedules**. The low number of projects which have completed permitting could indicate the existence of problems of both internal (promoter-related) and external (related to procedures, the relevant authorities, etc.) nature.

For some of the PCIs which failed to enter a scheduled implementation phase on time, promoters apparently still aim for commissioning by the original deadline (i.e., they did not report delays or rescheduling). The Agency notes that there is certain flexibility in project development in terms of reaching intermediate project milestones behind schedule, whereby promoters may speed-up all activities at a later point of time or re-arrange the performance of various works, so that the originally planned commissioning date is still reached on time. However, a recurrent failure to meet the planned milestones may raise doubts about the realism of the planned commissioning dates as well.

Another reason for concern is the fact that early project stages tend to be implemented on time, but subsequent stages tend to get postponed. Feasibility studies started according to schedule in 8 out of 9 instances (89%) and were always completed on schedule or even ahead of schedule. However, once the projects go into more advanced implementation stages, works performed tend to lag more and more behind schedule: market tests were completed on time in 54% of the instances, permitting started on time in 66% but was finished according to schedule in 38% of the cases, FID was taken as planned in 33% of the cases, and construction began as planned in 2016 for just 25% of the projects. Overall, the pattern is to abide by the intended schedule of project milestones for works which do not require great expenditure or resources (“desktop studies” and permitting), but to slow down when the project reaches the stages of actual commitment of significant capital and resources (tendering and contracting, field works).

***A historic overview – changes in the commissioning dates between 2013 and 2017***

On the basis of the available information, the Agency compared the evolution of the planned commissioning dates for 41 PCIs from 2013 and 2017. There are only 3 PCIs<sup>149</sup> which still foresee to be commissioned by the date originally planned back in 2013. In the case of 9 PCIs, the commissioning date has been shifted by **2 years or less**. The remaining 29 PCIs in this sample were postponed by **4 years** on average compared to 2013. The longest postponement compared to 2013 is 7 years (2 PCIs).

<sup>148</sup> For more information about the timely implementation of PCIs vs. project schedules, please consult Section 3.3.4.

<sup>149</sup> PCIs 5.7.1, 7.1.1 (TANAP) and 8.2.4.



### 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 “on time” if the commissioning date is unchanged compared to that of last year, i.e. changes in the commissioning date of a PCI which took place in 2015 or earlier are not visible on Figure 34. Therefore, a project which was delayed or rescheduled two years ago but was able to keep up to that postponed schedule in 2016, appears here as being “on time”. A project whose implementation is sped up and for which therefore the expected commissioning date is earlier than in the previous year is considered to be “ahead of schedule”.

A project can fall behind its schedule due to either delay or rescheduling. For the purpose of this Report, as for the previous ones, the Agency considers a project “rescheduled” if 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 to other transmission solutions, while a project is “delayed” if it is still needed at the expected date, but cannot be delivered on time due to various external factors, such as permitting (including environmental licencing), legislative reasons, etc.<sup>150</sup>.

The reported state of implementation for 2017 is very similar to those described in the 2016 PCI monitoring report: **roughly half of the PCIs are reported to be on time and the other half is reported to be behind schedule (cf. Figure 34)**. The share of delayed projects is identical to the one reported in 2016. However, there are relatively more rescheduled projects.

Figure 34 – Progress of PCI implementation (2017 vs. 2016)

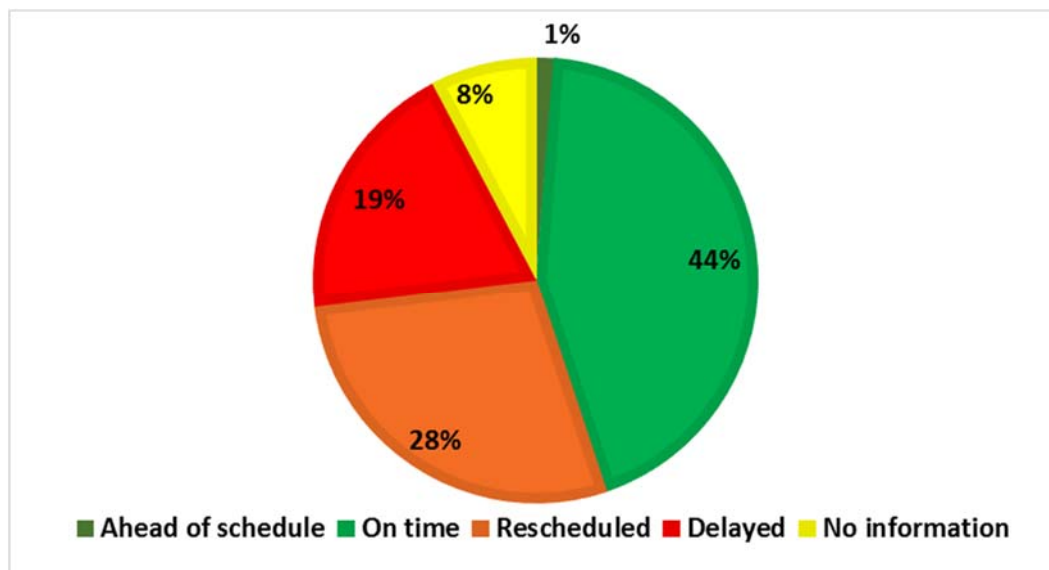


Figure 35 displays the current state of implementation per priority corridor as of 2017. The **largest share of PCIs which are on time** compared to the expectations in 2016 is in the **NSI West** corridor. In 2016, projects in the NSI West corridor had the lowest share of projects on time among all corridors, because many projects in NSI West were rescheduled in 2015-2016. The 2017 results show that most PCIs which slipped behind schedule in 2015-2016 managed to stick to that postponed timeline.

<sup>150</sup> Cf. Section 5 of the Agency’s Opinion No 16/2014.

In the **NSI East** corridor, the **trend is the opposite**: the share of PCIs which are on time decreased from 44% to 29%, due mostly to the higher number of rescheduled projects. Simply put, in the NSI East corridor there are PCIs which were on time in January 2016 compared to the schedule of 2015, but fell behind that schedule in the course of 2016.

Several projects in **SGC** also **fell behind schedule during 2016**. The share of projects on time fell sharply in SCG from 75% to just 42%.

The progress of PCIs in the **BEMIP** corridor in 2017 is almost identical to the results in 2016.

**Figure 35 – Current state-of-implementation per priority corridor**

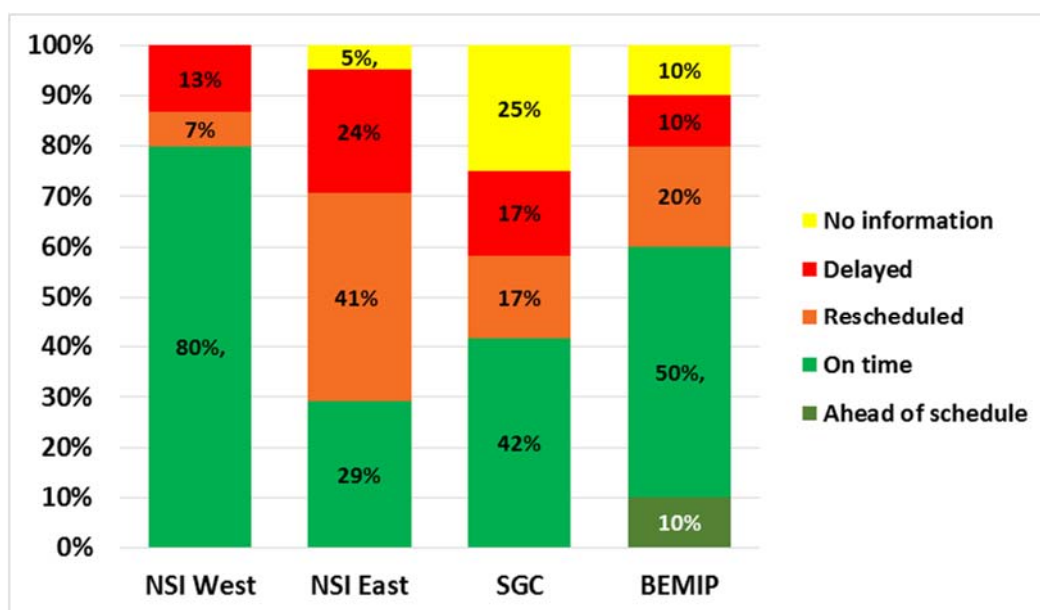


Figure 36 shows that in 2017 all the PCIs which were already **under construction** by January 2017 are on schedule, which is an improvement compared to the previous year. During the **permitting** stage, projects are still experiencing delays and rescheduling and tend to fall behind schedule. During the **planning phase**, PCIs have a 50-50 chance of being on schedule, whereas projects **under consideration** are largely on time. 1 PCI was cancelled and its schedule is no longer available.

The specific pattern of delays or rescheduling across the phases of a project’s implementation appears to confirm the Agency’s conclusion from the 2016 PCI monitoring report, notably that project promoters should dedicate more effort to managing their risks and business framework in the “mid-life years” of the project, and foresee mitigation strategies in order to overcome or avoid those potential delays which fall under the promoters’ control. The “mid-life crisis” of the PCIs apparently leads to even more serious delays and rescheduling during the final stages of implementation (actual contracting and field construction works): **once a project fails to meet a milestone, it is not just unlikely to make up for the lost time later on, but has a fair chance of accumulating even more postponement**. It could also be a sign for **Competent Authorities to scrutinize whether the permitting framework effectively provides to the promoters of PCIs all the benefits foreseen by Regulation (EU) No 347/2013**.

**Figure 36 - Breakdown of PCIs per implementation status and implementation stage compared to schedule**

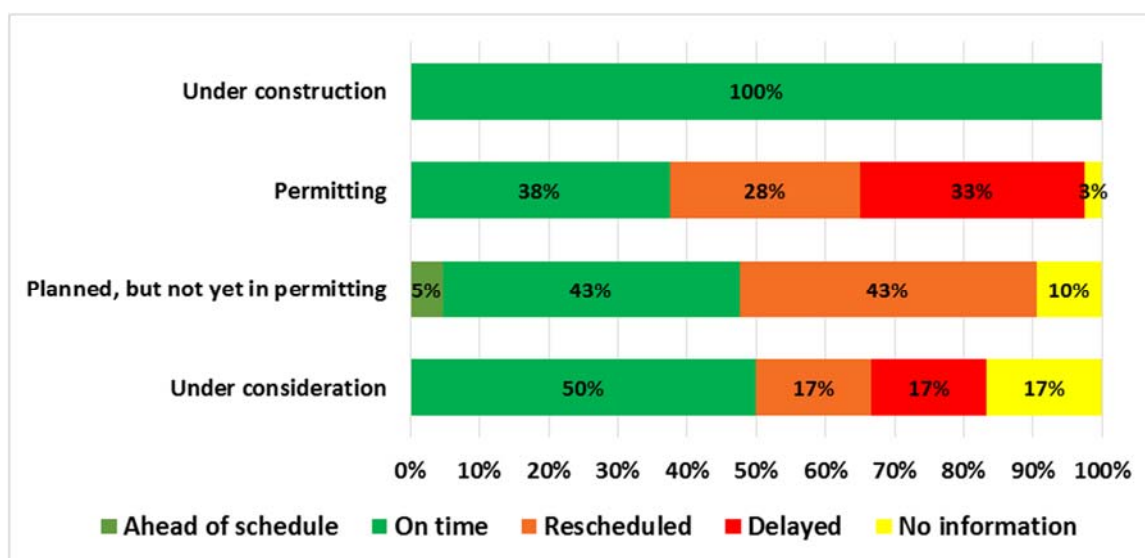


Figure 36 illustrates the overall progress of the PCIs compared to their 2016 schedule, but not the changes at individual project level. The Agency examined **how each PCI managed to keep to the original schedule milestones during the two-year lifetime of the 2015 PCI list**. Based on the findings of this examination, the Agency notes that PCIs generally fall in the following three groups:

- Projects which kept by the original commissioning date target (22 projects – 28% of PCIs): these are projects which are expected to be commissioned by the date reported in the 2015 PCI selection process, i.e. projects which have not been rescheduled or delayed since then.
- Projects which fell behind schedule in one of the two years of the PCI list (24 projects – 31% of PCIs): this category includes PCIs which were either rescheduled or delayed during 2015 but kept by that new schedule in 2016, or projects that were on time in 2015, but fell behind schedule in 2016.
- Projects which have been continuously falling behind schedule since 2015 (21 projects – 27% of PCIs): for these PCIs, commissioning dates have been pushed farther in time each year. Such PCIs have been repeatedly either delayed or rescheduled, or put off by a combination of delays and rescheduling.

Detailed information is available on Figure 37.

**Figure 37 - Breakdown of PCIs per status and timing (no. of PCIs)**

Progress 2015 \ Progress 2016	On time <sup>151</sup>	Rescheduled	Delayed	No information
On time <sup>152</sup>	22	7	5	4
Rescheduled	10	8	1	0
Delayed	2	3	9	1
No information	0	2	0	1

<sup>151</sup> For the purpose of the table, this category also includes PCIs which were/are “ahead of schedule”.

<sup>152</sup> Idem.

The Agency notes that the share of the PCIs in the various progress categories (on time, delayed and rescheduled) is the same as a year ago (cf. Figure 34), i.e. the pattern of progress of *all* PCIs measured year-on-year (2016 vs. 2015, 2017 vs. 2016) did not change. However, most of the PCIs which experienced delays or rescheduling in 2016 are not the ones which had already experienced delays or rescheduling earlier. The bottom line is that **the chance of a PCI eventually to be delayed or rescheduled increases over time, and by 2017 the bulk of the PCIs are behind the original 2015 schedule.**

Lacking data does not allow all (77) PCIs to be included in this analysis, but it is clear that **by 2017 approximately only one-third of the PCIs in the 2015 PCI list are still on track in their implementation.** Another one-third of the projects experienced a setback in one of the two years of the lifetime of the 2015 PCI list, and yet another one-third of the projects experienced such a setback on more than one occasion in their lifetime. **Overall, about two-thirds of the projects are now behind their original schedules,** and this level of across-the-board delays and rescheduling was “achieved” in just about 2 ½ years’ time. **The Agency is of the view that the quality of PCI planning and implementation deserves far more attention by all stakeholders, in order to bring the pace of PCI implementation closer to the initially targeted goals.**

The average length of both **rescheduling** and **delays** experienced in 2016 was 15 months.

### **3.3.5 Reasons for rescheduling, delays and difficulties encountered by the project promoters<sup>153</sup>**

#### **3.3.5.1 Rescheduling**

Project promoters were invited to indicate the main reasons for rescheduling. Among such reasons, the ones referred most commonly to are the **need to bring the project in line with the results of a market test or open season** which would take place at a later date (6 instances) and the existence of **uncertainties in the gas market** (5 instances). In 3 instances, the rescheduling was the result of the **re-prioritisation of the project’s implementation against other investments of the project promoter, and in 2 instances - of the lack of financing<sup>154</sup>.**

Other reasons for rescheduling were mentioned by project promoters only in individual cases<sup>155</sup>:

- Change of route;
- Changes due to complementarity with other rescheduled infrastructure investments of the promoter;
- Lack of clarity on the permit granting process;
- Re-assessing changes in the project’s main characteristics;
- Regulatory uncertainty;
- Unbundling.

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<sup>153</sup> There were no specific reasons mentioned for any difficulties encountered by the promoters. PCI 6.4 indicated a reason under “rescheduling”, which was taken into account there.

<sup>154</sup> In one of these two instances of lack of finance, the promoter also pointed out to unbundling as a reason for rescheduling.

<sup>155</sup> The listing of the reasons is in alphabetical order and does not reflect any priority or merit order.

A comparison with the reasons for rescheduling indicated by the promoters in 2016 shows **no consistent pattern of recurring reason(s) for rescheduling**. The indicated reasons appear to be related to *ad hoc* circumstances, rather than to a continuously existing condition or “bias” influencing the decisions of the project promoters.

### 3.3.5.2 Delays

The number of delayed projects remained essentially the same as in the 2016 PCI monitoring report (1 PCI less in 2017) and accounts for 19% of PCIs.

Promoters could indicate the main reason for the delays. The reasons for delays reported by the project promoters are related to the following issues<sup>156</sup>:

- Changes in national tendering procedures / longer administrative procedures;
- Obstacles in land acquisition;
- Permitting process;
- Prolonged administrative procedures related to Environmental Impact Assessment // appeal against a decision on environmental conditions;

A few reasons for delays mentioned in individual cases seem to be mainly related to the promoters' activities, such as<sup>157</sup>:

- Lack of activity from the promoter's counterparty promoter;
- Longer geological studies;
- Uncertain market demand<sup>158</sup>.

The common theme in most of the promoters' reports is delays related to various administrative procedures. However, due to the low number of responses, the available reports do not provide a representative sample and **no definite conclusion can be drawn regarding difficulties in permitting and other procedures as causes of delays**.

### 3.3.6 Duration of implementation

The Agency, following its practice in the previous editions of PCI monitoring reports, examined the length of the time which is expected to pass between the end of the market test and the commissioning date of PCIs. Because of the significant variety in the scope, technical characteristics and implementation conditions of the projects, this indicator aims at providing an overall picture of the expected duration of the PCIs' implementation, but is not meant to constitute or be used as a benchmark.

Information was provided for approximately half of the PCIs. The results show an **increase in the expected duration of time elapsing between the completion of a market test and the commissioning for transmission projects (additional 1 month) and for UGS facilities (additional 8 months)**. Promoters expect that it will take up to 5 years (56 months) from market test to commissioning of transmission projects, and more than 9 years (111 months) for UGS facilities. LNG PCIs are foreseen on average to reach commissioning during the same length of time as planned last year (78 months, 6 ½ years). Storage projects appear to

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<sup>156</sup> The listing of reasons is in alphabetical order and does not reflect any priority or merit order.

<sup>157</sup> *Idem*.

<sup>158</sup> This reason is mentioned here because the promoter indicated it as a reason for delay. However, it should be considered more as a reason for rescheduling.

continuously slip in time, as the expected period between the market test and the commissioning has been consistently extended by the promoters over the last 2 years. This is in line with the fact that the majority of the UGS projects is either delayed or rescheduled.

### Key findings and recommendations

- The Agency notes positively that 8 PCIs indicated progress in their status from one stage of implementation to a more advanced one.
- The Agency notes that a higher number of project promoters, compared to the previous reporting period, indicated that works have been performed in the course of 2016. However, the Agency notes that there are still PCIs for which no activity was reported for the entire period since 2015. **The Agency recommends that the Regional Groups thoroughly scrutinise the merits of candidate projects for the 2017 PCI selection for which no evidence exists of any implementation effort during the two years of their presence on the 2015 PCI list<sup>159</sup>.**
- **The commissioning dates of the PCIs continue to be shifted to the more distant future and now most of the PCIs are scheduled for commissioning in 2019-2022.** Not a single PCIs was planned to be commissioned or will actually be commissioned during the period of the 2015 PCI list.
- On a year-on-year basis (January 2017 vs. January 2016), approximately half of the PCIs are reported to be on track, with the other half being either delayed or rescheduled, a pattern similar to the one reported in 2016 vs. 2015. However, since the PCIs experiencing postponement are not the same in 2016 and in 2017, cumulatively the postponements mean that approximately only one-third of all PCIs have been consistently on time since early 2015. Another one-third experienced a postponement in either 2015 or 2016, and one-third of the PCIs was repeatedly put off to a later date every year.
- An insight into the progress of the individual PCIs indicates that projects are generally falling behind schedule in terms of not meeting both their commissioning date and the specific implementation milestones during the “mid-life” years of the project. In fact, once construction begins, the chances of a project experiencing postponement are much lower compared to the likelihood of postponements occurring in less advanced project phases, but time already lost will not be made up. In this sense, the “mid-years” of the project’s implementation cycle seem to be the ones when postponement problems tend to appear – and stay. **The Agency recommends to all stakeholders that the future monitoring of PCI implementation examines the progress of projects on a level of detail of the main implementation stages that would allow a clearer picture to be gleaned about the development of the PCIs and the reasons for postponements.**
- Based on the reports received by the Agency so far, there appear to be no consistently recurring reasons for project rescheduling across the various iterations of PCI monitoring. As regards delays, the reports suggest that difficulties exist that are related to the various administrative procedures, as applicable to project development and implementation. However, in the absence of a representative sample of reports touching

<sup>159</sup> PCI 6.25.2 (did not apply to become a PCI in 2017), PCI 7.1.6, PCI 7.3.2, PCI 5.3

on such reasons, the assumption about the existence of systemic administrative difficulties cannot be confirmed. **The Agency recommends that any concerns regarding administrative hurdles (*inter alia* related to permitting, tendering and Environmental Impact Assessment) are communicated by the project promoters to the Regional Groups.**

## 3.4 Progress of costs and benefits

### 3.4.1 Investment costs

In its previous Reports, the Agency made the conservative assumption that 100% of the indicated investment costs occur in the year of the commissioning of the project<sup>160</sup> and assessed the scale of investment that would be made in the coming years if all PCIs were to be implemented on the schedules reported by the promoters<sup>161</sup>.

In 2017, the project promoters reported in several instances changes in both the investment costs and in the PCI implementation schedule<sup>162</sup>. The modifications of these two items result in a remarkably different map of the potential investment outlays in the coming years.

The indicated **total investment costs for all PCIs amount to €52.7 billion**<sup>163</sup>, which is €1.3 billion lower compared to the 2016 PCI monitoring round. This aggregated figure includes reported instances of both **increases and decreases of the investment costs of projects**<sup>164</sup>. The reported reasons for changes in costs are indicated below.

#### **Reported reasons for an increase in the investment costs<sup>165</sup>:**

- Changes in a project's scope or technical characteristics (e.g., pipeline diameter, number of pipe strings, compressor power) – **main reason in 2015 and in 2016**
- Better cost estimate;
- Extra costs related to safety, environmental or legal requirements;
- Updated values provided by the feasibility study.

#### **Reported reasons for a decrease of the investment costs<sup>166</sup>:**

- Changes in a project's scope or technical characteristics (e.g., pipeline diameter, number of pipe strings, compressor power) – **main reason in 2015 and in 2016**

<sup>160</sup> 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.

<sup>161</sup> It is unlikely that all PCIs will be implemented, as the PCI list contains 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.

<sup>162</sup> Several projects are behind schedule and their implementation date has been moved to a later point in time. For the details, please consult Section 3.3.3 of this Report.

<sup>163</sup> This figure includes also the PCIs for which no commissioning date was provided and hence do not appear in Figure 38.

<sup>164</sup> For 12 PCIs reported total investment costs increased, for 41 PCIs the costs remained unchanged and for 19 PCIs reported investment costs decreased. There were 6 PCIs where a comparison was not possible due to a missing figure in one of the years.

<sup>165</sup> The reasons – apart from the first point – are listed alphabetically and not necessarily in order of priority or merit.

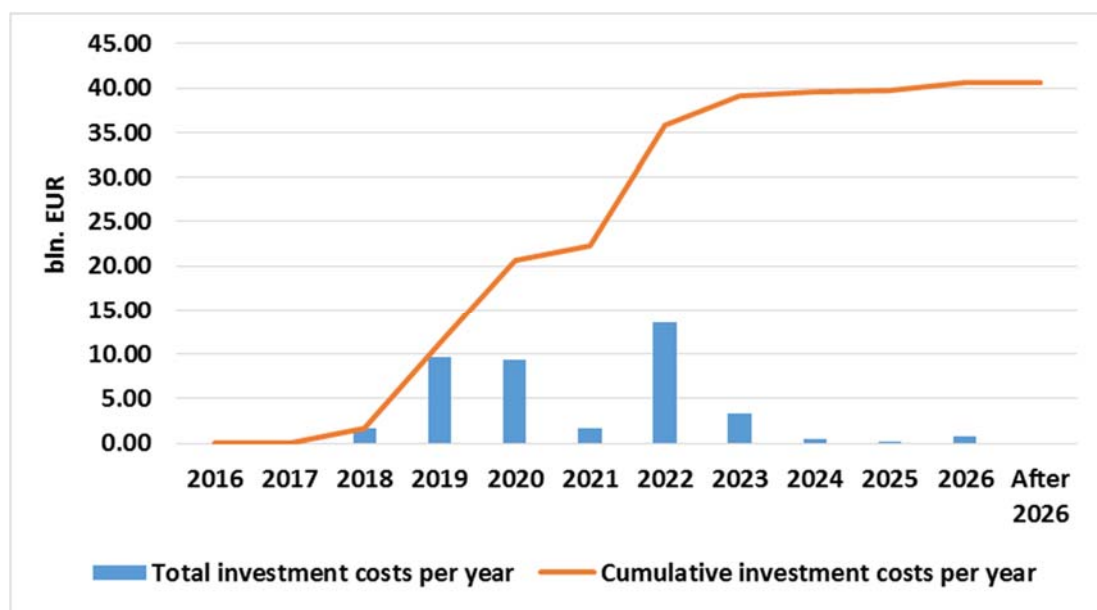
<sup>166</sup> Idem.

- Better cost estimate related to the advancement in implementation, better information available to the promoter;
- Currency exchange rate change;
- Some cost elements are not considered (e.g. financial cost);
- Some project elements are not considered (to ensure comparability with the previous report by the promoter).

The shift in the commissioning dates of a number of PCIs to a more distant future substantially changed the expected level of investment to be realised in the next few years. In 2016, the project promoters planned to invest €15 billion and €16 billion in the years 2019 and 2020, respectively. Figure 38 shows that **currently promoters plan to invest €0.6 billion and €0.2 billion in 2019 and 2020 respectively, which is 40% less than the planned level of investment reported last year.**

At the same time, a new **€13.5 billion** “peak” of investment appears in 2022, due to the postponement of the commissioning dates of projects with high investment needs.

**Figure 38 - Total investment costs of PCIs (€billion)**



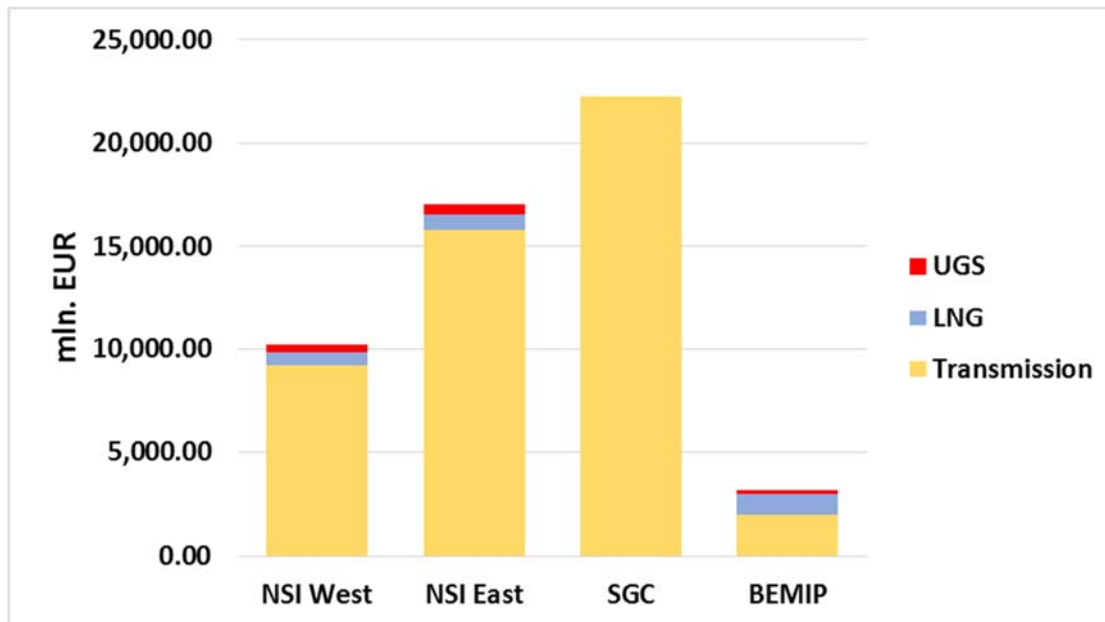
The **SGC** continues to account for the largest share in the planned investment costs among the priority corridors – slightly more than 40% of the total costs of all PCIs. SGC is followed by the **NSI East** corridor, which represents roughly 30% of all PCI investment costs, and the **NSI West** corridor, with a 20% share. The **BEMIP** corridor has the lowest share in the estimated investment costs among the corridors - 6%. The shares of the priority corridors in the total investment costs have not changed compared to the 2016 PCI monitoring. Figure 39 shows the level of investment costs in each priority corridor with a breakdown by project type.

The **ranges of variations in the estimated investment costs** were almost identical to last year’s figures in transmission (16% downward, 20% upward) and storage projects (11% both downward and upward). For LNG projects, the promoters reported higher variations (17% downward and 19% upward) vis-à-vis 10% for both upward and downward variations in the previous report. The main **drivers behind the reported variations** are the same as the ones



reported last year, i.e. uncertainties related to procurement and construction and to the degree of accuracy of the cost estimate at the early stages of project implementation and cost estimation.

**Figure 39 - Investment costs per priority corridor and project type (€million)**



Tracking the actual level of investment outlays provides useful insights into the progress of the PCIs. Similarly to the approach adopted in 2016, the Agency invited promoters to report the amount of capital which had been spent on the project from the project's inception until January 2017. The difference between this figure and the amounts indicated by the project promoters for the incurred investment costs in 2016 provides information about the **actual investments in PCIs made between January 2016 and January 2017**.

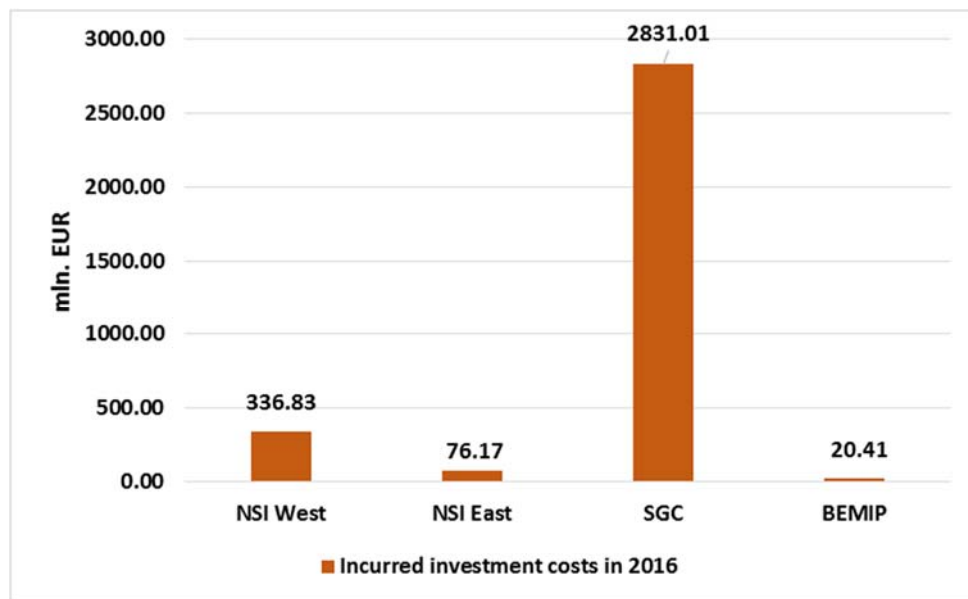
The results (cf. Figure 40) indicate that ca. **€3.2 billion was invested in PCIs in 2016**. This amount is higher than the realised investment until December 2015<sup>167</sup>, which stood at €2.8 billion. Overall, about **€6 billion has been invested in PCIs since 2013**.

Just like in 2015, most of the spending in 2016 took place in the SGC and was related to only 2 PCIs (cf. Figure 40). In terms of absolute investment, in all priority corridors except for the SGC, promoters spent less money on their projects in the course of 2016 than until December 2015. The reduction of investment is quite significant in the NSI East and BEMIP corridors, where the incurred investment costs in 2016 amount to only one-third of those which were incurred until December 2015<sup>168</sup>. In both NSI East and BEMIP corridors the total investment actually made in all PCIs up to January 2017 is only a miniscule fraction of the estimated investment cost of these PCIs (cf. Figure 40), a fact which does not correlate well with the declared intentions of the promoters to commission the bulk of the projects within the next 5 years. The pattern is not much different in the NSI West corridor. In fact, if actual investment is to be considered, only 2-4 projects (of these, 2 major ones in SGC) have a clear prospect of being commissioned within a few years' time, and de-facto all such projects are already under construction.

<sup>167</sup> Starting from the inception of the project.

<sup>168</sup> Please refer to Figure 88 of the Agency's 2016 PCI monitoring report for the values of 2015.

**Figure 40 – Level of incurred investment costs in 2016 (€million and % of the total investment costs of PCIs in the priority corridor)**



### 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<sup>169</sup>.

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 an existing or planned investment in gas infrastructure**<sup>170</sup>.

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

Further caution is advised due to the fact that the comparison of the investment cost estimates provided by the project promoters and the UIC reference values relies on a number of assumptions, of which the main ones are listed in Annex VII, Figure 51.

#### *Overview of investment costs and main technical parameters*

Figure 41 shows the reported investment costs and the main technical parameters of transmission projects (e.g. total length of pipelines and compressor power) per priority corridor.

<sup>169</sup> 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](http://www.acer.europa.eu/official_documents/acts_of_the_agency/publication/uic%20report%20-%20gas%20infrastructure.pdf)

<sup>170</sup> 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.

The **largest share of investment costs** for transmission PCIs (42% of total) is in the SGC. The **highest share of installed compressor power** (50%) is in NSI East corridor. In terms of **total length**, out of more than 18,000 km of PCI pipelines, NSI East corridor’s projects dominate (43%), followed by SGC (31%), the NSI West corridor (15%), and the BEMIP corridor (4%).

The Agency notes that the total length of transmission PCIs exceeds approximately 2.5 times the estimated length of pipelines to be constructed in Europe over the next few years as reported by industry sources<sup>171</sup> for major probable pipeline projects in Europe (7,368 km). The Agency notes that, although the industry sources limit their estimate only to probable pipeline projects, the total length of planned PCIs still seems significantly to exceed the one reported by industry sources, and the latter covers 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 41 - Main technical parameters and investment costs of transmission PCIs**

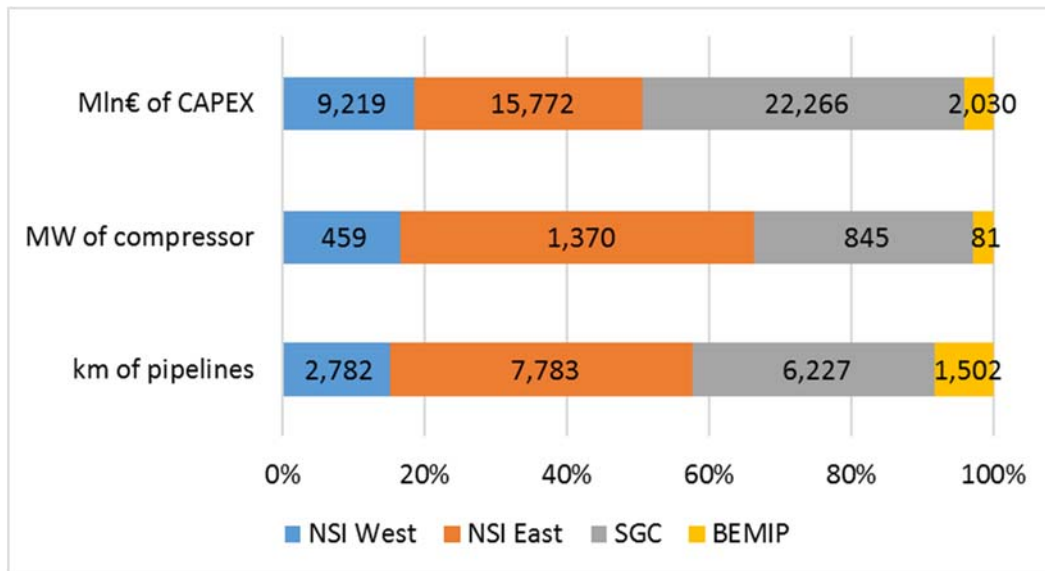


Figure 42 shows the length of pipeline PCIs per diameter and per priority corridor. As pipeline capacity is directly correlated to the diameter of a pipeline, it can be noted that the highest share of high (36”-47”) and very high capacity pipelines ( $\geq 48$ ”) is in the SGC (74% of the total length of pipe in this corridor), followed by the NSI East corridor (63%), the NSI West corridor (62%) and the BEMIP corridor (50%).

<sup>171</sup> Cf. Oil and Gas Journal, 6 February 2017, p. 63. In Europe, the gas pipeline construction in 2017 – *projects planned to be commissioned in that year* - is estimated at 339 miles, and beyond 2017 - *for some probable major projects whose installation will begin in 2017 or later* - at 4,239 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.

**Figure 42 – Length of PCI pipelines per range of diameter, per priority corridor (km)**

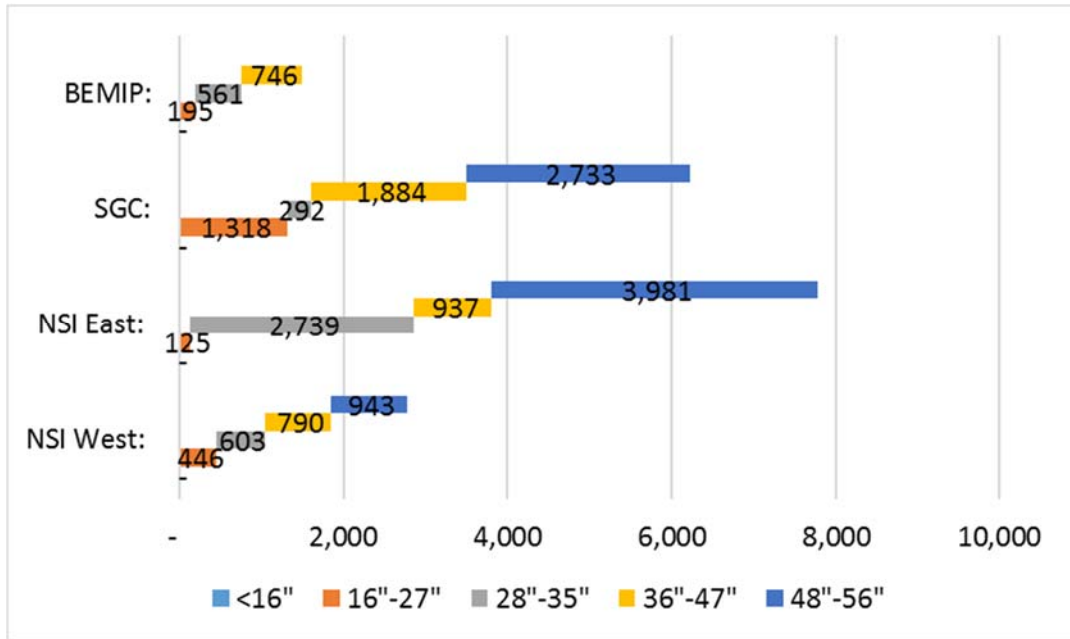
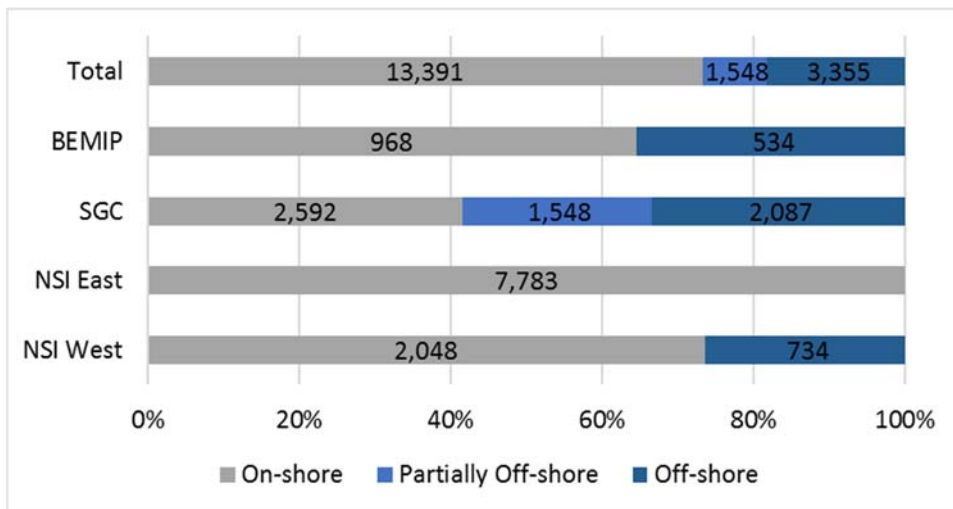


Figure 43 shows that, while about **75% of all transmission PCIs are located on-shore, the share of on-shore projects varies significantly across the priority corridors**. All NSI East corridor’s projects are on-shore; in contrast, more than 50% of SGC projects are located either partially or completely off-shore. Between these two extremes, 26% and 36% of NSI West corridor’s and BEMIP corridor’s projects are, respectively, located partially or completely off-shore.

**Figure 43 - Length of on-shore, partially off-shore, and off-shore pipelines (km)**



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

Figure 44 shows that the **total reported investment costs for transmission PCIs exceed the total investment costs calculated by using the average UIC reference values by 33%**. The reported values are 14% over the third or upper quartile (Q3) of UIC values, but 21% below the maximum observed UIC values. There are a number of possible reasons that could explain, to some extent, such deviation from the average reference values. Among such possible reasons, the following may be considered in order to avoid deriving premature conclusions regarding the reported costs for transmission PCIs:

- Reference values are available only for on-shore pipelines, however 25% of the total length of transmission pipeline PCIs is located either partially or entirely off-shore. Off-shore pipelines are generally more expensive per unit (km) than on-shore lines of equivalent capacity. Thus, it is reasonable to expect that project investment cost estimates for off-shore projects would 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 the project affect both the overall level and the structure of 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 electricity driven.
- The UIC reference values – which are used for this analysis – are based on a sample of pipelines laid down exclusively in the territory of the European Union (EU) and are arrived at by using average figures on EU level. However, some transmission PCIs are outside the EU, in particular some projects in the SGC, where the actual cost levels may be different.

**Figure 44 - Total reported investment cost vs. total cost by using UIC values, transmission PCIs (€ million)**

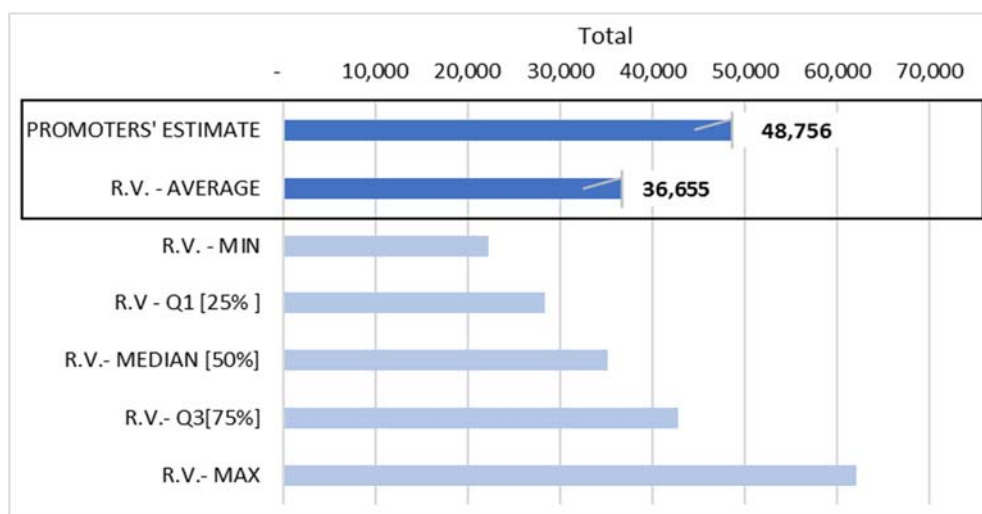
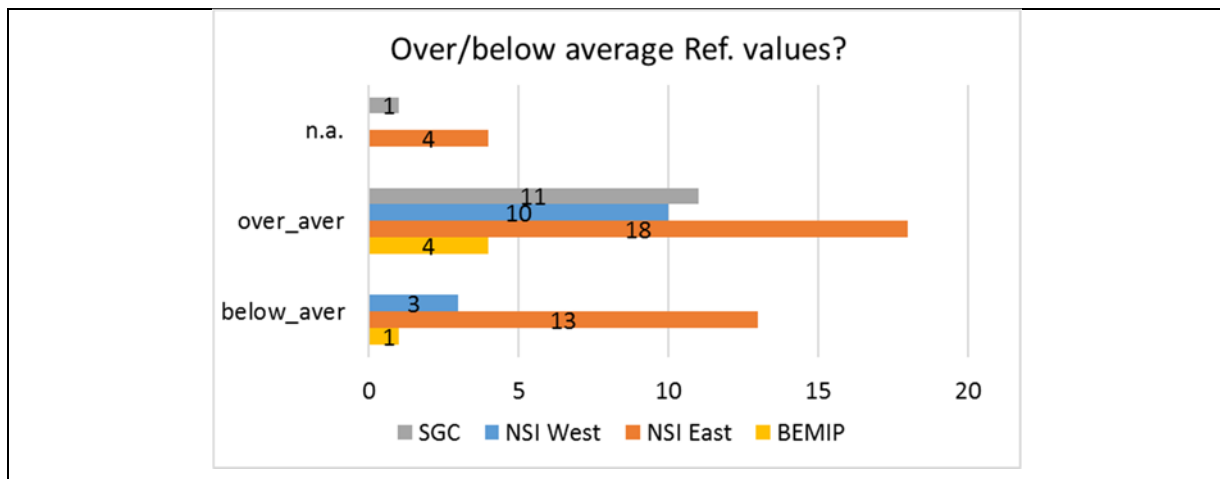


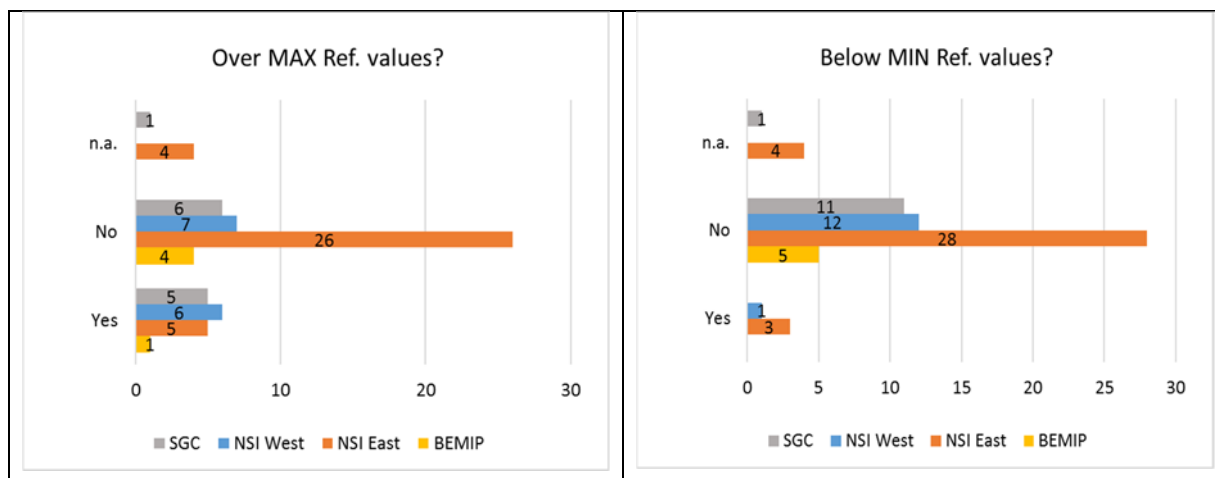
Figure 45 shows the analysis per priority corridor, and Figure 46 provides the number of PCIs reporting investment costs above or below certain types of reference values (average, minimum, and maximum)

**Figure 45 - Total reported investment cost vs Total cost applying reference values (€million), per priority corridor**



**Figure 46 – No. of projects over and/or below the average, maximum and minimum reference values**





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 72%** the total investment costs calculated by applying **the average UIC** reference values, and is only slightly (by 2%) 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.
- NSI West corridor's projects appear to be quite "expensive" with reference to the UIC values (the latter being calculated as pan-EU average). This 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. In the NSI West corridor, 25% of the length of PCIs pipeline is off-shore, which may also be correlated with the upwards deviation compared to the UIC reference values which only consider on-shore projects.

#### NSI East corridor:

- The total **investment costs reported by promoters is 7% below** the total investment costs calculated by applying **the average UIC** reference values, but well above (47%) the investment costs calculated by using the *minimum* UIC reference value. Approximately 50% of transmission PCIs are over the *average* reference UIC reference values.
- NSI East corridor's projects appear to be somewhat "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 off-shore projects may explain this downward deviation, and that the total estimated reported investment costs appear to be reasonable.

## SGC:

- The total **investment costs reported by project promoters exceeds by 80%** the total investment costs calculated by using the *average* UIC reference values, **and slightly exceeds (by 6%) the total investment costs** calculated by using the *maximum* UIC reference value. All 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 relative scarcity of specialised construction services in this corridor, in particular for projects outside the EU borders (42% of the total length of SGC projects), the complex terrain of the route of some projects, and the presence of long off-shore sections<sup>172</sup> may explain this apparent “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 for tendering procedures to take a closer look at the specific project features and circumstances before arriving at conclusions.

## BEMIP:

- The total **investment costs reported by project promoters is essentially identical (only 2% higher)** to the total investment costs calculated by using the *average* UIC reference values.
- BEMIP corridor’s projects are in line with the UIC reference values at EU level.

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<sup>173</sup> focusing on ways and means that could help achieve lower project costs.**

### 3.4.3 Life-cycle costs

The current report includes the second iteration of life-cycle cost reporting. In the absence of a harmonised methodology for calculating project life-cycle costs in gas, the reported figures do not represent a sufficient sample and a meaningful analysis is not possible.

### 3.4.4 Expected benefits

**For the majority of the PCIs<sup>174</sup>, promoters did not provide information about the quantified benefits** as requested by the Agency<sup>175</sup>. The information was provided in just 12

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<sup>172</sup> 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).

<sup>173</sup> Cf. ACER UIC report for gas infrastructure, July 2015, pp. 27, 28 and 31.

<sup>174</sup> 65 out of 77 projects

<sup>175</sup> 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.



cases, which did not allow the Agency to carry out an analysis of the expected PCI benefits or their annual changes.

Promoters repeatedly pointed to certain reasons which prevented them from providing information about expected benefits. Among such reasons is the fact that some of the benefits cannot be monetised by using ENTSOG's current CBA methodology, but can only be assessed via a qualitative analysis, and therefore no monetary values are available for the benefits. Some promoters indicated that a CBA providing an assessment of the benefits may become available later (e.g., at the time of finalising the feasibility study of the project).

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.**

#### **Key findings and recommendations**

- The overall **estimated investment costs** associated with the PCIs amount to **€52.7 billion**, which is €1.3 billion lower than the 2016 PCI estimate, mainly due to changes in the scope or in the technical characteristics of some projects, better cost estimates, and the non-inclusion (for various reasons) of certain cost items or project elements in the overall estimated costs.
- **Promoters reported to have spent €6 billion on the current PCIs** by January 2017 (€3.2 billion in 2016 and € 2.8 billion in the previous reporting period). The bulk of these investments is in a limited number of projects which are already under construction. The financial resources mobilised for PCIs in a less mature stage of implementation are lower.
- After comparing the total reported investment cost vs. the total cost calculated by using UIC reference values, the Agency finds that **promoters of transmission PCIs “prima facie” do not underestimate the investment costs of the projects.** The total reported investment costs exceed the level calculated by using the UIC *average* reference values by 33%, but **in the majority of instances costs appear to remain within a reasonable range.** In instances where the reported costs significantly exceed the reference values, the Agency recommends promoters and NRAs to conduct further detailed analyses of the specific circumstances and features of the projects.
- 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 (supply of and demand for CIME services) for specific 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.**

- The Agency highlights that the current cost-benefit analysis (CBA) methodology for gas infrastructure<sup>176</sup> does not allow project promoters to establish the level of monetised benefits and track their evolution. In the absence of such a feature, only a few promoters attempted to elaborate on the details of the benefits that their projects would bring. **The Agency reiterates its position<sup>177</sup> that the updated CBA methodology should facilitate the work of project promoters in pursuit of providing benefit-related information in adequate detail and format.**

### 3.5 Regulatory treatment and financial support to the projects from public sources

In addition to the other regulatory tools aiming at facilitating the development of PCIs, Regulation (EU) No 347/2013 introduced the notions of the “pre-application” and “statutory procedures” in the permit granting with a limited length of time available for these processes. The Agency notes that in some cases the project promoters seem to overlook Article 10(1) of Regulation (EU) No 347/2013, which deals with a pre-application procedure within the permit granting process. This “lack of attention” phenomenon **suggests that the relevant competent authorities and promoters should work closely together** to make sure that the promoters are aware of the procedures in permitting.

#### 3.5.1 Investment requests and decisions

**During 2016, project promoters submitted 5 investment requests to NRAs<sup>178</sup> (2 for PCIs in the NSI East corridor and 3 for PCIs in the BEMIP corridor). Out of these 5 projects, 4 projects have already received from the NRAs a positive decision on the investment request, including cross-border cost allocation (CBCA) (cf. Figure 47).** For one PCI<sup>179</sup>, the final decision was about to be delivered<sup>180</sup>. Until January 2017, all in all, 16 gas investment requests resulted in positive decisions (including CBCA) by NRAs.

PCI promoters intend to submit investment requests covering 13 PCIs in 2017. For 37 PCIs, the promoters do not plan to submit an investment request in 2017, and in 27 other cases they still have not decided on the intention to submit an investment request (cf. Figure 47).

The Agency notes that the number of investment requests depends on the maturity of the PCIs and thus may vary in the future depending on the number of mature projects on the PCI list.

<sup>176</sup> Cf. ENTSOG CBA methodology:

[https://www.entsog.eu/public/uploads/files/publications/CBA/2015/INV0175-150213\\_Adapted\\_ESW-CBA\\_Methodology.pdf](https://www.entsog.eu/public/uploads/files/publications/CBA/2015/INV0175-150213_Adapted_ESW-CBA_Methodology.pdf)

<sup>177</sup> Cf. Opinion of the Agency No 04/2014 on ENTSOG cost-benefit methodology:

[http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Opinions/Opinions/ACER%20Opinion%2004-2014.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Opinions/Opinions/ACER%20Opinion%2004-2014.pdf)

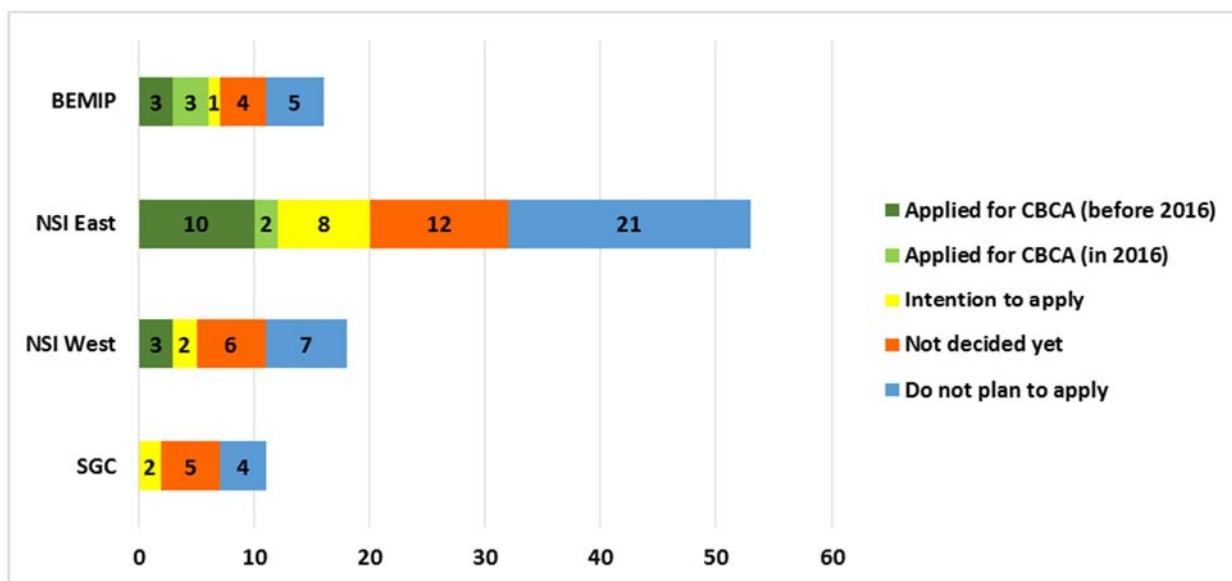
<sup>178</sup> As a comparison, promoters submitted 4 investment requests to NRAs in 2015.

<sup>179</sup> As of January 2017. In April 2017, the NRAs of Croatia and Hungary adopted a coordinated decision on the investment request (including CBCA) for “Gas pipeline Omisalj-Zlobin-Bosiljevo-Sisak-Kozarac-Slobodnica - Phase I (Croatia)”, related to PCI 6.5.2.

<sup>180</sup> For more information about investment request decisions (including cross-border cost allocation) as of January 2017, please consult the Agency’s report of 23.03.2017:

[http://www.acer.europa.eu/official\\_documents/acts\\_of\\_the\\_agency/publication/overview%20of%20cross-border%20cost%20allocation%20decisions%20-%20status%20update%20as%20of%20january%202017.pdf](http://www.acer.europa.eu/official_documents/acts_of_the_agency/publication/overview%20of%20cross-border%20cost%20allocation%20decisions%20-%20status%20update%20as%20of%20january%202017.pdf)

**Figure 47 – Submission of investment requests and future plans per priority corridor**



### 3.5.2 Risks and incentives

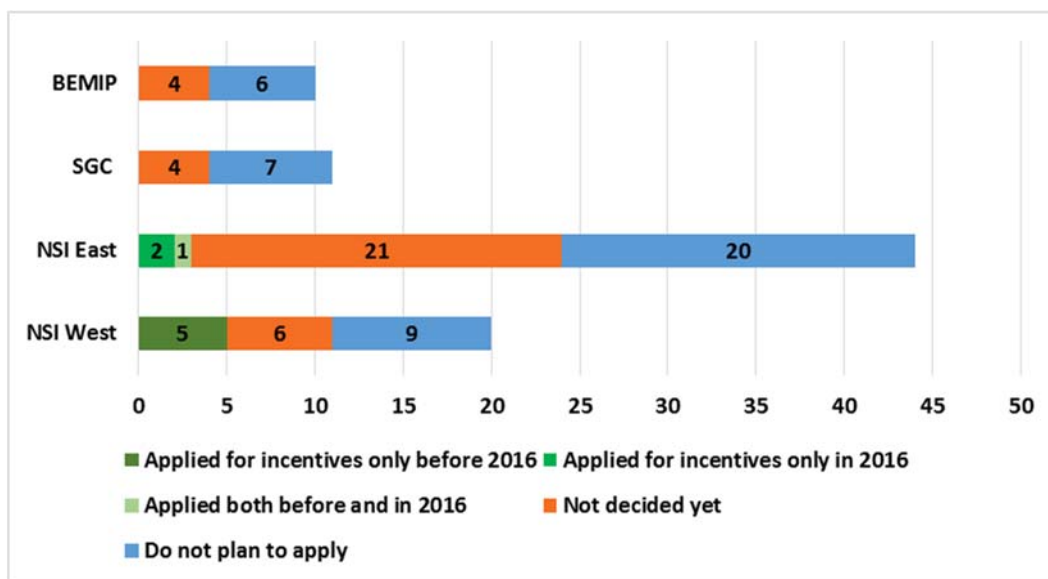
According to Article 13(1) of Regulation (EU) No 347/2013, where a project promoter incurs higher risks for the development, construction, operation or maintenance of a PCI compared to the risks normally incurred by a comparable infrastructure project, Member States and NRAs shall ensure that appropriate incentives are granted to that project if it fulfils certain conditions.

Promoters' reports show that **2 applications were submitted for risk-related incentives in 2016** and no applications are expected to be submitted in the future<sup>181</sup>. This is a decrease compared to year 2015, when 6 PCIs applied for risk-related incentives.

The Agency notes that the low number of applications for incentives may merit a further analysis of the reasons due to which project promoters do not seem to have much interest in using such incentives for PCIs.

<sup>181</sup> Project promoters either do not plan to apply for incentives (41 PCIs) or they have not decided yet (35 PCIs).

Figure 48 - Past and planned applications for specific incentives by priority corridor

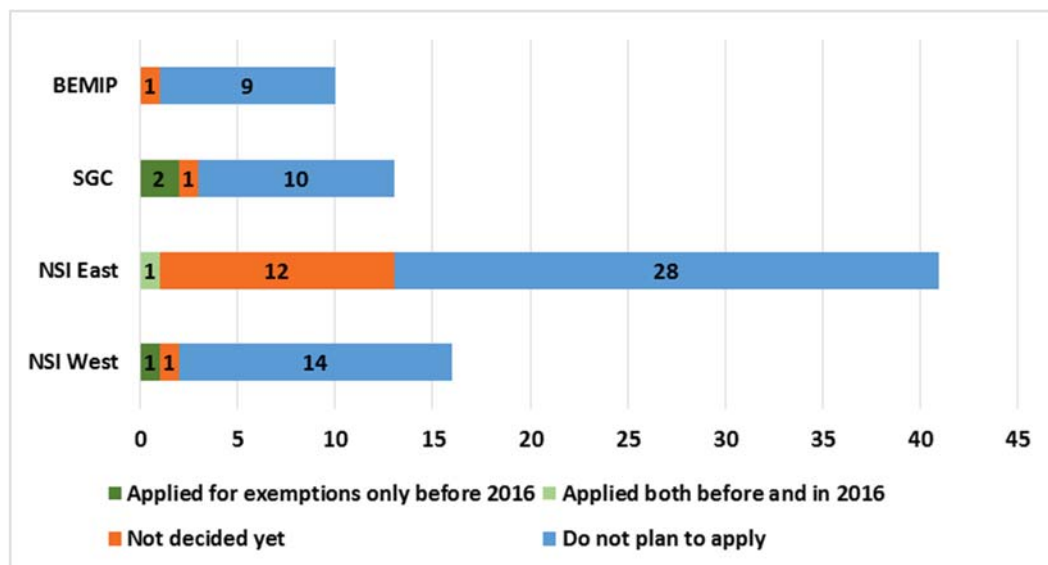


### 3.5.3 Exemptions

Promoters may apply for an exemption from third-party access rules or certain tariff-related obligations, in line with the Third Package<sup>182</sup>. However, in case such an exemption is granted, the project is no longer eligible for receiving either a cross-border cost allocation decision (and thus potentially also Union financial assistance from the CEF in the form of grants for works) or specific incentives.

The number of applications for exemptions is decreasing. **In 2016, no application for an exemption was submitted<sup>183</sup>**. A single project was marked as ‘other’ due to the fact that the promoter is currently in the process of applying for an exemption.

Figure 49 - Submitted and planned applications for an exemption by priority corridor (no. of PCIs)



<sup>182</sup> Exemption from Articles 32, 33, 34 and Article 41(6), (8) and (10) of Directive 2009/73/EC pursuant to Article 36 of Directive 2009/73/EC as referred to in Article 12(9) and Article 13(1) of Regulation (EU) No 347/2013.

<sup>183</sup> As a comparison, last year promoters reported 4 exemption requests.

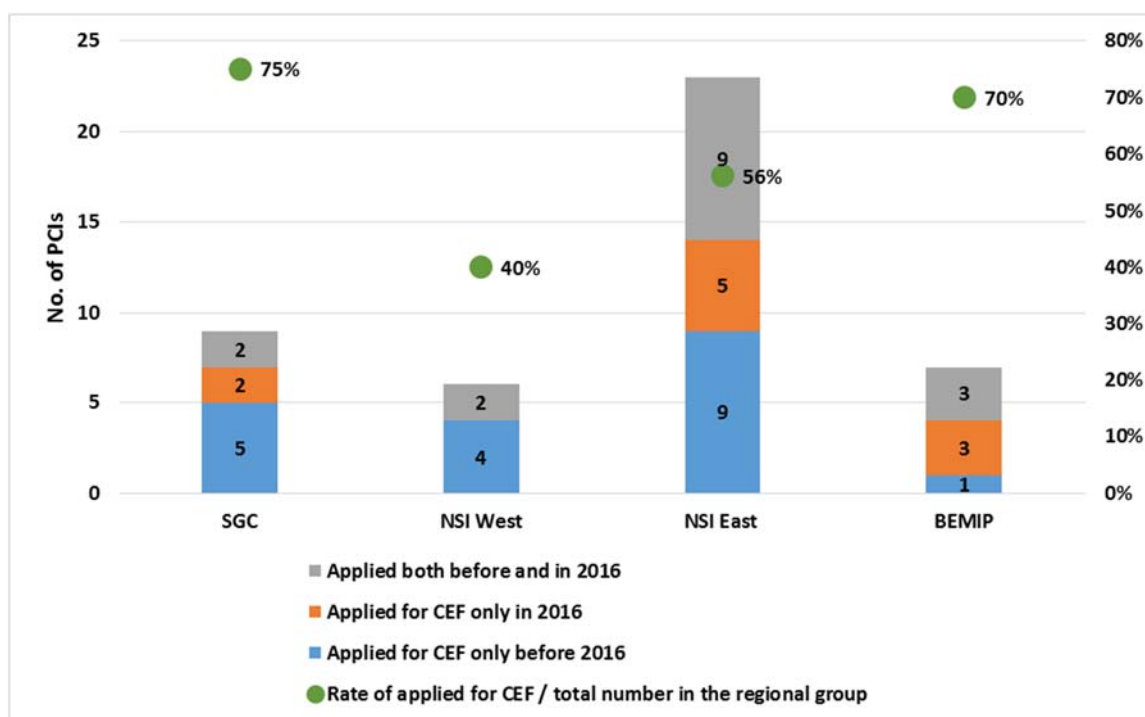
The plans of the promoters also demonstrate a limited interest in using this tool. **In the case of 61 projects, the promoters do not plan to apply for exemptions in the future<sup>184</sup>, for 15 projects they are undecided, and only 1 promoter certainly intends to apply for an exemption.**

### 3.5.4 Overview of the financial support to the projects from public sources<sup>185</sup>

Promoters reported to have submitted applications to CEF<sup>186</sup> in 26 instances during 2016 and in 30 instances during 2015<sup>187</sup>. A comparison with the promoters' plans as they stood last year shows that more CEF applications were actually submitted than planned<sup>188</sup>. However, **the majority of those promoters who were undecided<sup>189</sup> about applying to CEF in 2015, chose not to apply for CEF support in 2016 (52 instances in total)<sup>190</sup>.**

**Error! Reference source not found.** shows a more detailed breakdown of the applications to CEF, indicating if an application was filed for a PCI only once (either before or in 2016) or more than once<sup>191</sup>. Almost three-quarter of the PCIs in the BEMIP corridor and in SGC applied for CEF at least once in the last 2 years; this share is much lower in the NSI East and the NSI West corridors.

**Figure 50 - Applications to CEF**



<sup>184</sup> This includes those promoters, who have already received a decision on an exemption before 2016.

<sup>185</sup> For detailed information about the CEF applications and grants, please visit the website of the Innovation and Networks Executive Agency - <http://ec.europa.eu/inea/>

<sup>186</sup> For studies or for works

<sup>187</sup> Due to the fact that one PCI could have applied more than once during the last two years, these figures indicate the numbers of applications and not the number of PCIs related to these applications.

<sup>188</sup> In 2016, PCI promoters planned to file CEF applications for 15 PCIs.

<sup>189</sup> Promoters were undecided in 2016 whether to apply for CEF support in the case of 42 projects.

<sup>190</sup> In 2016, only 21 promoters reported that they had no plans to apply for CEF support in 2016.

<sup>191</sup> Project promoters could apply to CEF more than once in case they did not receive any support from CEF.

The outlook for 2017 and 2018 shows patterns which are similar to those of the previous reporting period. The majority of the promoters are undecided whether to apply for CEF support or not, and a similarly large number indicate that they do not plan to submit an application. Only a few promoters expressed interest in applying for CEF support in the coming two years.

When asked about their intentions to apply for public funding programmes other than CEF, promoters provided a similar feedback: the share of those undecided is the highest, followed by those who do not plan to apply and lastly by those who plan to apply. It appears that PCI promoters are less likely to rely on support from public funding programmes other than CEF, since 95% of the promoters reported not to have received in 2016 any funding from public sources other than CEF

#### **Key findings and recommendations**

- Among the available regulatory tools of Regulation EU (No) 347/2013 (investment requests, incentives) and exemptions, only the option of filing **investment requests** appears to attract the sustained attention of PCI promoters. The actual submission of an investment request depends on the maturity of the PCI and this may prevent a high number of investment requests being filed in a specific year.
- The interest of project promoters towards using incentives or exemptions appears to be vanishing. It could be relevant to examine the reasons due to which promoters do not use much and do not plan to avail themselves of the incentives provided for in Regulation (EU) No 347/2013.

## Annexes

### Annex I: PCIs not included in the TYNDP 2016 and NDPs – electricity

PCI Code	Hosting Countries	Missing from the TYNDP 2016 and/or the NDP of the following countries/ jurisdictions
<b>Transmission</b>		
1.10B	NO, UK	Norway ( <i>Not included in the latest NDP</i> ) <sup>192</sup>
1.13	IS, UK, DK	Iceland ( <i>Not included in the latest NDP</i> ); Denmark ( <i>Not included in NDP 2016</i> )
3.4	AT, IT	Austria ( <i>Not included in the latest NDP</i> ) <sup>193</sup> Italy ( <i>Not included in NDP 2016</i> ) <sup>194</sup>
3.9.3	SI	Slovenia ( <i>Partially included in NDP 2017</i> ) <sup>195</sup>
3.9.4	SI	Slovenia ( <i>Partially included in NDP 2017</i> ) <sup>196</sup>
3.10.1	CY, IL	Cyprus ( <i>Not included in NDP 2016</i> ) <sup>197</sup>
3.10.2	CY, EL	Cyprus ( <i>Not included in NDP 2016</i> ) <sup>198</sup>
3.18.1	HU, SK	Slovakia ( <i>Not included in NDP 2015</i> ) <sup>199</sup>
3.21	IT, SI	Slovenia ( <i>Partially included in NDP 2017</i> ) <sup>200</sup>
4.5.5	LT	Not included in the TYNDP 2016 <sup>201</sup>
4.9	EE, LV, LT	Estonia ( <i>Partially included in NDP 2015</i> ); Latvia ( <i>Partially included in NDP 2016</i> ); Lithuania ( <i>Partially included in NDP 2016</i> ) <sup>202</sup>
<b>Storage</b>		

<sup>192</sup> The project promoter clarified that the project is identified in National Grid's 'Network Options Assessment', by name, but not as a numbered project. In Norway, the TSO is aware of the project but not yet included in an NDP.

<sup>193</sup> Reason for not inclusion in the Austrian NDP was not provided by the project promoters.

<sup>194</sup> Project promoters' clarification: The Italian TSO indicated in the NDP 2016 that it has no elements to determine in advance which merchant projects will actually be realized. For this reason these kind of projects are not included in its NDP.

<sup>195</sup> The Project is in study phase and was due to several reasons in the new NDP rescheduled past the next ten year period and financially not assessed.

<sup>196</sup> Idem.

<sup>197</sup> The Information of the NDP in Cyprus is not publicly available. The Cypriot NRA informed the Agency that the PCI is not included in the latest NDP.

<sup>198</sup> Idem.

<sup>199</sup> Project promoters' clarification: Since the commissioning date of the project has been postponed to year 2029 and the Slovak NDP spans only 10 years of development, the project is not included in the Slovak NDP 2016 - 2025. The project is included in the Hungarian NDP which covers a period up to 2030.

<sup>200</sup> The project promoters' clarified that as the final investment decision for the Project in Slovenia was not yet made, only study part of the Project is financially included in the latest Slovenian NDP 2017-2026.

<sup>201</sup> The project promoter clarified that the project was included in the TYNDP 2014 Cluster number 59. In TYNDP 2016 as project is under construction it is not included.

<sup>202</sup> The project promoters clarified that the project is dependent on the selection of the Baltic synchronization scenario. Complete set of the projects will be clear after technical conditions for synchronous operation are issued by ENTSO-E.

1.12	UK (NI)	Northern Ireland ( <i>Not included in the latest NDP</i> ) <sup>203</sup>
2.21	DE	Not included in the TYNDP 2016 <sup>204</sup>
4.6	EE	Estonia ( <i>Not included in the NDP 2015</i> ) <sup>205</sup>
<b>Smart grid</b>		
10.3	HR, SI	Not included in the TYNDP 2016

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<sup>203</sup> Project promoter is a private entity.

<sup>204</sup> Based on the project promoter's clarification, no application for the TYNDP 2016 was submitted. (In TYNDP 2014, the project was listed as project 226.)

<sup>205</sup> 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”]	Change in category of investment <sup>206</sup> from off-shore DC transmission cable to combined investment items
2.2.1	Interconnection between Lixhe (BE) and Oberzier (DE)	Decrease in length of the transmission line
2.18	Capacity increase of hydro-pumped storage in Austria – Kaunertal, Tyrol (AT)	Increase in installed generation power, installed generation capacity and decrease in net pumping power
3.10.1	Interconnection between Hadera (IL) and Kofinou (CY)	Increase in voltage level
3.10.2	Interconnection between Kofinou (CY) and Korakia, Crete (EL)	Increase in voltage level
3.10.3	Internal line between Korakia, Crete and Attica region (EL)	Increase in voltage level
3.11.1	Internal line between Vernerov and Vitkov (CZ)	Increase in the length of the transmission line
3.11.2	Internal line between Vitkov and Prestice (CZ)	Increase length of the transmission line
3.11.3	Internal line between Prestice and Kocin (CZ)	Decrease length of the transmission line
3.12	Internal line in Germany between Wolmirstedt and Bavaria to increase internal North-South transmission capacity	Change in category of investment from combined investment items to on-shore DC transmission cable
4.1	Denmark — Germany interconnection between Tolstrup Gaarde (DK) and Bentwisch (DE) via offshore windparks Kriegers Flak (DK) and Baltic 1 and 2 (DE) [currently known as “Kriegers Flak Combined Grid Solution”]	Change of substation <u>Difference compared to the PCI description as appears on the 2015 PCI list:</u> Substation was moved from Tolstrup Gaarde to Bjæverskov in Denmark
4.6	Hydro-pumped storage in Estonia — Muuga	Change of location <u>Difference compared to the PCI description as appears on the 2015 PCI list:</u> Relocated from Muuga to Paldiski

<sup>206</sup> The project promoters reported a change in PCI category of investment (from off-shore DC transmission line to combined investments) but it appears it was more of a correction this year.

## Annex III: Transfer capacity increase – electricity

PCI Code	Impacted Border		Expected transfer capacity increase (MW) [2020]		Expected transfer capacity increase (MW) [2030]	
	Direction 1	Direction 2	Direction 1	Direction 2	Direction 1	Direction 2
1.1.1	BE-UK	UK-BE	1000	1000	1000	1000
1.1.2	UK-BE		0		1000	
1.3.1	DK-DE	DE-DK	500	500	500	500
1.3.2	DK-DE	DE-DK	500	500	500	500
1.4.1	DK-DE	DE-DK	720	1000	720	1000
1.4.2	DK-DE	DE-DK	700	1000	700	1000
1.4.3	DK-DE	DE-DK	700	1000	700	1000
1.5	DK-NL	NL-DK	700	700	700	700
1.6	IE-FR		700		700	
1.7.1	FR-UK		1400		1400	
1.7.2	UK-FR	FR-UK	1000	1000	1000	1000
1.7.3	<b>No impacted border or transfer capacity value reported</b>					
1.8	NO-DE	DE-NO	1400	1400	1400	1400
1.9.1	UK-IE		0		500	
1.9.2	<b>No impacted border or transfer capacity value reported</b>					
1.10	NO-UK		0		1400	
1.10.B	UK-NO		0		1400	
1.13	UK-IS		0		1000	
1.14	DK(west)-UK		1400		1400	
2.1.	AT-DE				>500	
2.2.1	DE-BE	BE-DE	1000	1000	1000	1000
2.2.2	DE-BE	BE-DE	1000	1000	1000	1000
2.2.3	DE-BE	BE-DE	1000	1000		
2.3.2	BE-LU	LU-BE	300	180	600	720
2.5.1	IT-FR	FR-IT	1000	1200	1000	1200
2.7	FR-ES	ES-FR			2200	2600
2.8	FR-ES	ES-FR	100	500	100	500
2.9	DE-CH	DE-NL	600	600	600	600
2.10	DE-DK/NO	DK/NO-DE	1800	1800	1800	1800
2.11.2	DE-AT	AT-DE		1000		1000

PCI Code	Impacted Border		Expected transfer capacity increase (MW) [2020]		Expected transfer capacity increase (MW) [2030]	
	Direction 1	Direction 2	Direction 1	Direction 2	Direction 1	Direction 2
2.11.3	DE-AT	AT-DE		1000		1000
2.12	NL-DE	DE-NL	1200	1500		1800
2.13.1	IE-UK (NI)	UK (NI)-IE	1120	1120	1120	1120
2.13.2	IE-UK (NI)		570			
2.14	IT-CH		800/1200		850	
2.15.1	IT-CH	CH-IT	600	1000	750	750
2.16.1	PT-ES	ES-PT	0	500	0	500
2.16.3	PT-ES	ES-PT	No transfer capacity value reported			
2.17	PT-ES	ES-PT	700-1000	1300-1900	700-1000	1300-1900
2.23	NL-BE	BE-NL		1000	1000	1000
2.24	BE-FR-UK-NL				1500	
2.25.1	South-North	North-South	1000	1400	400-2000	400-1600
2.25.2	South-North	North-South	1000	1400	400-2000	400-1600
2.26	South-North	North-South			1100-2400	800-2300
2.27	FR-ES	ES-FR	0	0	3000	3000
3.1.1	DE-AT	AT-DE	2320	2320	2320	2320
3.1.2	AT-DE				1740	
3.2.1	IT-AT	AT-IT			1000	1100
3.2.2	AT-IT				>500	
3.4	AT-IT	IT-AT	275	200	275	200
3.7.1	BG-GR	GR-BG	650	0	850	400
3.7.2	BG-GR	GR-BG	650	0	850	400
3.7.3	BG-RO	RO-BG	650	0	850	400
3.7.4	RO-BG		650	0	850	400
3.8.1	BG-RO	RO-BG	130	104	156	175
3.8.4	RO-BG				808	
3.8.5	No impacted border or transfer capacity increase value reported					
3.9.1	SI-HU	HU-SI	1650	650	800	1050
3.9.2	SI-HU	HU-SI	1650	650	800	1050
3.9.3	SI-HU	HU-SI	1650	650	800	1050
3.9.4	SI-HU	HU-SI	1650	650	800	1050
3.10.1	IL-CY	CY-IL	1000		2000	

PCI Code	Impacted Border		Expected transfer capacity increase (MW) [2020]		Expected transfer capacity increase (MW) [2030]	
	Direction 1	Direction 2	Direction 1	Direction 2	Direction 1	Direction 2
3.10.2	GR(CR)-CY	CY-GR(CR)	1000		2000	
3.10.3	CR-GR	GR-CR	1000		2000	
3.11.1	DE-CZ		500		500	
3.11.2	DE-CZ		500		500	
3.11.3	DE-CZ		500		500	
3.11.4	DE-CZ		500		500	
3.11.5	DE-CZ		500		500	
3.12	PL/CZ/AT - DE	DE - PL/CZ/AT	650	650	650	650
3.13	DE-CZ		550		550	
3.14.2	DE-PL	PL-DE			1500	500
3.14.3	DE-PL	PL-DE			1500	500
3.15.1	PL-DE/CZ/SK		0-1500			0-1500
3.15.2	PL-DE/CZ/SK		0-1500			0-1500
3.16.1	SK-HU	HU-SK			1320	522.5
3.17	SK-HU	HU-SK			1080	427.5
3.18.1	HU-SK	SK-HU			300	250
3.19.1	IT-ME	ME-IT	600	600	1200	1200
3.21	SI-IT	IT-SI	1000	800	950	950
3.22.1	RO-RS				350	
3.22.2	RO-RS				287	
3.22.3	RO-RS				180	
3.22.4	RO-RS				180	
4.1	DK-DE		400		400	
4.2.1.	EE-LV		500-600		500-600	
4.2.2.	EE-LV		500-600		500-600	
4.2.3	LV-EE		250		250	
4.4.1	Baltic-Nordic		700		700	
4.4.2	<b>No impacted border or transfer capacity increase value reported</b>					
4.5.2	LT-PL	PL-LT	0	500	500	500
4.5.5	LT-PL	<b>No impacted border or transfer capacity increase value reported</b>				

PCI Code	Impacted Border		Expected transfer capacity increase (MW) [2020]		Expected transfer capacity increase (MW) [2030]	
	Direction 1	Direction 2	Direction 1	Direction 2	Direction 1	Direction 2
4.8.1	EE-LV				600	
4.8.2	EE-LV				500	
4.8.3	LV-EE				600	
4.8.4	EE-LV				500	
4.8.5	LT-PL		0		600	
4.8.6	<b>No impacted border or transfer capacity increase value reported</b>					
4.9	<b>No impacted border or transfer capacity increase value reported</b>					

## Annex IV: Measures to solve delays and difficulties - electricity

Difficulty / Reason for delay	Measure	Taken or foreseen?	Who took or should take the measure?	Actual / expected result of the measure
<b>Permitting – National law changes affecting permitting</b>				
Lack of recognised process for submitted applications in Norway.	Communication and lobbying activities.	Taken	Project promoter	Norwegian Energy Act has changed.
	Continued dialogue with TSO and NRA.	Taken and foreseen	Project promoter	
Lawmaker introduced the legal obligation to build underground cable. That provided for a re-planning (including revision of application documents)	Strong alignment with the relevant Competent Authority on development of new methodology and time schedule.	Taken	Project promoters and competent authority	Speeding up of pre-alignment process and administrative proceedings
	Early public integration activities to foster public acceptance, integrate information from local stakeholders and ensure smooth planning.	Taken	Project promoters together with competent authority	Ensuring better understanding in the public and to speed up the process.
Different, irregular and unpredictable approaches of respective authorities in the permit-granting process has negatively affected the project time schedule	Communication with all relevant stakeholders on the importance of the timely implementation and completion of the project	Taken	Project promoter, DG ENER and INEA	Not yet identified
	Pro-active early securing of external resources to speed-up technical and environmental planning phase	Taken	Project promoters	Speed-up of planning
<b>Permitting – Delays and difficulties due to environmental problems</b>				

Difficulty / Reason for delay	Measure	Taken or foreseen?	Who took or should take the measure?	Actual / expected result of the measure
Extensive public consultation and examination of alternative routes because of public demand affected the implementation plan.	Early public information and integration activities	Taken	Project promoters and NRA	Better public acceptance and acceleration of process.
Local opposition forced relocation of part of the projects	Change of location of part of the investment (converter station) / changes in the cable route	Evaluation in progress	Project promoter	New route / new right of way to be agreed.
Political and public opposition in both hosting Member States	Coordinated field studies in order to find a new corridor that may solve the problems of local public acceptance.	Taken	Project promoters	The initial cross-border point was confirmed, as there wasn't any better option.
Permitting: environmental problems (without reporting about any specific issue)	Additional project manager for planning authority.	Taken	Tendered by authority	To be paid by project promoter
	Submit additional studies to the competent authorities.	Taken and foreseen	Local authorities	Ongoing activities
	Coordination of the ministry for infrastructure.	Taken	Ministry and NRA	Acceleration of permitting procedures
	Additional negotiations with land owners.	Taken	Project promoter	Successfully signed contracts with Land owners
<b>Permitting – Delays and difficulties due to other permit granting reasons</b>				
Longer than expected permit granting compared to what the Competent Authority initially indicated	Close engagement with Competent Authority to ensure all further information required is provided.	Taken	Project promoter	Planning permission is anticipated soon.
Different interpretation of requirements by each concerned National Competent Authority;	Continue contacting the regulators	Taken	Project promoter	Application package finalised, at the cost of additional resources.

Difficulty / Reason for delay	Measure	Taken or foreseen?	Who took or should take the measure?	Actual / expected result of the measure
uncertainties about responsibilities for one stop shops; manuals of procedures only published in national language, difficulty to establish coherent permit granting schedule to mutually satisfy all authorities' processes.	Sending draft for Table of Content to authorities to approve content and scope	Taken	Project promoter	
Design update resulted in issuance of modified permit which was a prerequisite for the EIA submission.	Efforts to speed up the permitting procedure	Taken and foreseen	Project promoter	Minimizing major delays
Delays due to risks related to the national regulatory framework or uncertainty of regulatory decisions.	Studies for pricing policy by the Promoter	Taken and foreseen	NRA and Ministry	The studies have provided adequate documentation to prepare the ground for the Authorities decision
<b>Permitting - Delays in the preparation of necessary application files by the project promoter</b>				
Changes in project promoter's approach to public consultation. That continues to be the case and has delayed the project further.	Pilot Public Consultation Process	Ongoing	Project promoter	Post piloting phase this can be applied to this project
Other: Further technical studies are presently being conducted. The outcome of these studies may impact the overall scope of the project.	Carry out further assessments to take account of changes in generation assumptions.	Ongoing	Project promoter	Based on the outcome of the assessments project scope can then be reviewed.
<b>Delays due to risks related to the national regulatory framework or uncertainty of regulatory decisions</b>				



Difficulty / Reason for delay	Measure	Taken or foreseen?	Who took or should take the measure?	Actual / expected result of the measure
Delays due to risks related to the national regulatory framework or uncertainty of regulatory decisions (no specific reasons are indicated)	Regular and continued liaison with NRAs, Government, and European Commission	Taken	Project promoter's senior project team	Greater understanding of issues, level of influence over regulatory process
	Submissions to NRA	Taken	Project promoter's project team	Uncertain timeline.
Form of UK regulatory arrangement to provide appropriate balance of risks and reward between consumers and investors is still under consideration. A regulatory regime for interconnectors in the other hosting country Iceland has not been developed.	Support to the UK-Iceland energy task force.	Taken	Project promoters	The politically nominated task force delivered positive results for the project and suggested next steps for how the project may be taken forward
The interconnector will not be built without political commitment from the governments of both hosting countries	Dialogue with the new governments	Foreseen	Project promoter	The governments mandate feasibility assessment of the PCI including design of an appropriate regulatory and support mechanism
<b>Delays due to technological reasons (including any changes, re-routing and/or siting or re-siting of facility(ies) initiated by the PP)</b>				
Additional technical studies were necessary to find a technically feasible submarine route.	Additional technical studies	Taken	Project promoters	Technically feasible submarine route assessed
<b>Discussions with local authorities and communities on the location of part of the investment</b>				
Search of location for the converter station mainly driven by communities, local authorities and regional planning authorities	Early public integration activities to foster public acceptance and to ensure smooth Sectoral Planning taken Project promoters together with competent authority.	Taken	Project promoters together with competent authority	Ensuring better understanding in the public and to speed up the process.

Difficulty / Reason for delay	Measure	Taken or foreseen?	Who took or should take the measure?	Actual / expected result of the measure
as well as political discussions with the mentioned parties.	Ensuring better understanding in the public and to speed up the process.			
	Additional measures regarding the search of a publicly accepted location for the converters.	Taken	Project promoters	Ensuring better understanding in the public and to speed up the process.
<b>Delays in the preparation of studies</b>				
Cost Benefit Analysis is still on-going, it is taking longer than expected.	Cost benefit Analysis assessment Study	Taken and on-going	Project promoters	
<b>Delays due to lawsuits and court proceedings</b>				
Lawsuit on the EIA of the project. Long administrative procedures related to the ruling of the preliminary execution of the EIA Decision. The delays caused by the EIA appeal, lead to the cancellation of the contract for the implementation of the Final Detailed Development Plan.	New internal unit “Coordination of Externally Funded Projects” was formed	Taken	Project promoter	Mitigate the risks of delays in the implementation of the project
	Project promoter’s experts committed to providing expert assistance to the Ministry in the preparation of the defence documentation on the EIA case.	Foreseen	Project promoter	Strong defence of the EIA decision during the lawsuit.
<b>Difficulties in tendering process</b>				
Delay in tendering main contracts and final detailed engineering, mainly due to complexity of technical solution and necessary alignment between the project partners	Optimizing detailed design, fabrication and construction processes for main asset contracts	Taken for part of the contracts and foreseen for outstanding contracts	Contractor	Catch up of project delays to keep the original expected commissioning date
<b>Other reasons for delay or other difficulties</b>				

Difficulty / Reason for delay	Measure	Taken or foreseen?	Who took or should take the measure?	Actual / expected result of the measure
'Brexit' referendum result necessitated additional consultation with political and administration stakeholders to assess the additional investment risk caused front end engineering design to be paused.	Engagement with political & administrative stakeholders to assess Brexit risk	Taken	Promoter	Risk is considered manageable
There is a limited number of specialist suppliers of HVDC cables and converters, and European manufacturing capacity is heavily committed on projects which are already in construction phase.	Programme of engagement with far Eastern HVDC suppliers	Taken	Project promoters	Stimulated additional interest and competition in the supply chain”
Delays due to financing reasons.	Looking actively for sources of finance	Both	Project promoter	Discussion with potential funding bodies/ organizations. Project's registration at the EIPP

## Annex V: PCI specific information - electricity<sup>207</sup>

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
1.1.1	Interconnection between Zeebrugge (BE) and the vicinity of Richborough (UK) - NEMO project	Nemo Link Limited, Elia System Operator NV/SA	Under construction	2019	On time		Yes	Yes
1.1.2	Internal line between the vicinity of Richborough and Canterbury (UK)	National Grid Electricity Transmission	Permitting	2018	On time		Yes	Yes
1.3.1	Interconnection between Endrup (DK) and Niebüll (DE)	TenneT TSO GmbH, Energinet.dk	Planned, but not yet in permitting	2022 <sup>212</sup>	On time		Yes	Yes

<sup>207</sup> Agency's modifications of the data submitted by the project promoters are highlighted by blue text.

<sup>208</sup> Changes compared to 2016 data are highlighted by red text.

<sup>209</sup> For the current progress "repeatedly" means that the PCI was reported as "delayed" or "rescheduled" in 2016 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.

<sup>210</sup> Project promoters were required to provide the costs and benefit indicators discounted to the present and expressed in 2017 values. In line with the ENTSO-E CBA methodology, promoters were expected to use the discount parameters of 25 years of operation, 4% discount rate (real) and zero residual value.

<sup>211</sup> Idem.

<sup>212</sup> The German NRA indicated that according to the national monitoring the expected commissioning date (for the German part of the PCI) is 2021.

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
1.3.2	Internal line between Brunsbüttel and Niebüll (DE)	TenneT TSO GmbH	Under construction	2019	Delayed	Technological reasons related to other investment <sup>213</sup>	Yes	Yes
1.4.1	Interconnection between Kassø (DK) and Audorf (DE)	TenneT TSO GmbH, Energinet.dk	Permitting	2020	On time		Yes	Yes
1.4.2	Internal line between Audorf and Hamburg/Nord (DE)	TenneT TSO GmbH	Under construction	2017	On time		Yes	Yes
1.4.3	Internal line between Hamburg/Nord and Dollern (DE)	TenneT TSO GmbH	Under construction	2018	Delayed (repeatedly)	Correlation with other delayed investment; revision of the technical concept due to new technical standards <sup>214</sup>	Yes	Yes
1.5	Denmark — Netherlands interconnection between Endrup (DK) and Eemshaven (NL) [currently known as “COBRACable”]	TenneT TSO B.V, Energinet.dk	Under construction	2019	On time		Yes	Yes
1.6	France — Ireland interconnection between La Martyre (FR) and Great Island	EirGrid plc (IE) and Réseau de transport d’électricité (FR)	Under consideration <sup>215</sup>	2025	Rescheduled	Project promoters’ agreement on the preparation and	Yes	Yes

<sup>213</sup> The Agency’s classification based on the project promoter’s description of the main reason for delay.

<sup>214</sup> Idem.

<sup>215</sup> Last year the PCI status was “planned, but not yet in permitting.” However, it seems more a correction of the status than a change.

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
	or Knockraha (IE) [currently known as “Celtic Interconnector”]					submission of an investment request <sup>216</sup>		
1.7.1	France — United Kingdom interconnection between Cotentin (FR) and the vicinity of Exeter (UK) [currently known as “FAB” project]	FAB Link Limited, Réseau de Transport d'Electricite (RTE)	Permitting	2021	Ahead of schedule		Yes	Yes
1.7.2	"France — United Kingdom interconnection between Tourbe (FR) and Chilling (UK) [currently known as ""IFA2"" project]"	Réseau de Transport d'Electricité (RTE), National Grid Interconnector Holdings Limited	Permitting	2020	On time		Yes	Yes
1.7.3	France - United Kingdom interconnection between Coquelles (FR) and Folkestone (UK) [currently known as the "ElecLink" project]	ElecLink Limited	Under construction (last year: permitting)	2019	Delayed (repeatedly) (less than 6 months)	Delays due to major obstacles beyond the control of project promoter (not specified)	Only investment costs	No

<sup>216</sup> The Agency’s classification based on the project promoter’s description of the main reason for rescheduling.

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
1.8	Germany — Norway interconnection between Wilster (DE) and Tonstad (NO) [currently known as "NordLink"]	TenneT TSO GmbH, Statnett SF, KfW Kreditanstalt für Wiederaufbau	Under construction	2019	On time		Yes	Yes
1.9.1	Greenlink	Element Power Ireland Ltd, <b>Greenwire Transmission Pembroke Ltd</b> <sup>217</sup>	Planned, but not yet in permitting	2023	Delayed (repeatedly)	Delays due to risks related to the national regulatory framework or uncertainty of regulatory decisions <sup>218</sup>	Yes	Yes
1.9.2	Ireland — United Kingdom interconnection between Coolkeeragh — Coleraine hubs (IE) and Hunterston station, Islay, Argyll and Location C Offshore Wind Farms (UK) [currently known as "ISLES"]	Department of Communications, Energy & Natural Resources (Ireland), Scottish Government (UK), Department of Enterprise, Trade & Investment, Northern Ireland (UK)	<b>Under consideration</b> <sup>219</sup>	Not provided <sup>220</sup>	N/A		No	No

<sup>217</sup> The project promoter changed from Element Power Ireland Ltd and Greenwire Ltd to Element Power Ireland Ltd and Greenwire Transmission Pembroke Ltd.

<sup>218</sup> The reason for delay is not further described by the project promoters. The Irish NRA highlighted that work to clarify the regulatory treatment of electricity interconnectors in Ireland is begin undertaken by CER during 2017 and 2018.

<sup>219</sup> The promoter claimed "planned but not yet in permitting" which is modified by the Agency as the project does not meet the criteria of being "planned, but not yet in permitting"(no studies have been performed).

<sup>220</sup> The project promoter clarified that no information can be provided as no investment projects have emerged to date.

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
1.10	Norway - United Kingdom Interconnection	Statnett SF National Grid Interconnector Holdings Limited	Under construction	2021	On time		Yes	Yes
1.10.B	Norway — United Kingdom interconnection (NorthConnect)	NorthConnect KS	Permitting	2022	On time		Yes	Yes
1.12	Compressed air energy storage in United Kingdom - Larne	Gaelectric Energy Storage Ltd	Permitting	2021	Delayed (repeatedly)	Delays due to longer than expected permit granting process (for planning permission) <sup>221</sup>	Yes	Yes
1.13	Interconnection between Iceland and United Kingdom [currently known as "Ice Link"]	Landsnet, Landsvirkjun, National Grid Interconnector Holdings Ltd.	Under consideration	2027	On time		Yes	Yes
1.14	Interconnection between Revsing (DK) and Bicker Fen (UK) [currently known as "Viking Link"]	National Grid Interconnector Holdings Ltd., Energinet.dk	Planned, but not yet in permitting	2022	On time		Yes	Yes

<sup>221</sup> Agency's classification based on promoters' description of the main reason for delay.



PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
2.1	Austria internal line between Westtirol and Zell-Ziller (AT) to increase capacity at the Austrian/German border	Austrian Power Grid AG	Under consideration <sup>222</sup>	2023	On time		Only investment costs / Only undiscounted	Referred to TYNDP 2016
2.2.1	Interconnection between Lixhe (BE) and Oberzier (DE)	Amprion GmbH, Elia System Operator NV/SA	Permitting (last year: planned, but not yet in permitting)	2020	Delayed	National law changes affecting permitting	Yes	Yes
2.2.2	Internal line between Lixhe and Herderen (BE)	Elia System Operator SA/NV	Under construction	2017	Rescheduled (less than 3 months)	Changes on the generation side (in relation to other types of generation)	Yes	Yes
2.2.3	New substation in Zutendaal (BE)	Elia System Operator SA/NV	Commissioned	2015	N/A		Yes	Yes
2.3.2	Cluster Belgium — Luxembourg capacity increase at the Belgian/Luxembourgian border, including the following PCI: Interconnection between Aubange (BE) and	Creos Luxembourg S.A., Elia System Operator	Under consideration	Not provided (after 2022) <sup>223</sup>	Rescheduled	Changes due to priority given to other transmission investments	Not provided	Yes

<sup>222</sup> In previous year the PCI status was planned but not yet in permitting. However, it seems more a correction of the status than a change.

<sup>223</sup> Agency's addition based on previous year's data

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
	Bascharge/Schiffflange (LU)							
2.5.1	Interconnection between Grande Ile (FR) and Piosasco (IT) [currently known as Savoie - Piemont project]	Terna - Rete Elettrica Nazionale SpA, RTE - Réseau de Transport d'Electricité	Under construction	2019	On time		Only investment costs	Yes
2.7	France-Spain interconnection between Aquitaine (FR) and the Basque country (ES) [currently known as "Biscay Gulf" project]	Réseau de Transport d'Electricité, Red Eléctrica de España SAU	Planned, but not yet in permitting	2025	Delayed (repeatedly shifted)	Delays due to technological reasons <sup>224</sup>	Yes	Yes
2.8	Coordinated installation and operation of a PST in Arkale (ES)	Red Eléctrica de España SAU	Under construction (last year: permitting)	2017	Delayed	Delays in construction works	Only undiscounted	Yes
2.9	Germany internal line between Osterath and Philippsburg (DE) to increase capacity at Western borders	Amprion GmbH (DE), TransnetBW GmbH (DE)	Planned, but not yet in permitting	2021	Delayed	Discussions with local authorities and communities on the location of part of the investment <sup>225</sup>	Yes	Yes
2.10	Germany internal line between Brunsbüttel-Großgartach and	TenneT TSO GmbH (DE),	Planned, but not yet in permitting	2025	Delayed	National law changes impacting the technical solution for the project	Yes	Yes

<sup>224</sup> The project promoters' description: "Additional technical studies were necessary to find a technically feasible submarine route."

<sup>225</sup> Agency's classification based on the project promoters' description of the reason for delay.

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
	Wilster-Grafenrheinfeld (DE) to increase capacity at Northern and Southern borders	TransnetBW GmbH (DE)						
2.11.2	Internal line in the region of point Rommelsbach to Herberlingen (DE)	Amprion GmbH	Permitting	2020	Delayed	Delays due to environmental problems	Yes	Referred to TYNDP 2016
2.11.3	Internal line point Wullenstetten to point Niederwangen (DE) and internal line Neuravensburg to the border area DE-AT	Amprion GmbH, TransnetBW GmbH	Planned, but not yet in permitting	2023	On time		Yes	Referred to TYNDP 2016
2.12	PCI Germany – Netherlands interconnection between Niederrhein (DE) and Doetinchem (NL)	Amprion GmbH, TenneT TSO B.V.	Under construction (last year: permitting)	2018	Delayed	Delays due to other permit granting reasons (i.e. Delays due to delayed planning approval by the district council)	Yes	Yes
2.13.1	Ireland-United Kingdom Interconnection between Woodland (IE) and Turleenan (UK – Northern Ireland)	EirGrid plc, SONI Ltd	Permitting	2020	Delayed	Delays due to longer than expected permit granting process <sup>226</sup>	Yes	Yes

<sup>226</sup> Idem.

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
2.13.2	Ireland-United Kingdom Interconnection between Srananagh (IE) and Turleenan (UK)	EirGrid plc, SONI Ltd	Planned, but not yet in permitting	2029	Delayed (repeatedly)	Delays in the preparation of necessary application files by the project promoter (changes regarding public consultation)	Yes	Yes
2.14	Italy — Switzerland interconnection between Thusis/Sils (CH) and Verderio Inferiore (IT)	Greenconnector Srl, Greenconnector AG	Permitting	2022	Delayed	Delays due to environmental problems	Yes	Yes
2.15.1	Interconnection between Airolo (CH) and Baggio (IT)	Terna - Rete Elettrica Nazionale SpA, Swissgrid	Permitting	2025	Rescheduled	Unclear <sup>227</sup>	Only investment costs	Yes
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	2021	On time		Yes	Yes
2.16.3	Internal line between Vieira do Minho, Ribeira de Pena and Feira (PT), formerly designated Frades B,	Rede Eléctrica Nacional, S.A.	Planned, but not yet in permitting <sup>228</sup>	2022	On time		Yes	Yes

<sup>227</sup> Project promoters' description of the reason for rescheduling: "Authorization process ongoing"

<sup>228</sup> In previous year the PCI status was "in permitting". However, it seems more a correction of the status than a change.

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
	Ribeira de Pena and Feira (PT)							
2.17	Portugal — Spain interconnection between Beariz — Fontefría (ES), 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)	Red Eléctrica de España SAU, Rede Eléctrica Nacional S.A.	Permitting	2019	Delayed (repeatedly)	Delays due to environmental problems	Yes	Yes
2.18	PCI capacity increase of hydro-pumped storage in Austria — Kaunertal, Tyrol	TIWAG-Tiroler Wasserkraft AG	Permitting	2034	Delayed		Yes	Yes
2.20	Capacity increase of hydro-pumped storage in Austria — Limberg III, Salzburg (AT)	VERBUND Hydro Power GmbH	Permitting	2026	Delayed (repeatedly shifted)	Delays due to correlation with other delayed infrastructure investments	Only investment costs	Not provided
2.21	Hydro-pumped storage Riedl in the AT/DE border area	Donaukraft Jochenstein AG	Permitting	2023	Delayed (repeatedly shifted)	Delays due to other permit granting reasons:	Only investment costs	Not provided

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
						Longer than expected permit granting process due to bilateral permitting procedures <sup>229</sup>		
2.22	Hydro pumped storage Pfaffenboden in Molln (AT)	Bernegger GmbH <sup>230</sup>	Under construction	2021	On time		Yes	Yes
2.23	Cluster of internal lines at the Belgian northern border between Zandvliet — Lillo (BE), Lillo-Mercator (BE), including a substation in Lillo (BE) [currently known as “Brabo”]	Elia	Permitting	2023	On time		Yes	Yes
2.24	Internal line between Horta-Mercator (BE)	Elia	Permitting	2019	On time		Yes	Yes
2.25.1	Internal lines Mudejar — Morella (ES) and Mezquite-Morella (ES), including a substation in Mudejar (ES)	Red Eléctrica de España, SAU	Commissioned (last year: under construction)	2016	Delayed (1 month)		For cluster only	For cluster only

<sup>229</sup> Agency’s classification based on the project promoters’ description of the reason for delay.

<sup>230</sup> The project changed from Wien Energie GmbH to Bernegger GmbH.

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
2.25.2	Internal line Morella-La Plana (ES)	Red Eléctrica de España , SAU	Permitting	2018	On time		For cluster only	For cluster only
2.26	Spain Internal line La Plana/Morella-Godelleta to increase capacity of the north-south Mediterranean axis	Red Eléctrica de España, SAU	Under consideration	2023	On time		Yes	Yes
2.27	Capacity increase between Spain and France (generic project)	Réseau de Transport d'Electricité, Red Eléctrica de España SAU	Planned, but not yet in permitting	2026	Delayed	Delays in the preparation of studies (CBA) <sup>231</sup>	Yes	Yes
3.1.1	Interconnection between St. Peter (AT) and Isar (DE)	TenneT TSO GmbH, Austrian Power Grid AG	Permitting	2021	Delayed (repeatedly)	Delays due to environmental problems	Yes	Yes
3.1.2	Internal line between St. Peter and Tauern (AT)	Austrian Power Grid AG	Permitting	2023	On time		Only investment costs	Referred to TYNDP 2016
3.2.1	Interconnection between Lienz (AT) and Veneto Region (IT)	Terna - Rete Elettrica Nazionale SpA, APG	Planned, but not yet in permitting	Not provided (after 2023) <sup>232</sup>	Rescheduled	Changes due to priority given to other transmission investments <sup>233</sup>	Not provided	Not provided

<sup>231</sup> Agency's classification based on the project promoters' description of the reason for delay.

<sup>232</sup> After a common study of the promoters the project is considered as a long term project.

<sup>233</sup> Agency's classification based on the project promoters' description of the reason for rescheduling.

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
3.2.2.	Internal line between Lienz and Obersielach (AT)	Austrian Power Grid AG	Planned, but not yet in permitting	2025	On time		Only for investment costs / Only undiscounted	Referred to TYNDP 2016
3.4	PCI Austria - Italy interconnection between Wurmlach (AT) and Somplago (IT)	Alpe Adria Energia S.p.A.	Permitting	2019	On time		Yes	Yes
3.7.1	Interconnection between Maritsa East 1 (BG) and N. Santa (GR)	Elektroenergien Systemen Operator EAD, Independent Power Transmission Operator (IPTO) S.A.	Permitting	2021	On time		Yes	Yes
3.7.2	Internal line between Maritsa East 1 and Plovdiv (BG)	Elektroenergien systemen operator (ESO) EAD	Permitting	2020	Delayed	Delays due to other permit granting reasons; Delays due to lawsuits and court proceedings (related to environmental impact assessment of the project) <sup>234</sup>	Yes	Yes
3.7.3	Internal line between Maritsa East 1 and Maritsa East 3 (BG)	Elektroenergien systemen operator (ESO) EAD	Permitting	2018	Delayed	Delays due to lawsuits and court proceedings (related to	Yes	Yes

<sup>234</sup> Agency's classification based on the project promoters' description of the reason for delay.



PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
						environmental impact assessment of the project)		
3.7.4	Internal line between Maritsa East 1 and Burgas (BG)	Elektroenergien sistemien operator (ESO) EAD	Permitting	2021	On time		Yes	Yes
3.8.1	Internal line between Dobrudja and Burgas (BG)	Elektroenergien sistemien operator (ESO) EAD	Permitting	2021	Ahead of schedule		Yes	Yes
3.8.4	Internal line between Cernavoda and Stalpu (RO)	CNTEE TRANSELECTRIC A SA	Permitting	2020	On time		Only investment costs	Not provided / Not available on PCI level <sup>235</sup>
3.8.5	Internal line between Gutinas and Smardan (RO)	CNTEE TRANSELECTRIC A SA	Permitting	2020	On time		Only investment costs	Not provided / Not available on PCI level <sup>236</sup>
3.9.1	Interconnection between Žerjavinec (HR)/Hévíz (HU) and Cirkovce (SI)	ELES, d.o.o., sistemski operater prenosnega elektroenergetskega omrežja	Permitting	2018	On time		Only investment costs	Referred to TYNDP 2016
3.9.2	Internal line between Divača and Beričevo (SI)	ELES, d.o.o., sistemski operater prenosnega elektroenergetskega omrežja	Permitting	2026	Rescheduled	Changes in the overall planning data input <sup>237</sup>	Only investment costs	Referred to TYNDP 2016

<sup>235</sup> The project promoter reported that the benefit indicators has been calculated at cluster level in the last TYNDPs (2014 and 2016) and they do not have yearly disaggregated benefits per investment.

<sup>236</sup> Idem.

<sup>237</sup> Agency's classification based on the project promoters' description of the reason for rescheduling.

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
3.9.3	Internal line between Beričevo and Podlog (SI)	ELES, d.o.o., sistemski operater prenosnega elektroenergetskega omrežja	Under consideration (last year: planned, but not yet in permitting)	Only data range is provided (2030-2035)	Rescheduled	Changes in the overall planning data input	Only investment costs	Referred to TYNDP 2016
3.9.4	Internal line between Podlog and Cirkovce (SI)	ELES, d.o.o., sistemski operater prenosnega elektroenergetskega omrežja	Under consideration (last year: planned, but not yet in permitting)	Only data range is provided (2030-2035)	Rescheduled	Changes in the overall planning data input	Only investment costs	Referred to TYNDP 2016
3.10.1	Interconnection between Hadera (IL) and Kofinou (CY)	<b>EuroAsia Interconnector Ltd<sup>238</sup></b>	Planned, but not yet in permitting	2020	Delayed	Delays due to other permit granting reasons: Longer than expected permit granting process due to multilateral permitting procedures, involvement of non-EU country <sup>239</sup>	Only for cluster	Only for cluster
3.10.2	Interconnection between Kofinou (CY) and Korakia, Crete (EL)	<b>EuroAsia Interconnector Ltd</b>	Planned, but not yet in permitting	2022	On time		Only for cluster	Only for cluster

<sup>238</sup> The project changed from DEH Quantum Energy Ltd to EuroAsia Interconnector Ltd.

<sup>239</sup> Agency's classification based on the project promoters' description of the reason for delay.

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
3.10.3	Internal line between Korakia, Crete and Attica region (EL)	EuroAsia Interconnector Ltd	Planned, but not yet in permitting	2021	Delayed	Delays due to other permit granting reasons: Longer than expected permit granting process due to multilateral permitting procedures, involvement of non-EU country <sup>240</sup>	Only for cluster	Only for cluster
3.11.1	Internal line between Vernerov and Vitkov (CZ)	CEPS, a.s. - The transmission system operator of the Czech Republic	Permitting	2023	On time		Yes	Only for cluster
3.11.2	Internal line between Vitkov and Prestice	CEPS, a.s. - The transmission system operator of the Czech Republic	Permitting	2021	Delayed	National law changes affecting permitting <sup>241</sup>	Yes	Only for cluster
3.11.3.	Internal line between Prestice and Kocin (CZ)	CEPS, a.s. - The transmission system operator of the Czech Republic	Permitting	2028	On time		Yes	Only for cluster
3.11.4	Internal line between Kocin and Mirovka (CZ)	CEPS, a.s. - The transmission system operator of the Czech Republic	Permitting	2025	On time		Yes	Only for cluster

<sup>240</sup> Idem.

<sup>241</sup> Agency's classification based on the project promoters' description of the reason for delay.

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
3.11.5	Internal line between Mirovka and Cebin (CZ)	CEPS, a.s. - The transmission system operator of the Czech Republic	Permitting	2032	Ahead of schedule		Yes	Only for cluster
3.12	Internal line in Germany between Wolmirstedt and Bavaria to increase internal North-South transmission capacity	50Hertz Transmission GmbH, <b>TenneT TSO GmbH<sup>242</sup></b>	Planned, but not yet in permitting	2025	Delayed	National law changes affecting permitting	Yes	Yes
3.13	Internal line in Germany between Halle/Saale and Schweinfurt to increase capacity in the North-South Corridor East	50Hertz Transmission GmbH, TenneT TSO GmbH	Under construction	2017	Delayed (repeatedly)	Delays due to other permit granting reasons: <b>Delays in the permit granting process due to strong public resistance<sup>243</sup></b>	Yes	Yes
3.14.1	Internal line between Eisenhüttenstadt (DE) and Plewiska (PL)	Polskie Sieci Elektroenergetyczne S.A., 50Hertz Transmission GmbH	Cancelled <sup>244</sup>	N/A	N/A	Reason for cancellation: Changes	N/A	N/A

<sup>242</sup> The project promoter changed from Amprion GmbH to TenneT TSO GmbH.

<sup>243</sup> Agency's classification based on the project promoters' description of the reason for delay.

<sup>244</sup> In 2016, the PCIs was in planned, but not yet in permitting status with an expected commissioning date of 2030.

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
						due to the overall planning inputs <sup>245</sup>		
3.14.2	Internal line between Krajnik and Baczyna (PL)	Polskie Sieci Elektroenergetyczne S.A	Permitting	2021	On time		Only for investment costs	Not provided
3.14.3	Internal line between Mikulowa and Świebodzice (PL)	Polskie Sieci Elektroenergetyczne S.A	Planned, but not yet in permitting	2022	Rescheduled (repeatedly)	Changes due to complementarity with other rescheduled transmission investments	Only for investment costs	Not provided
3.15.1	Interconnection between Vierraden (DE) and Krajnik (PL)	50Hertz Transmission GmbH, Polskie Sieci Elektroenergetyczne S.A	Under construction	2018	Rescheduled	Changes due to complementarity with other rescheduled transmission investments	Yes	Only for cluster
3.15.2	Installation of phase shifting transformers on the interconnection lines between Krajnik (PL) — Vierraden (DE) and coordinated operation with the PST on the interconnector	50Hertz Transmission GmbH, Polskie Sieci Elektroenergetyczne S.A	Under construction	2021	On time		Yes	Only for cluster

<sup>245</sup> Agency's summary of the project promoters' detailed description of the reason for cancellation: PCI 3.14.1 is replaced functionally by TYNDP 2016 project 229 "GerPol Power Bridge II". Additional analytical work carried out by PSE has shown that expansion of the transmission grid in the Krajnik ES and Mikulowa ES area increase power import comparable to the construction of a new interconnection (PCI 3.14.1) with the German system, however it requires less capital expenditure. Moreover, the expansion of the internal grid will be more advantageous in terms of improvement of the reliability of power supply in the western part of the country, improved reliability of power evacuation from domestic generating sources, and avoiding an increase in loop flows from the system.

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
	Mikulowa (PL) — Hagenwerder (DE)							
3.16.1	Interconnection between Gabčíkovo (SK) — Gönyü (HU) and Veľký Ďur (SK)	Slovenská elektrizačná prenosová sústava, a.s., MAVIR Hungarian Independent Transmission Operator Company Ltd.	Permitting <i>(last year: planned, but not yet in permitting)</i>	2020	Delayed (repeatedly)	Delay related to finalisation of agreements and coordination across borders (i.e. delay in the approval of the contract for construction)	Yes	Yes
3.17	PCI Hungary — Slovakia interconnection between Sajóvánka (HU) and Rimavská Sobota (SK)	MAVIR Hungarian Independent Transmission Operator Company Ltd. and Slovenská elektrizačná prenosová sústava, a.s.	Permitting <i>(last year: planned, but not yet in permitting)</i>	2020	Delayed (repeatedly)	Delay related to finalisation of agreements and coordination across borders (i.e. delay in the approval of the contract for construction)	Yes	Yes
3.18.1	Interconnection between Kisvárda area (HU) and Veľké Kapušany (SK)	Slovenská elektrizačná prenosová sústava, a.s., MAVIR Hungarian Independent Transmission Operator Company Ltd.	Under consideration	2029	On time		Yes	Yes

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
3.19.1	Interconnection between Villanova (IT) and Lastva (ME)	Terna - Rete Elettrica Nazionale SpA, Crnogorski Elektroprenosni Sistem AD.	Under construction	2019	On time		Only for investment costs	Yes
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	Not provided (after 2025) <sup>246</sup>	Rescheduled	Project is under consideration, commissioning date has not been decided yet <sup>247</sup>	Only for investment costs	Referred to TYNDP 2016
3.22.1	Interconnection between Resita (Romania) and Pancevo (Serbia)	CNTEE Transelectrica, Elektromreza Srbije	Under construction	2017	Delayed	National law changes affecting permitting	Only for investment costs	Not provided / Not available on PCI level
3.22.2	Internal line between Portile de Fier and Resita (RO)	CNTEE Transelectrica SA	Under construction	2018	On time		Only for investment costs	Not provided / Not available on PCI level
3.22.3	Internal line between Resita and Timisoara/Sacalaz (RO)	CNTEE Transelectrica SA	Permitting	2023	On time		Only for investment costs	Not provided / Not available on PCI level
3.22.4	Internal line between Arad and Timisoara/Sacalaz (RO)	CNTEE Transelectrica SA	Planned, but not yet in permitting	2023	On time		Only for investment costs	Not provided / Not available on PCI level

<sup>246</sup> The commissioning date is realistic only after 2025 based on promoter's clarification.

<sup>247</sup> Agency's classification based on the project promoters' description of the reason for rescheduling.

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
3.23	Hydro-pumped storage in Bulgaria — Yadenitsa	Natsionalna Elektrieska Kompania EAD	Permitting	2024	Delayed (repeatedly)	Delays due to technological reasons	Only for investment costs	Not provided
3.24	PCI hydro-pumped storage in Greece — Amfilochia	TERNA ENERGY S.A.	Permitting	2022	Delayed	Due to other permit granting reason: Delays due to modification of the permit due to a design update <sup>248</sup>	Yes	Yes
4.1	Denmark — Germany interconnection between Tolstrup Gaarde (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	Permitting	2018	On time		Yes	Yes
4.2.1	Interconnection between Kilingi-Nõmme (EE) and Riga CHP2 substation (LV)	Latvian TSO "Augstsprieguma tikls" AS, Estonian TSO "Elering" AS and Latvian transmission system	Permitting	2020	On time		Yes	Yes

<sup>248</sup> Agency’s classification based on the project promoters’ description of the reason for delay.



PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
		owner "Latvijas elektriskie tīkli" AS						
4.2.2	Internal line between Harku and Sindi (EE)	Elering AS	Planned, but not yet in permitting	2020	On time		Yes	Yes
4.2.3	Internal line between Riga CHP 2 and Riga HPP (LV)	Augstsprieguma tīkls	Permitting <sup>249</sup> (last year: under consideration)	2020	On time		Yes	Yes
4.4.1	Internal line between Ventspils, Tume and Imanta (LV)	"Augstsprieguma tīkls"AS, "Latvijas elektriskie tīkli" AS	Under construction	2019	On time		Yes	Yes
4.4.2	Internal line between Ekhyddan and Nybro/Hemsjö ( SE)	Affärsverket svenska kraftnät	Permitting	2023	On time		Yes	Did not provide
4.5.2	Internal line between Stanisławów and Olsztyn Mątki (PL)	Polskie Sieci Elektroenergetyczne S.A.	Planned but not yet in permitting <sup>250</sup>	2021	On time		Only for investment costs	Not available
4.5.5	Internal line between Kruonis and Alytus (LT)	Litgrid AB	Under construction	2018	On time		Only for investment costs	Not provided / Not available on PCI level

<sup>249</sup> The project promoter reported that the PCI is “planned, but not yet in permitting.” As the PCI has been reported to have already entered the pre-application procedure, the Agency changed the status for “permitting” for the sake of consistency.

<sup>250</sup> The Project promoter clarified that the Ostrołęka-Olsztyn Mątki line is "under construction" and Stanisławów-Ostrołęka is "planned, but not yet in permitting". For the Agency’s assessment the status of the PCIs is determined by the status of the least advanced section / elements, therefore the project promoter’s data is changed from under construction to planned, but not yet in permitting.

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
4.6	Hydro-pumped storage in Estonia – Muuga (New project name: Estonian PHES)	Energiasalv Pakri OÜ <sup>251</sup>	Permitting	2027	Rescheduled (repeatedly shifted)	Relocation of the project	Yes	Not provided / under recalculation
4.7	Capacity increase of hydro-pumped storage in Lithuania — Kruonis	Lietuvos energija, UAB	Under consideration (last year: planned, but not yet in permitting)	Not provided <sup>252</sup>	On hold <sup>253</sup> (before rescheduled)	Assessment of market conditions.	Yes	Not assessed <sup>254</sup>
4.8.1	Interconnection between Tartu (EE) and Valmiera (LV)	Augstsprieguma tikls AS, Elering AS	Under consideration	2023	On time		Yes	Referred to TYNDP 2016
4.8.2	Internal line between Balti and Tartu (EE)	Elering AS	Planned, but not yet in permitting	2024	On time		Only undiscounted	Not assessed <sup>255</sup>
4.8.3	Interconnection between Tsirguliina (EE) and Valmiera (LV)	Augstsprieguma tikls AS, Elering AS	Planned, but not yet in permitting (last year: under consideration)	2024	On time		Yes	Referred to TYNDP 2016

<sup>251</sup> Project promoter changed from Energiasalv OÜ to Energiasalv Pakri OÜ.

<sup>252</sup> Last year the expected commissioning date was 2021.

<sup>253</sup> Agency's classification based on the project promoter's clarification the Project is on hold, assessing market conditions and possibilities. No estimation of the commissioning date is made.

<sup>254</sup> Project promoters' clarification: "The project is too complex to evaluate its benefits. Benefits depend on the selection of the Baltic synchronization scenario. Complete set of the projects will be clear after technical conditions for synchronous operation are issued by ENTSOE".

<sup>255</sup> Project promoters' clarification: Synchronisation project was not assessed due to the reason that it is unconventional project.

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
4.8.4	Internal line between Eesti and Tsirguliina (EE)	Elering AS	Planned, but not yet in permitting	2025	On time		Only undiscounted	Not assessed <sup>256</sup>
4.8.5	Internal line between substation in Lithuania and state border (LT)	Litgrid AB	Planned, but not yet in permitting	2025	On time		Only for investment costs	Not provided / Not available on PCI level
4.8.6	Internal line between Kruonis and Visaginas (LT)	Litgrid AB	Under consideration <sup>257</sup>	2025	Rescheduled	Changes on the generation side (in relation to nuclear generation) <sup>258</sup>	Only for investment costs	Not provided / Not available on PCI level
4.9	Various aspects of the integration of the Baltic States' electricity network into the continental European network, including their synchronous operation (generic project)	Litgrid AB, Augstsprieguma tīkls AS, Elering AS	Planned, but not yet in permitting	2025	Rescheduled	Ongoing studies (on synchronization) <sup>259</sup>	Only for investment costs / Only undiscounted	Not provided

<sup>256</sup> Project promoters' clarification: Synchronisation project was not assessed due to the reason that it is unconventional project.

<sup>257</sup> In previous year the PCI status was planned but not yet in permitting. However, it seems more a correction of the status than a change.

<sup>258</sup> Agency's classification based on the project promoters' description of the reason for rescheduling.

<sup>259</sup> Idem.

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
10.1	North Atlantic Green Zone Project (Ireland, United Kingdom/Northern Ireland) <sup>260</sup>	Did not submit a report	Cancelled <sup>261</sup>	N/A	N/A	Did not submit a report	N/A	N/A
10.2	Green-Me (France, Italy) <sup>262</sup>	Enel Distribuzione S.p.A., Electricité Réseau Distribution France SA, RTE Réseau de Transport d'Electricité Terna S.p.A.	Cancelled <sup>263</sup>	N/A	N/A	Re-prioritization of the project's implementation against other investments of the project promoter	N/A	N/A

<sup>260</sup> “North Atlantic Green Zone Project (Ireland, United Kingdom/Northern Ireland) aims at lowering wind curtailment by implementing communication infrastructure, enhanced grid control and interconnection and establishing (cross-border) protocols for Demand Side Management”.

<sup>261</sup> While there was no PCI report submitted for PCI 10.1, the Agency has been informed by the project promoter that the PCI was cancelled.

<sup>262</sup> “Green-Me (France, Italy) aims at enhancing RES integration by implementing automation, control and monitoring systems in HV and HV/MV substations, including communication with the renewable generators and storage in primary substations, as well as new data exchange to allow for a better cross-border interconnection management”.

<sup>263</sup> Last year the PCI was under consideration with a commissioning date of 2019. The PCI was already rescheduled between 2015-2016.

PCI Code	PCI name	Project promoter(s) <sup>208</sup>	Current status	Expected year of commissioning	Current progress <sup>209</sup>	Reason for delay or rescheduling (if applicable)	Availability of discounted investment costs and life-cycle costs data <sup>210</sup>	Availability of monetised benefit data <sup>211</sup>
10.3	SINCRO.GRID (Slovenia/Croatia) <sup>264</sup>	ELES, d.o.o., sistemski operater prenosnega elektroenergetskega omrežja, Hrvatski operater prijenosnog sustava d.o.o., HEP Operator Distribucijskog Sustava d.o.o., SODO sistemska operater distribucijskega omrežja z električno energijo, d.o.o.	Permitting (Last year: under consideration) <sup>265</sup>	2021	Rescheduled (3 months)	Project optimisation (taking into account available resources) <sup>266</sup>	Only for investment costs	Yes

<sup>264</sup> “SINCRO.GRID (Slovenia/Croatia) aims at solving network voltage, frequency control and congestion issues enabling further deployment of renewables and displacement of conventional generation by integrating new active elements in the transmission and distribution grids into the virtual cross-border control centre based on advanced data management, common system optimisation and forecasting involving two neighbouring TSOs and the two neighbouring DSOs”.

<sup>265</sup> The project promoters clarified that for the smart grid PCI all physical intervention will be performed in existing substations, without changing substation layouts, permit granting is not required (pre-application and statutory procedure do not apply). Only building permits must be obtained (normally last step in permitting process).

<sup>266</sup> Agency’s classification based on the project promoters’ description of the reason for rescheduling.

## Annex VI: PCIs not included in NDPs - gas

PCI number	PCI missing from the NDP of the following hosting Member State(s)
5.1.1	Ireland, UK
5.4	Spain
5.6	Germany
6.5.1	Croatia
6.8.1	Greece
6.9.1	Greece
6.20.4	Romania
6.20.5	Romania
6.20.6	Romania
6.24.3	Austria
6.25.2	Austria, Greece, Hungary
6.26.4	Austria
7.1.3	Greece, Italy
7.1.4	Greece
7.3.1	Cyprus, Greece
7.3.2	Cyprus, Greece
8.1.1	Finland
8.1.2.3	Estonia
8.2.1	Latvia
8.2.4	Latvia, Lithuania
8.6	Sweden

## Annex VII: Reported investment costs vs. reference values – gas

Figure 51 - 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 off-shore pipelines	UIC reference values are available for on-shore pipelines only	Approx. 73% of the total length (km) of new PCI pipelines are on-shore, 8% are partially off-shore, and 18% are off-shore.  The cost per km of off-shore pipelines is generally higher, although strongly dependent on depth and seabed features (off-shore 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” (inflation-adjusted) values are provided. For reference UIC values, the inflation-adjusted values to 2014 are considered to be a better proxy.
- Use of inflation since 2014	Reference values from UIC report (inflated until 2014) <sup>267</sup>	HICP <sup>268</sup> inflation rate during years 2014-2016 in EU was low (0.5% in 2014, 0% in 2015 and 0.3% in 2016), as published by <a href="#">Eurostat</a> . Inflation was not considered for 2014-2016 due to these low values observed.
- 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.

<sup>267</sup> 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.

<sup>268</sup> Harmonised Indices of Consumer Prices as published by Eurostat.

## Annex VIII: PCI specific information - gas

PCI number	PCI name in the 2015 Union list of PCIs	TYNDP code	PCI promoter(s)	Current status	Expected year of commissioning	Current progress
<b>Transmission</b>						
5.1.1	Physical Reverse Flow at Moffat interconnection point (Ireland/United Kingdom)	TRA-N-829	GNI(UK)	Under consideration	2020	on time
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 Limited (PTL)	Under consideration	2021	on time
5.10	Reverse flow interconnection on TENP pipeline in Germany	TRA-F-2018	Fluxys TENP GmbH	Permitting <sup>269</sup>	2019	delayed
5.11	Reverse flow interconnection between Italy and Switzerland at Passo Gries interconnection point	TRA-F-214	Snam Rete Gas S.p.A.	Under construction	2018	on time
5.19	Connection of Malta to the European Gas network – pipeline interconnection with Italy at Gela and/or offshore Floating LNG Storage and Re-gasification Unit (FSRU)	TRA-N-031 and LNG-N-211	Office of the Prime Minister (Energy & Projects) - Govt. of Malta	Planned, but not yet in permitting	2026	on time

<sup>269</sup> The PCI changed status. It was “Planned, but not yet in permitting” in the previous report.



PCI number	PCI name in the 2015 Union list of PCIs	TYNDP code	PCI promoter(s)	Current status	Expected year of commissioning	Current progress
5.20	Gas Pipeline connecting Algeria to Italy (via Sardinia) [currently known as "Galsi " pipeline]	TRA-N-012	Galsi S.p.A.	Permitting	2022	rescheduled
5.5	Eastern Axis Spain — France — interconnection point between Iberian Peninsula and France at Le Perthus, including the compressor stations at Montpellier and St. Martin de Crau [currently known as "Midcat"]	TRA-N-161 (Enagas), TRA-N-252 (TIGF), TRA-N-256 (GRTgaz) in TYNDP 2015 ; TRA-N-161 (Enagas), TRA-N-727 (Enagas) and TRA-N-256 (GRTgaz and TIGF) in TYNDP 2017	Enagás (Spain), TIGF and GRTgaz (France)	Planned, but not yet in permitting	2022	on time
5.4	3rd Interconnection Point between Portugal and Spain	TRA-N-283 (PT);TRA-N-284 (PT);TRA-N-285 (PT);TRA-N-168 (ES) (according with TYNDP 2015). TRA-N-283 (PT);TRA-N-284 (PT);TRA-N-285(PT);TRA-N-168(ES);TRA-N-729 (ES) (according with TYNDP 2017).	REN-Gasodutos, S.A. and Enagás Transporte S.A.U.	Permitting <sup>270</sup>	2021	on time

<sup>270</sup> The PCI changed status. It was "Planned, but not yet in permitting" in the previous report.

PCI number	PCI name in the 2015 Union list of PCIs	TYNDP code	PCI promoter(s)	Current status	Expected year of commissioning	Current progress
5.6	Reinforcement of the French network from South to North – Reverse flow from France to Germany at Obergailbach/Medelsheim Interconnection point (FR)	TRA-N-047	GRTgaz	Planned, but not yet in permitting	2022	on time
5.7.1	Reinforcement of the French network from South to North to create a single market zone, including PCI 5.7.1 Val de Saône pipeline between Etrez and Voisines (FR)	TRA-N-043	GRTgaz	Under construction <sup>271</sup>	2018	on time
5.7.2	Gascoigne Midi pipeline	TRA-N-331 (TIGF) ; TRA-N-391 (GRTgaz)	GRTgaz; TIGF	Permitting	2018	on time
5.8.1	Reinforcement of the French network from South to North including PCI 5.8.1 – Est Lyonnais pipeline between Saint-Avit and Etrez (FR)	TRA-N-253 (TYNDP 2015) ; TRA-N-256 and TRA-N-269 (TYNDP 2017)	GRTgaz	Planned, but not yet in permitting	2022	on time
5.8.2	Reinforcement of the French network from South to North including PCI 5.8.2 – Eridan pipeline between Saint-Martin-de-Crau and Saint-Avit (FR)	TRA-F-041 (TYNDP 2015) ; TRA-N-256 and TRA-N-269 (TYNDP 2017)	GRTgaz	Permitting	2022	on time
6.1.1	Poland — Czech Republic Interconnector [currently known as “Stork II”] between Libhošť	TRA-N-136; TRA-N-273	NET4GAS s.r.o.; Operator Gazociągów Przesyłowych GAZ-SYSTEM S.A.	Permitting	2022	delayed

<sup>271</sup> The PCI changed status. It was “Permitting” in the previous report.

PCI number	PCI name in the 2015 Union list of PCIs	TYNDP code	PCI promoter(s)	Current status	Expected year of commissioning	Current progress
	— Hať (CZ/PL) — Kędzierzyn (PL)					
6.1.12	Tvrdonice-Libhošť pipeline, including upgrade of CS Břeclav (CZ)	TRA-N-136	NET4GAS s.r.o.	Permitting	2020	delayed
6.1.2	Transmission infrastructure projects between Lwówek and Kędzierzyn (PL)	TRA-N-247 / TRA-N-273	Operator Gazociągów Przesyłowych GAZ-SYSTEM S.A.	Permitting	2020	delayed
6.10	Gas Interconnection Bulgaria-Serbia (currently known as IBS)	TRA-N-137	Ministry of Energy, Republic of Bulgaria Srbijagas, Republic of Serbia	Permitting	2020	rescheduled
6.15	Interconnection of the national transmission system with the international gas transmission pipelines and reverse flow at Isaccea (RO)	TRA-N-139	SNTGN TRANSGAZ SA	Planned, but not yet in permitting <sup>272</sup>	2019	on time
6.18	Adriatica pipeline (IT)	TRA-N-007	Snam Rete Gas S.p.A.	Permitting	2023	rescheduled
6.2.1	Poland - Slovakia interconnector	GAZ-SYSTEM : TRA-N-275; Eustream : TRA- N-190	Operator Gazociągów Przesyłowych GAZ-SYSTEM S.A.; eustream, a.s.	Permitting	2021	delayed
6.2.2	Transmission infrastructure projects between Rembelszczyzna and Strachocina	TRA-N-245	Operator Gazociągów Przesyłowych GAZ-SYSTEM S.A.	Permitting	2019	delayed
6.2.3	Transmission infrastructure projects between Tworóg and Strachocina	TRA-N-245	Operator Gazociągów Przesyłowych GAZ-SYSTEM S.A.	Permitting	2020	delayed
6.23	Hungary — Slovenia interconnection (Nagykanizsa —	TRA-N-112 (R15/1 Pince-	Plinovodi, Družba za upravljanje s prenosnim sistemom, d.o.o.;	Permitting	2020	on time

<sup>272</sup> The PCI changed status. It was “Under consideration” in the previous report.

PCI number	PCI name in the 2015 Union list of PCIs	TYNDP code	PCI promoter(s)	Current status	Expected year of commissioning	Current progress
	Tornyiszentmiklós (HU) — Lendava (SI) — Kidričevo)	Lendava-Kidričevo) and TRA-N-325 (Slovenian-Hungarian interconnector)	FGSZ Natural Gas Transmission, Private Company Limited by Shares			
6.24.1	Romanian-Hungarian reverse flow: Hungarian section 1st stage CS at Csanádpalota (1st phase)	TRA-N-286	FGSZ Natural Gas Transmission Private Company limited by Shares	Planned, but not yet in permitting	2020	rescheduled
6.24.2	Development on the Romanian territory of the National Gas Transmission System on the Bulgaria — Romania — Hungary — Austria Corridor — transmission pipeline Podișor — Horia GMS and 3 new compressor stations (Jupa, Bibești and Podișor) (1st phase)	TRA-N-358	SNTGN Transgaz SA	Permitting	2019	on time
6.24.3	GCA Mosonmagyaróvár	TRA-N-423	GAS CONNECT AUSTRIA GmbH	Planned, but not yet in permitting	2021	rescheduled
6.24.4	Városföld-Ercsi- Győr pipeline (capacity 4.4 bcm/a) (HU)	TRA-N-018	FGSZ Natural Gas Transmission Private Company limited by Shares	Planned, but not yet in permitting	2022	rescheduled
6.24.5	Ercsi-Százhalombatta pipeline (capacity 4.4 bcm/a) (HU)	TRA-N-061	FGSZ Natural Gas Transmission Private Company limited by Shares	Planned, but not yet in permitting	2022	rescheduled
6.24.6	Városföld compressor station (capacity 4.4 bcm/a) (HU)	TRA-N-123	FGSZ Natural Gas Transmission Private Company limited by Shares	Planned, but not yet in permitting	2022	rescheduled
6.24.7	Expansion of the transmission capacity in Romania towards	TRA-N-358	SNTGN Transgaz SA	Permitting	2020	on time

PCI number	PCI name in the 2015 Union list of PCIs	TYNDP code	PCI promoter(s)	Current status	Expected year of commissioning	Current progress
	Hungary up to 4.4 bcm/year (2nd phase)					
6.24.8	Black Sea shore — Podișor (RO) pipeline for taking over the Black sea gas	TRA-N-362	SNTGN Transgaz SA	Permitting	2020	rescheduled
6.24.9	Romanian-Hungarian reverse flow: Hungarian section 2nd stage CS at Csanádpalota or Algyő (HU) (capacity 4.4 bcm/a) (2nd phase)	TRA-N-377	FGSZ Natural Gas Transmission Private Company limited by Shares	Planned, but not yet in permitting	2022	rescheduled
6.25.1	Pipeline system from Bulgaria to Slovakia [currently known as “Eastring”]	TRA-N-654, TRA-N-656, TRA-N-655,TRA-N-628	Bulgartransgaz EAD; FGSZ Ltd; Transgaz S.A.; Eastring B.V (Eustream, a.s.)	Planned, but not yet in permitting	2021	rescheduled
6.25.2	Pipeline system from Greece to Austria [currently known as “Tesla”]	-	FGSZ Natural Gas Transmission Private Company limited by Shares; DESFA S.A.; GA-MA AD; JP. Srijagas; Gas Connect Austria GmbH	Under consideration	no planning date	
6.25.3	Further enlargement of the Bulgaria — Romania — Hungary — Austria bidirectional transmission corridor [currently known as “ROHUAT/BRUA”, phase 3]	TRA-N-126, TRA-N-384	S.N.T.G.N. TRANSGAZ S.A.	Planned, but not yet in permitting	2023	on time
6.25.4	Infrastructure to allow the development of the Bulgarian gas hub	TRA-N-593, TRA-N-594, TRA-N-592	Bulgartransgaz EAD	Under consideration	2022	on time
6.26.1	Interconnection Croatia — Slovenia (Lučko — Zabok — Rogatec)	TRA-N-086	PLINACRO Ltd.	Permitting	2019	rescheduled

PCI number	PCI name in the 2015 Union list of PCIs	TYNDP code	PCI promoter(s)	Current status	Expected year of commissioning	Current progress
6.26.2	CS Kidričevo, 2nd phase of upgrade	TRA-N-094	PLINOVODI, Družba za upravljanje s prenosnim sistemom, d.o.o.	Permitting	2020	on time
6.26.3	Compressor stations at the Croatian gas transmission system	TRA-F-334, Compressor station 1 at the Croatia gas transmission system; TRA-N-1057 Compressor stations 2 and 3 at the Croatian gas transmission system	PLINACRO Ltd.	Permitting	2020	rescheduled
6.26.4	GCA 2014/04 Murfeld	TRA-N-361	GAS CONNECT AUSTRIA GmbH	Planned, but not yet in permitting	2020	rescheduled
6.26.5	Upgrade of Murfeld/Ceršak interconnection	TRA-N-389	PLINOVODI, Družba za upravljanje s prenosnim sistemom, d.o.o.	Permitting	2020	on time
6.26.6	Upgrade of Rogatec interconnection	TRA-N-390	PLINOVODI, Družba za upravljanje s prenosnim sistemom, d.o.o.	Permitting	2020	on time
6.4	PCI Bidirectional Austrian — Czech interconnection (BACI) between Baumgarten (AT) — Reinthal (CZ/ AT) — Brečlav (CZ)	TRA-N-021; TRA-N-133	GAS CONNECT AUSTRIA GmbH; NET4GAS s.r.o.	Permitting	2020	on time
6.5.2	Gas pipeline Zlobin-Bosiljevo-Sisak-Kozarac-Slobodnica (HR)	TRA-N-075	PLINACRO Ltd., for natural gas transmission	Permitting	2023	rescheduled
6.8.1	Interconnection Greece — Bulgaria [currently known as	TRA-N-378	ICGB AD	Permitting	2020	delayed

PCI number	PCI name in the 2015 Union list of PCIs	TYNDP code	PCI promoter(s)	Current status	Expected year of commissioning	Current progress
	IGB] between Komotini (EL) — Stara Zagora (BG)					
6.8.2	Necessary rehabilitation, modernization and expansion of the Bulgarian transmission system	TRA-N-298	Bulgartransgaz EAD	Permitting <sup>273</sup>	2020	on time
6.8.4	Gas pipeline aiming at expanding the capacity on the interconnection of the Northern ring of the Bulgarian and Romanian gas transmission networks	TRA-N-379	Bulgartransgaz EAD	Under consideration	The project is at a very initial phase therefore Bulgartransgaz EAD cannot submit detailed implementation plan.	
6.9.3	Gas compressor station at Kipi (EL)	TRA-N-128	HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA) S.A.	Under consideration	2020	on time
7.1.1	Expansion of the South-Caucasus	TRA-F-395	SOCAR MIDSTREAM OPERATIONS	Under consideration	2021	delayed
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), “Expansion of the South-Caucasus Pipeline” (SCP-(F)X) and “Trans Anatolia Natural Gas Pipeline” (TANAP)]	TRA-F-221	SOCAR (“SOUTHERN GAS CORRIDOR” CLOSED JOINT STOCK COMPANY, a SOCAR Affiliate is the major shareholder in TANAP)	Under construction	2019	on time

<sup>273</sup> The PCI changed status. It was “Planned, but not yet in permitting” in the previous report.

PCI number	PCI name in the 2015 Union list of PCIs	TYNDP code	PCI promoter(s)	Current status	Expected year of commissioning	Current progress
7.1.1	Trans-Caspian Gas Pipeline (TCP)	TRA-N-339	W-Stream Caspian Pipeline Company Limited	Under consideration	2020	delayed
7.1.2	Gas compressor station at Kipi (EL)	TRA-N-128 plus TRA-N-1129	HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA) S.A.	Under consideration <sup>274</sup>	2020	on time
7.1.3	Gas pipeline from Greece to Italy via Albania and the Adriatic Sea [currently known as “Trans Adriatic Pipeline” (TAP)]	TRA-F-051	Trans Adriatic Pipeline AG	Under construction <sup>275</sup>	2020	on time
7.1.4	Gas Pipeline from Greece to Italy (currently known as "Poseidon Pipeline")	TRA-N-010	NATURAL GAS SUBMARINE INTERCONNECTOR GREECE-ITALY POSEIDON S.A. (IGI Poseidon S.A.)	Permitting	2022	rescheduled
7.1.6	Metering and Regulating Stations for the connection of the Greek transmission system with TAP	TRA-N-940 Metering & Regulating station at Komotini and TRA-N-941 Metering and Regulating station at Nea Messimvria	HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA) S.A.	cancelled <sup>276</sup>	2019	
7.1.7	Komotini-Thesprotia pipeline (EL)	TRA-N-014	HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA) S.A.	Planned, but not yet in permitting	2023	on time
7.3.1	Pipeline from offshore Cyprus to Greece mainland via Crete	TRA-N-330	NATURAL GAS SUBMARINE INTERCONNECTOR	Permitting	2022	rescheduled

<sup>274</sup> The PCI changed status. It was “Planned but not yet in permitting” in the previous report.

<sup>275</sup> The PCI changed status. It was “Permitting” in the previous report.

<sup>276</sup> The PCI changed status.



PCI number	PCI name in the 2015 Union list of PCIs	TYNDP code	PCI promoter(s)	Current status	Expected year of commissioning	Current progress
	(currently known as “EastMed Pipeline”)		GREECE-ITALY POSEIDON S.A. (IGI Poseidon S.A.)			
7.3.2	Removing bottlenecks in Cyprus to end isolation and to allow for transmission of gas from the Eastern Mediterranean region	TRA-N-1146	Ministry of Energy, Commerce, Industry and Tourism (MECIT)	Planned, but not yet in permitting		
7.4.1	Gas compressor station at Kipi (EL)	TRA-N-128	HELLENIC GAS TRANSMISSION SYSTEM OPERATOR (DESFA) S.A.	Under consideration	2020	on time
7.4.2	Interconnector between Turkey and Bulgaria [currently known as “ITB”]	TRA-N-140	Bulgartransgaz EAD	Permitting <sup>277</sup>	2020	
8.1.1	Interconnector between Finland and Estonia "Balticconnector"	TRA-N-895 (from the ENSOG TYNDP 2017). As the FID decision was taken the project code was changed accordingly, TRA-F-928 (ENTSOG project code for third PCI list application)	Elering AS, Baltic Connector OY	Permitting	2019	on time
8.2.1	Enhancement of Latvia-Lithuania interconnection	TRA-N-342 (LT), TRA-N-382 (LV)	AS Conexus Baltic Grid, AB Amber Grid	Planned, but not yet in permitting	2020	on time
8.2.2	Enhancement of Estonia-Latvia interconnection	TRA-N-915 (From ENTSOG TYNDP 2017)	Elering AS	Permitting	2019	on time

<sup>277</sup> The PCI changed status. It was “Planned, but not yet in permitting” in the previous report.

PCI number	PCI name in the 2015 Union list of PCIs	TYNDP code	PCI promoter(s)	Current status	Expected year of commissioning	Current progress
8.3	Poland - Denmark interconnection "Baltic Pipe"	TRA-N-271	Operator Gazociągów Przesyłowych GAZ-SYSTEM S.A.; Energinet.dk	Planned, but not yet in permitting	2022	Ahead of schedule
8.5	Poland - Lithuania interconnection [currently known as "GIPL"]	TRA-N-212, TRA-N-341	Operator Gazociągów Przesyłowych GAZ-SYSTEM S.A.; AB Amber Grid	Permitting	2021	rescheduled
<b>LNG</b>						
5.3	Shannon LNG Terminal and connecting pipeline (IE)	LNG-N-030	Shannon LNG Ltd.	Permitting	2022	Delayed
6.5.1.	Phased development of a LNG terminal in Krk (HR)	LNG-N-082	LNG Hrvatska d.o.o./ LNG Croatia LLC	Planned, but not yet in permitting <sup>278</sup>	2019	Rescheduled
6.9.1	LNG terminal in northern Greece	LNG-N-062, TRA-N-063	GASTRADE S.A.	Permitting	2020	Delayed
8.1.2.3	Tallinn LNG (EE)	LNG-N-146	Vopak LNG Holding B.V. / Vopak E.O.S. Ltd / Port of Tallinn Ltd.	Permitting	2021	on time
8.1.2.2	Paldiski LNG (EE)	LNG-N-079	Balti Gaas OÜ	Permitting	2021	Rescheduled
8.6	Gothenburg LNG terminal in Sweden	LNG-N-032	Swedegas AB	<i>Reported as classified by the project promoter</i>	<i>Reported as classified by the project promoter</i>	<i>Reported as classified by the project promoter</i>
8.7.	Capacity extension of Świnoujście LNG terminal in Poland	LNG-N-272	Operator Gazociągów Przesyłowych GAZ-SYSTEM S.A.	Planned, but not yet in permitting		
<b>UGS</b>						
5.1.3	Development of the Islandmagee Underground Gas Storage (UGS) at Larne (Northern Ireland)	UGS-N-294	Islandmagee Storage Limited	Permitting	2021	On time

<sup>278</sup> The PCI changed status. It was "Permitting" in the previous report.

PCI number	PCI name in the 2015 Union list of PCIs	TYNDP code	PCI promoter(s)	Current status	Expected year of commissioning	Current progress
6.20.2	Chiren UGS expansion (BG)	UGS-N-138	Bulgartransgaz EAD	Permitting <sup>279</sup>	2024	Delayed
6.20.4	Depomures storage in Romania	UGS-N-233	Engie Romania SA	Permitting	2023	Delayed
6.20.5	New underground gas storage in Romania	UGS-N-366	Societatea Națională de Gaze Naturale ROMGAZ S.A.	Under consideration	2024	Rescheduled
6.20.6	Sărmășel underground gas storage in Romania	UGS-N-371	Societatea Națională de Gaze Naturale ROMGAZ S.A.	Under consideration	2024	Rescheduled
8.2.4	Enhancement of Incukalns Underground Gas Storage (LV)	UGS-N-374	Joint Stock Company "Conexus Baltic Grid"	Planned, but not yet in permitting	2025	On time

<sup>279</sup> The PCI changed status. It was “Planned, but not yet in permitting” in the previous report.



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