

OPINION No 09/2023
OF THE EUROPEAN UNION AGENCY
FOR THE COOPERATION OF ENERGY REGULATORS

of 29 September 2023

**on the draft regional lists of
proposed Hydrogen Projects of Common Interest and
Projects of Mutual Interest 2023**

THE EUROPEAN UNION AGENCY FOR THE COOPERATION OF ENERGY REGULATORS,

Having regard to Regulation (EU) 2022/869 of the European Parliament and of the Council of 30 May 2022 on guidelines for trans-European energy infrastructure, amending Regulations (EC) No 715/2009, (EU) 2019/942 and (EU) 2019/943 and Directives 2009/73/EC and (EU) 2019/944, and repealing Regulation (EU) No 347/2013¹ and, in particular, Annex III.2(14) thereto,

Having regard to the outcome of the consultation with the ACER's Gas Working Group,

Having regard to the favourable opinion of the Board of Regulators of 20 September 2023, delivered pursuant to Article 22(5)(a) of Regulation (EU) 2019/942 of the European Parliament and of the Council of 5 June 2019 establishing a European Union Agency for the Cooperation of Energy Regulators (ACER)²,

Whereas:

1. INTRODUCTION

- (1) According to Article 3 of Regulation (EU) 2022/869 (the 'TEN-E Regulation'), a Union list of Projects of Common Interest ('PCIs') and Projects of Mutual Interest

¹ OJ L 152, 3.6.2022, p. 45

² OJ L 158, 16.6.2019, p.22

- (‘PMIs’)³ shall be established every two years, on the basis of the regional lists adopted by the decision-making bodies of the Regional Groups as set out in Annex III.1 to the same Regulation.
- (2) The draft regional lists of proposed projects falling under the competence of National Regulatory Authorities (‘NRAs’) drawn up by the Regional Groups shall be submitted to ACER before the adoption date of the Union list⁴. The draft list shall be accompanied by the Opinions of Member States to whose territory a proposed project does not relate, but on which the proposed project may have a potential net positive impact or a potential significant effect, which were presented to a Regional Group specifying its concerns.
 - (3) According to Annex III.2(8) to the TEN-E Regulation, the NRAs, and if necessary, ACER, shall check the consistent application of the criteria and cost-benefit analysis (‘CBA’) methodology and evaluate the cross-border relevance of the PCIs. They shall present their assessment to the Regional Groups.
 - (4) In view of the above, ACER coordinated NRA inputs and invited NRAs to provide structured assessments of the candidate projects by completing a questionnaire. Through this questionnaire, the NRAs provided structured assessments of the candidate projects on the eligibility criteria, as well as on the cost-benefit analysis of the projects and the elements affecting it (a summary of NRAs’ assessments are presented in Annex I to this Opinion).
 - (5) On 15 March 2023 the European Scientific Advisory Board on Climate Change (ESABCC) published its recommendations⁵ on a harmonised EU energy system-wide cost-benefit analysis, some of which are relevant to the PCI/PMI process and are considered by ACER. More specifically, ESABCC calls for more transparency in the coordination between ENTSO-E and ENTSO-G, as well as between the European Commission and ENTSOs, and the highest possible accessibility to the market and network models used by ENTSOs to calculate projects’ costs and benefits.
 - (6) The NRAs’ assessments of the candidate projects were presented during the "Hydrogen and Electrolysers TEN-E Cross-Regional Groups meeting" held on 17 April 2023 and have also been considered as an input for preparing this Opinion.
 - (7) ACER shall assess the draft regional lists and the accompanying opinions from Member States within three months of the date of receipt. ACER shall provide an

³ In this Opinion, the term “proposed PCIs/PMIs” indicates projects, which are included in the document of the draft regional PCI/PMI lists submitted to ACER in sections “Hydrogen and electrolyser projects” of which only hydrogen project have been considered for this opinion, and the term “candidate projects” indicates projects for which an application for inclusion on the regional lists was submitted.

⁴ As requested in Annex III.2(14) of the Regulation 2022/869 (TEN-E)

⁵ <https://climate-advisory-board.europa.eu/reports-and-publications/towards-a-decarbonised-and-climate-resilient-eu-energy-infrastructure-recommendations-on-an-energy-system-wide-cost-benefit-analysis/advice-on-a-harmonised-eu.pdf/@@display-file/file>

Opinion on the draft regional lists, in particular, on the consistent application of the criteria and the cost-benefit analysis across regions.

- (8) The European Commission released to the Regional Group members the final project assessment methodology⁶ on 16 June 2023, in the document “*Methodology for assessing the hydrogen and electrolyser candidate PCI/PMI projects*” (*The PCI / PMI Selection Methodology*). The methodology, as well as the final scores and ranking of the candidate projects proposed for inclusion in the draft regional lists of PCIs and PMIs, to be submitted to the Decision-Making Bodies, were presented in the Regional Groups meetings held on 16 June 2023.
- (9) The technical Decision-Making Bodies of the Regional Groups agreed on 28 June 2023 on which projects to include in the draft regional PCI/PMI lists.
- (10) On 12 July 2023, the European Commission submitted to ACER the draft regional lists of proposed PCIs/PMIs (cf. Annex III to this Opinion) agreed by the technical Decision-Making Bodies of the Regional Groups and requested ACER’s opinion on the projects falling under the competence of national regulatory authorities.
- (11) ACER herein provides its opinion concerning hydrogen transmission pipelines, terminals and storages⁷ set out in Annex II.3 to the TEN-E Regulation, i.e. regarding the HI West, HI East and BEMIP Hydrogen priority corridors. ACER is well aware at this point that the hydrogen sector is an infant sector, therefore this aspect has been taken into consideration when drafting the opinion.
- (12) The draft Regional PCI/PMI lists submitted to ACER includes two projects for which Member States expressed support even where the initial assessment of project was not sufficient during the technical Decision-Making Bodies meeting.
- (13) ACER notes that two gas PCIs associated with Malta and Cyprus, both of which are not interconnected to the trans-European gas network, have retained their status from the previous 5th PCI list due to a derogation as outlined in Article 24 of the TEN-E Regulation.
- (14) During the preparation of the draft PCI/PMI lists, a significant number of NRAs stated that they lack competence and jurisdiction over hydrogen projects within their respective Member States, therefore, currently they may not be in a position to offer scrutiny on the proposed hydrogen projects. At the time of NRA consultation process

⁶ The draft PCI/PMI assessment methodology for hydrogen and electrolyzers has been circulated on 2 June 2023 to RG members for comments by 12 June 2023.

⁷ Regarding the consistent application of the criteria and the cost-benefit analysis across regions (requested in Annex III.2.14 of the TEN-E Regulation), ACER notes that according to the TEN-E Regulation, ACER is not obligated to provide an opinion on electrolyzers. Regarding the assessment of smart gas grids (SGG) projects, ACER has not provided an opinion due to “Thematic area SGG” outcome of not putting any of the SGG projects on the draft PCI/PMI lists.

on candidate projects, only five NRAs⁸ (DE, LT, MT, PT, RO) possessed the necessary competency to oversee hydrogen projects. Consequently, not all NRAs assessed the candidate projects at the national level and provided their perspectives during the PCI/PMI selection process.

2. ASSESSMENT OF THE PCI/PMI SELECTION PROCESS AND DRAFT REGIONAL LISTS

2.1. The organisation of the PCI/PMI selection process

- (15) ACER welcomes some aspects of the first hydrogen PCI/PMI selection process, including the involvement of various stakeholders in the Regional Groups meetings, the informative presentations on individual project proposals and the up-to-date information on all candidate projects. Additionally, ACER commends the European Commission's efforts to facilitate the extension of the energy system with new energy carriers during the challenging energy transition period, while considering future EU targets and managing delays in the finalisation of the TYNDP 2022. Despite these efforts, it remained at this point clear the lack of concreteness of the hydrogen candidate projects, which relates to the uncertainties of this emerging sector, where the applicable revenue model or the applicable regulatory regime is still under consideration.
- (16) ACER commends the cooperation with the European Commission and the European Network of Transmission System Operators for Gas (ENTSO-G) held in the framework of the Cooperation Platform⁹.
- (17) For future PCI/PMI selection processes, ACER sees a possibility for improvement in the timing of the discussions on the methodologies (i.e. the identification of system needs assessment methodology and the PCI/PMI selection methodology), which should take place at the beginning of the selection process, allowing sufficient time to the Regional Groups members for substantial discussions and developments and allowing to achieve the same level of understanding between these members. Furthermore, ACER believes that methodologies as well as their application and the

⁸ Source: ACER Report on Investment Evaluation, Risk Assessment and Regulatory Incentives for Energy Network Projects, June 2023. "ACER notes that in only five Member States (DE, LT, MT, PT, RO), NRAs reported competence (e.g. evaluation and/or tariff approval) for hydrogen infrastructure. In the remaining Member States, NRAs have no competence over hydrogen infrastructure or the legal basis giving competence over hydrogen infrastructure to NRAs has not been established yet. In some Member States the legislative framework on how to organise the hydrogen market and system development is under discussion."

⁹ The Cooperation Platform is an informal, working level team, chaired by the European Commission, where representatives from the European Commission, ENTSO-E and the Agency discuss the issues pertaining to the PCI/PMI selection process, aiming at finding solutions for a better PCI selection.

obtained results should firstly be discussed in the scope of the Cooperation Platform ahead of their presentation to the Regional Groups.

- (18) The delays on the TYNDP 2022 and more specifically the non-availability of the project specific CBA results created hurdles in the PCI / PMI selection process. At the time of the submission of candidate projects¹⁰ and of the provision of NRAs' assessment¹¹ the draft TYNDP 2022 had not been yet submitted to ACER for opinion¹² and the project specific CBA results were not available. ACER Opinion on the draft ENTSOG TYNDP 2022 was issued only on 14 July 2023. The non-availability of the complete and final TYNDP data could not allow a proper assessment of projects by NRAs and the other Regional Groups members. Therefore, ACER recommends that key information on candidate projects (especially their costs and benefits) that impact the project assessment must be finalised before the project assessment starts and be subject to the PCI/PMI candidates public consultation. ACER also requests that the ENTSOG TYNDP, which provides the necessary data for the project assessment, to take into account ACER's opinion and be finalised before the project assessment starts, including also the results of the CBA assessment of the candidate projects.

2.2. Identification of hydrogen infrastructure needs

- (19) The approach followed by the Regional Groups regarding the identification of hydrogen infrastructure needs is described in the European Commission document "*Identification of Hydrogen infrastructure needs for the TEN-E priority corridors*"¹³. The list of regional needs per corridor was presented in the Regional Groups meetings on 20 March 2023.
- (20) The methodology implemented was consulted with the Regional Groups¹⁴ and is based on indicators to identify each specific need, namely, improvement of market integration, sustainability and security of supply. Due to lack of reliable input data for the hydrogen supply and demand per Member State, the identification of hydrogen needs methodology was simplified and assessed only three needs, with one indicator per each need, i.e. market integration, curtailed hydrogen demand and variation of greenhouse gas emissions.
- (21) Based on this methodology, the hydrogen infrastructure needs per Member States were identified and all Member States have shown a need in "improvement in market integration" and "sustainability". Moreover, the analysis identified a security of

¹⁰ By December 15th, 2022

¹¹ mid-March 2023

¹² The draft TYNDP 2022 was submitted to ACER for opinion on 26 May 2023.

¹³ <https://circabc.europa.eu/ui/group/3ba59f7e-2e01-46d0-9683-a72b39b6decf/library/bc8707b5-a1c6-4bb6-b702-159087ae48c0/details> issued on 23 March 2023

¹⁴ Consultation started on 6 February and finished on 24 February.

supply need only for isolated Member States¹⁵. These outcomes may require further considerations, as how to further improve the methodology to fit the future system needs identification process.

- (22) For the purpose of the current PCI/PMI selection process, taking place for the first time and while lacking firm input data on hydrogen demand and supply, ACER understands that the current uncertainties lead to the adoption of such simplified approach. Looking ahead to future selection processes, ACER recommends Regional Groups to dedicate further efforts in the next PCI/PMI selection round to refine the process of identifying infrastructure needs for hydrogen projects, with the objective to develop a more robust methodology that yields outcomes tailored to address potentially growing requirements for future hydrogen market development.

2.3. The selection methodology for candidate projects

- (23) The final selection methodology was described in the Commission's document "*Methodology for assessing the hydrogen and electrolyser candidates PCI/PMI projects*" that was presented and adopted on 16 June 2023 in the Regional Groups meeting¹⁶.

- (24) ACER commends the Commission's efforts to develop a selection methodology that addresses the unique challenges posed by the uncertainty of input data for future hydrogen demand and supply and the non-maturity of the hydrogen market in general. The development of such a methodology, given the infancy of the hydrogen landscape is complex and demonstrates a proactive approach. At the same time, given the limitations of the current hydrogen market, ACER points out the importance of a continuous improvement and refinement of the methodology for future selection processes, allowing for more accurate and comprehensive evaluation of candidate projects.

- (25) In this respect, ACER recommends the following:

- the future TYNDPs should better fit the purpose of the PCI/PMI selection process, by providing a sufficient level of information on the candidate projects, including project specific CBA results, before a beginning of the selection process;
- in the early stages of the hydrogen market development, ACER recommends that candidate projects should show certain level of concreteness (being in a more advanced development stage) in order to be qualified as eligible for the PCI/PMI list;

¹⁵ Ireland, Malta, and Cyprus

¹⁶ Consultation of a draft methodology started on 2 June and finished on 12 June 2023

- regarding the benefits monetisation, ACER understands that certain benefits are intrinsically difficult to monetise and that in such cases a kind of normalisation is used in order to determine a relative benefit/cost ratio. ACER considers such approach as pragmatic, but not necessarily leading to coherent outcomes. Therefore, ACER recommends paying further attention to the monetisation of benefits;
- taking into consideration in the next PCI/PMI selection methodology the hydrogen specific CBA methodology, that is being currently under finalisation. This would allow Regional Groups to make more informed decisions, better ensuring that selected projects are having more benefits recognised compared to the costs and effectively contributing to the advancement of the hydrogen sector. ACER has published a consultancy study¹⁷ on this matter, with recommendations for the CBA methodology for hydrogen infrastructures that ENTSOG is developing for future TYNDPs;
- regarding the scenario used, according to the PCI/PMI selection Methodology, the assessment was “primarily based on benefits estimated under the 2030 Distributed Energy scenario of the TYNDP 2022”, plus taking into account further data on national hydrogen plans of Member States and project promoters, and “the choice of the scenario was made considering the consistency of ENTSOs scenarios with the latest Commission scenario used for the Climate Target Plan impact assessment and also the consistency with the electricity PCI/PMI process”. In ACER’s view, a scenario in alignment with the European Union targets can be used for the assessment, however, the Commission should strive to take into consideration more than a single scenario in the next selection rounds. Otherwise it may result in biased outcomes by missing other possible futures, both in terms of infrastructure needs and assessments of individual projects. In addition, applying the study years beyond 2030 would reduce uncertainties of results in the longer assessment period.

(26) Furthermore, ACER calls for a greater transparency of the application of the selection methodology as well as the results obtained for candidate projects. Also the application of grouping of candidates and its impact on the results is, for instance, one of the elements which remains largely non-transparent. ACER is of the opinion that the application as well as the results should be available to all members of the Regional Groups, rather than being only available and discussed bilaterally with the concerned promoters.

2.4. Assessment of the draft regional lists

(27) Regarding the consistency of the PCI/PMI selection across regions, ACER notes that the same terms of reference for Regional Groups, identification of infrastructure needs methodology and selection methodology were applied for the evaluation of the three

¹⁷ https://www.acer.europa.eu/Publications/Study_on_ENTSOG_CBA_for_hydrogen_infrastructure_ACER.pdf

specific criteria of Article 4(3)d of the TEN-E Regulation across all regions. Therefore, a certain degree of consistency was safeguarded throughout the process and across all regions.

- (28) ACER notes that a generic emerging corridor covering Ukraine, Slovakia, Czechia, Austria, and Germany has been included in the regional list HI EAST Hydrogen transmission projects, which otherwise would have had a negative assessment due to the uncertain hydrogen source. The primary purpose of this corridor, according to the Commission, is to facilitate in the future the transmission of hydrogen from Ukraine to Central and Western Europe, aiming to acknowledge Ukraine's hydrogen production potential and the necessity of its transmission towards Central Europe. To enhance the clarity of this "generic project group" or "generic corridor," ACER recommends to clearly divide it into more individual projects within the corridor. Additionally, in order to avoid uncertainties there should be further clarification of this emerging corridor provided, especially in terms of its PCI/PMI status and its privileges compared to a "normal" PCI project.
- (29) ACER notes that inclusion and exclusion criteria for a "generic corridor" should be further clarified and defined as to projects and participating countries.
- (30) Within the draft PCI/PMI lists submitted to ACER, two additional PCI projects¹⁸ have been included on the basis of the support of the respective Member States and their assurance that new data is available for the projects, despite that the benefits assessment of these candidate projects had initially fallen short of the set threshold. In light of this, ACER recommends that the Regional Group conducts a reassessment of these two projects, providing all the assumptions and results to all Regional Groups members.
- (31) ACER highlights that, in the early stages of the hydrogen development, it remains important to understand the rationale behind the grouping of the specific project groups or the creation of new generic projects. The Commission should transparently communicate this early on to the Regional Groups, to keep the concerned project promoters and Members States informed and aligned. The regrouping should be timely and take place before NRAs assessment of projects. Otherwise, the NRA assessment of projects might fall short.
- (32) In Annex II, NRAs views on the projects included in the draft Regional PCI/ PMI lists are presented, building on the joint assessments of candidate projects by NRAs, the statistics of which are presented in Annex I to this Opinion. In total, project promoters submitted 179 candidate projects/project groups to the PCI/PMI selection process. Among these projects, 19 have been indicated as being in an "Advanced" maturity status, where one project reached the stage of FID (Final Investment Decision). The

¹⁸ The Delta Rhine Corridor H2 and Belgium - Germany interconnection (Antwerp-Eynatten pipeline & H2ercules West)

remaining 159 projects have been indicated as less advanced, meaning that they are still in the early stages of planning and development and generally lacked maturity and concreteness. The level of immaturity of projects causes challenges for NRAs when it comes to projects' assessment and evaluation. Furthermore, the regulatory status of projects, namely whether projects will be regulated or not, at this point, was largely unclear because the EU regulatory package on hydrogen has yet to be established,

HAS ADOPTED THIS OPINION:

1. ACER commends the Commission's efforts to develop the system needs identification and the project selection methodologies that address the unique challenges of the current stage of hydrogen sector development, emphasizing proactive steps despite the complexities of the evolving hydrogen landscape, which demonstrates a commitment to fostering a mature and robust hydrogen energy sector in the future.
2. ACER's and NRAs' assessment on the projects of the draft regional PCI/PMI lists is provided in section 2.4, Annex I and II of this Opinion.
3. ACER is unable to assess the consistent application of the criteria of the TEN-E Regulation and of the cost-benefit analysis to all the candidate projects due to:
 - (i) unavailability of the project specific CBA results for the candidate projects as part of the TYNDP 2022;
 - (ii) lack of full transparency in the results from applying the PCI / PMI Selection Methodology and project grouping in the selection process;
 - (iii) the infancy of the hydrogen sector and the ongoing legislative process on hydrogen regulation, the majority of NRAs lacked abilities to scrutinise the candidate projects.
4. To help tackle the deficiencies listed above and enable ACER to perform its legal duty, the Regional Groups should work on improving the transparency of the process and the methodologies used in the next PCI/PMI selection process, taking into account ACER's recommendations included in this Opinion.

This Opinion is addressed to the European Commission.

Done at Ljubljana, on 29 September 2023.

- SIGNED -

For the Agency
The Director
C. ZINGLERSEN

Annexes:

Annex I - Statistics on NRAs' assessment of candidate projects

Annex II - Draft Regional PCI / PMI lists and NRA comments on individual projects

Annex I - Statistics on NRAs' assessment of candidate projects

In line with the provisions of Annex III, 2.(8), Regulation (EU) 2022/869, the NRAs¹⁹ cooperating in the framework of ACER checked the consistent application of the criteria and the CBA methodology and evaluated the cross-border relevance of the candidate projects for PCI lists. The NRA checks and evaluations were carried out between 8 February 2023 and 3 March 2023. The scope of the assessments covered the candidate projects and project groups. The summary of the assessment results was communicated to the Regional Groups on 17 April 2023²⁰.

The assessment included the following main elements:

- Compliance with the criteria of cross-border relevance²¹, in line with Article 4(1)(c) of Reg. (EU) 2022/869
- Compliance with the specific policy criteria²², in line with 4(3)(d) of Reg. (EU) 2022/869
- Presence of the candidate projects in the National Development Plans of the hosting Member States;
- Consistency of the indicated capital expenditure (CAPEX) and operational expenditure (OPEX) data of the project and the information available to the NRA from other sources;
- Consistency and validity of the simulation results and the Economic Performance Indicators²³;
- Credibility of the qualitative analysis;
- Whether the overall benefits by the project outweigh its costs;
- NRAs' own assessment of the realism of the indicated commissioning date; and
- Objections (if any) to the inclusion of the candidate project in the PCI/PMI lists.

General statistics of the candidate projects assessment

In total submitted 179 candidate projects/project groups for the PCI/PMI lists. Among these projects, 19 have been designated as being in an "Advanced" maturity status. Additionally, one

¹⁹ Most NRAs did not have competences over hydrogen projects and did not have information, therefore couldn't have assessed the projects from any of the aspects listed in the bullet points on this page.

²⁰ ACER shared the detailed NRAs assessment table with the European Commission.

²¹ These criteria scrutinise whether the candidate project involves at least two Member States by directly crossing the border between them, or it is located in one Member State but has a significant cross-border impact, or it crosses the border of an EU Member State and a country of the European Economic Area.

²² These are: security of supply, market integration, competition and sustainability.

²³ Including net present value, the benefit-to-cost ratio and the sensitivity of the cost figures, where applicable, due to non-availability of the Economic Performance Indicator data for NRAs, unless direct requests for such data were made by the NRAs to project promoters.

project has reached the crucial stage of FID (Final Investment Decision). The remaining projects (159) have been classified as less advanced, suggesting that they are still in the early stages of planning and development. The NRAs examined 50 PCI candidates at the group level (out of the 59 in total) and 9 at individual level. The individual projects include: HYD-N-1051, HYD-N-1092, HYD-N-385, TRA-A-10, TRA-A-35, TRA-A-70, RET-N-916, HYD-N-1065, HYD-N-1100.

Cross-border relevance

Regarding cross-border relevance, NRAs indicated 23 candidate projects as not being able to be assessed against criteria of Article 4(1)(c) of the Regulation (EU) No 2022/869. 12 candidate projects are located on the territory of one Member State, either inland or offshore, including islands, and has a significant cross-border impact as set out in point (1) of Annex IV, while 18 projects involve at least two Member States by directly or indirectly, via interconnection with a third country, crossing the border of two or more Member States. Finally, for 5 candidate project groups/individual projects NRAs did not provide an answer.

Meeting specific criteria according to TEN-E Articles 4(3)

For 10 of the candidate projects, NRAs indicated that it's unclear if they meet any of the four specific criteria, as they were not able to assess them (PRJ-G-133, PRJ-G-247, PRJ-G-250, PRJ-G-261, PRJ-G-269, PRJ-G-274, PRJ-G-276, PRJ-G-279, PRJ-G-280 and individual project HYD-N-1100), while 33 of the assessed projects contribute to all four specific policy criteria.

Inclusion in the national development plan (NDP)

33 projects were not included in any of the current national NDP according to NRAs. In 10 cases, not all of the projects are included, and they are only included in some of the hosting Member State NDP(s), while 16 projects are included in all hosting Member State NDP(s).

Objection of NRAs to the inclusion on the PCI lists

In 2 cases [for projects PRJ-G-134 and RET-N-916], Slovakian NRA objects to the inclusion of the project (candidate PCI/PMI) in the final Regional Union list, while for PRJ-G-261, Estonian NRA is not able to assess.

CAPEX and OPEX consistency

By looking at the consistency of CAPEX and OPEX estimations, NRAs confirmed for 17 of the candidate projects that the data for CAPEX is consistent and 11, regarding OPEX costs. Moreover, values of CAPEX and OPEX were not provided for 13 candidate projects, while for 27 candidate projects, NRAs were not able to assess the consistency of CAPEX values as well as for 34 in respect of OPEX values. Notably, divergent views among NRAs were observed for candidate projects PPJ-G-284 (between Germany and Czech Republic²⁴) with regards to CAPEX and PPJ-G-286 (between Hungary and Slovenia) on both CAPEX and OPEX.

²⁴ In case of CZ-DE the divergent view is not drastic, as one Member State reported it had no opinion and the other one that the data were not consistent enough to make conclusions.

Credibility of simulation results

The NRAs were not able to assess the credibility of simulation results for a significant number of candidate projects, specifically 29 in total. Additionally, 25 projects either lacked the necessary modelling results or were not subjected to modelling at all. Additionally, 5 candidate projects were deemed immature and thus were not assessed. Furthermore, for 32 projects, economic performance results (EPIs) were not provided to the NRAs, and out of these, 22 projects were not assessed from the NRAs. Among these, 5 projects were classified as immature and were unable to be properly assessed by the NRAs.

Timelines of commissioning date

Regarding the planned commissioning dates, NRAs estimated that 26 of the assessed projects could be completed by the indicated deadline. For 6 of the assessed projects, NRAs indicated that their commissioning could realistically take place at a later date than the one indicated by the promoter, and for 26 candidate projects the NRAs were unable to assess the credibility of the indicated commissioning date.

Assessment of candidate projects' benefits and costs

Hungarian and Slovak NRAs indicated that for 2 projects (PRJ-G-224 and RET-N-916) benefits outweigh costs, while the rest were either not able to assess (41 candidate projects) or were not provided with the results (11 candidate projects). Finally, 5 candidate projects were not mature enough to be assessed.

Below we present statistics in tables based on the candidate projects' assessment provided by NRAs:

NRA assessments statistics by corridor

Corridor	Assessments per corridor	Assessment in coordination with other EU-NRAs	Coordination with non-EU country
Hi East	37	10	3
Hi West	17	0	0
BEMIP Hydrogen	5	1	0
Total	59	11	3

Consistency of CAPEX figures

Corridor	Number of assessed candidate projects			
	Consistent	No data provided	Unable to assess	Divergent views of NRAs

HI East	7	12	16	2
HI West	8	0	9	0
BEMIP Hydrogen	2	0	3	0
Total	17	12	28	2

Divergent views of NRAs were expressed for PPJ-G-284 between Germany and Czech Republic and PPJ-G-286 between Hungary and Slovenia.

Consistency of OPEX figures

Corridor	Number of assessed candidate projects			
	Consistent	No data provided	Unable to assess	Divergent views of NRAs
HI East	1	13	22	1
HI West	8	0	9	0
BEMIP Hydrogen	2	0	3	0
Total	11	13	34	1

Divergent views of NRAs were expressed for PPJ-G-286 between Hungary and Slovenia

Specific simulation results (identifying benefits)

Corridor	Number of assessed candidate projects		
	No data provided	Unable to assess	Project/project group is not mature enough
HI East	15	17	5
HI West	8	9	0

BEMIP Hydrogen	2	3	0
Total	25	29	5

Credibility of EPIs (NPV, IRR, B/C ratio)

Corridor	Number of assessed candidate projects		
	No data provided	Unable to assess	Project/project group is not mature enough
HI East	24	8	5
HI West	8	9	0
BEMIP Hydrogen	0	5	0
Total	32	22	5

Credibility of qualitative analysis (i.e. apparently reasonable, valid, truthful)

Corridor	Number of assessed candidate projects		
	Credible	No data provided	Unable to assess
HI East	2	23	12
HI West	0	8	9
BEMIP Hydrogen	0	0	5
Total	2	31	26

Do benefits outweigh the costs?

Corridor	Number of assessed candidate projects			
	Yes	Project/project group is not mature enough	Unable to assess	No data provided
HI East	2	5	27	3
HI West	0	0	9	8
BEMIP Hydrogen	0	0	5	0
Total	2	5	41	11

NRAs assessment of the commissioning date

Corridor	Number of assessed candidate projects			
	In the same year	Later	Unable to assess	Divergent views of NRAs
HI East	23	6	7	1
HI West	1	0	16	0
BEMIP Hydrogen	0	0	5	0
Total	24	6	28	1

Divergent views of NRAs were expressed for PPJ-G-284 between Germany and Czech Republic. However, the inconsistency regarding the project PPJ-G-284 was later explained to the EC, and currently there are no divergent views.



The concerned PCI/PMI project is:

Corridor	Number of assessed candidate projects		
	Repurposing of an existing natural gas project	Not answered	Other
HI East	12	0	25
HI West	2	0	15
BEMIP Hydrogen	0	3	2
Total	14	3	42

Annex II - Draft Regional PCI / PMI lists and NRA comments on individual projects

HI WEST Hydrogen transmission projects

PCI/PMI candidate	Project number	Project name	NRA comments
PCI		Corridor Portugal – Spain – France - Germany	<p><i>CNMC (Spanish NRA) is not competent on H2 and doesn't receive information on these projects. Up to date, in Spain there are an H2 roadmap and a draft Spanish National Energy and Climate Plan 2023-2030 (currently under public consultation). This last one includes objectives on H2 production and use in industry and transport, as well as references to the Iberian Hydrogen Corridor and H2MED projects. Spain does not have a NDP for the H2 yet. In any case, CNMC considers it is important to assure there is enough demand for H2 to avoid possible overinvestments.</i></p> <p><i>BNetzA (German NRA) does not approve H2 projects as part of the (natural) gas network development plan. Hence, BNetzA is not in a position to assess the project and therefore takes a neutral position. In case the project involves the repurposing of a natural gas infrastructure, the assessment is neutral subject to the condition that it would not trigger significant additional investment in the gas system to ensure the integrity of the natural gas system.</i></p>
	HYD-N-978	- Internal infrastructure in Portugal	<p><i>ERSE (PT NRA): This project was included in the proposal of the NPD 2023 (2024 to 2033) which was submitted by the TSO on 31/mar. That NDP proposal was subjected to a public consultation process that took place between 8/5 and 20/6/23. ERSE's Opinion will be sent in the following weeks. This project does not belong to an approved NDP. There are several doubts about it, namely in terms of costs/benefits and demand. In this particular issue, it seems to derive from national objectives and not from the market.</i></p>

HYD-N-1156	- Interconnection Portugal	<p><i>ERSE (PT NRA): Same comment as above on HYD-N-978.</i></p> <p><i>CNMC is not competent on H2 and doesn't receive information on these projects. Up to date, in Spain there are an H2 roadmap and a draft Spanish National Energy and Climate Plan 2023-2030 (currently under public consultation). This last one includes objectives on H2 production and use in industry and transport, as well as references to the Iberian Hydrogen Corridor and H2MED projects. Spain does not have a NDP for the H2 yet. In any case, CNMC considers it is important to assure there is enough demand for H2 to avoid possible overinvestments.</i></p>
HYD-N-1324	- Spain	
HYD-N-1149	<p>- Internal infrastructure in Spain except Guitiriz - Zamora H2 Pipeline</p>	<p><i>CNMC is not competent on H2 and doesn't receive information on these projects. Up to date, in Spain there are an H2 roadmap and a draft Spanish National Energy and Climate Plan 2023-2030 (currently under public consultation). This last one includes objectives on H2 production and use in industry and transport, as well as references to the Iberian Hydrogen Corridor and H2MED projects. Spain does not have a NDP for the H2 yet. In any case, CNMC considers it is important to assure there is enough demand for H2 to avoid possible overinvestments.</i></p>
HYD-N-1151	<p>- Interconnection Spain - France (currently known as BarMar)</p>	<p><i>CNMC is not competent on H2 and doesn't receive information on these projects. Up to date, in Spain there are an H2 roadmap and a draft Spanish National Energy and Climate Plan 2023-2030 (currently under public consultation). This last one includes objectives on H2 production and use in industry and transport, as well as references to the Iberian Hydrogen Corridor and H2MED projects. Spain does not have a NDP for the H2 yet. In any case, CNMC considers it is important to assure there is enough demand for H2 to avoid possible overinvestments.</i></p>
HYD-N-1153		
HYD-N-819		
HYD-N-569	<p>- Internal infrastructure in France connecting to Germany (currently known</p>	



		as HyFen) except Section Saint Martin de Crau – Cruzy	
	HYD-N-1052	- Internal infrastructure in Germany connecting to France (currently known as H2Hercules South)	<i>BNetzA does not approve H2 projects as part of the (natural) gas network development plan. Hence, BNetzA is not in a position to assess the project and therefore takes a neutral position. In case the project involves the repurposing of a natural gas infrastructure, the assessment is neutral subject to the condition that it would not trigger significant additional investment in the gas system to ensure the integrity of the natural gas system.</i>
PCI		France-Germany cross-border hydrogen valleys:	<i>BNetzA does not approve H2 projects as part of the (natural) gas network development plan. Hence, BNetzA is not in a position to assess the project and therefore takes a neutral position. In case the project involves the repurposing of a natural gas infrastructure, the assessment is neutral subject to the condition that it would not trigger significant additional investment in the gas system to ensure the integrity of the natural gas system.</i>
	HYD-N-1096	- Interconnection France-Germany (currently known as RHYn) except section Freiburg – Offenburg	
	HYD-N-969		
	HYD-N-987	- Interconnection France-Germany (currently known as Mosahyc)	
HYD-N-899			
PCI	HYD-N-1311	Internal infrastructure in Belgium (currently known as Belgian Hydrogen Backbone)	
PCI	HYD-N-468	Internal infrastructure in the Netherlands (currently known as National Hydrogen Backbone) except Limburg area and its connection to the North-	



		South backbone in the East of the Netherlands	
PCI	HYD-N-1035	Internal infrastructure in France at the border to Belgium (currently known as Franco-Belgian H2 corridor)	
PCI	HYD-N-991	German offshore pipeline (currently known as AquaDuctus)	<i>BNetzA does not approve H2 projects as part of the (natural) gas network development plan. Hence, BNetzA is not in a position to assess the project and therefore takes a neutral position. In case the project involves the repurposing of a natural gas infrastructure, the assessment is neutral subject to the condition that it would not trigger significant additional investment in the gas system to ensure the integrity of the natural gas system.</i>
PCI	HYD-N-1001	Interconnection Denmark – Germany (currently known as West DK hydrogen system; HyperLink III)	<i>BNetzA does not approve H2 projects as part of the (natural) gas network development plan. Hence, BNetzA is not in a position to assess the project and therefore takes a neutral position. In case the project involves the repurposing of a natural gas infrastructure, the assessment is neutral subject to the condition that it would not trigger significant additional investment in the gas system to ensure the integrity of the natural gas system.</i>
	HYD-N-1236		
PMI	HYD-N-884	Offshore pipeline Norway-Germany (currently known as CHE Pipeline)	
PCI	HYD-N-757	Interconnection Austria-Germany (currently known as H2 WAG and Penta West; HyPipe Bavaria)	<i>E-Control (AT NRA): HYD-N-757 is included in the Austrian NDP 2022. The Austrian NDP was approved by E-Control in June 2023.</i> <i>BNetzA does not approve H2 projects as part of the (natural) gas network development plan. Hence, BNetzA is not in a position to assess the project and therefore takes a neutral position. In case the project involves the repurposing of a natural gas infrastructure, the assessment is neutral subject to the condition that it would not</i>
	HYD-N-642		

			<i>trigger significant additional investment in the gas system to ensure the integrity of the natural gas system.</i>
PCI	(part of) HYD-N-1311	Belgium - Germany interconnection: - Antwerp-Eynatten pipeline (part of the Belgian Hydrogen Backbone)	
	HYD-N-1038	- Internal infrastructure in Germany (currently known as H2ercules West)	<i>BNetzA does not approve H2 projects as part of the (natural) gas network development plan. Hence, BNetzA is not in a position to assess the project and therefore takes a neutral position. In case the project involves the repurposing of a natural gas infrastructure, the assessment is neutral subject to the condition that it would not trigger significant additional investment in the gas system to ensure the integrity of the natural gas system.</i>
PCI		Interconnections National Hydrogen Backbone (NL) – Germany:	
	HYD-N-1037	- Connection from the North-South backbone in East to Oude (Netherlands) - H2ercules North (Germany)	<i>BNetzA does not approve H2 projects as part of the (natural) gas network development plan. Hence, BNetzA is not in a position to assess the project and therefore takes a neutral position. In case the project involves the repurposing of a natural gas infrastructure, the assessment is neutral subject to the condition that it would not trigger significant additional investment in the gas system to ensure the integrity of the natural gas system.</i>
	HYD-N-468		
	HYD-N-906	- Connection from the North-South backbone in East to Vlieghuis (Netherlands) - Vlieghuis-Ochtrup (Germany)	
	HYD-N-468		
	HYD-N-1075	- Connection from the North-South backbone in East to Zevenaar/Elten (Netherlands) - H2ercules North-West (Germany)	
HYD-N-468			
HYD-N-793	Cross-border pipeline from Netherlands to Germany (currently known as Delta Rhine Corridor H2)		

HI WEST Hydrogen reception facilities

PCI/PMI candidate	Project number	Project name	NRA comments
PCI	HYD-N-664	Ammonia reception facility Antwerp (Fluxys Belgium)	
PCI	HYD-N-1100	Ammonia reception facility Amplifhy Antwerp (Belgium)	
PCI	HYD-N-1325	Zeebrugge New Molecules development ammonia reception facility (Belgium)	
PCI	HYD-N-820	Ammonia reception facility Dunkerque (France)	
PCI	HYD-N-543	Rotterdam LH2 reception facility, except the ship (Netherlands)	
PCI	HYD-N-1127	Ammonia reception facility Amplifhy Rotterdam (Netherlands)	
PCI	HYD-N-754	Ammonia reception facility ACE Rotterdam (Netherlands)	
PCI	HYD-N-1099	Ammonia reception facility terminal Brunsbüttel (Germany)	<i>BNetzA does not approve H2 projects as part of the (natural) gas network development plan. Hence, BNetzA is not in a position to assess the project and therefore takes a neutral position. In case the project involves the repurposing of a natural gas infrastructure, the assessment is neutral subject to the condition that it would not trigger significant additional investment in the gas system to ensure the integrity of the natural gas system.</i>
PCI	HYD-N-1159	Ammonia reception facility Wilhelmshaven (BP) (Germany)	<i>BNetzA does not approve H2 projects as part of the (natural) gas network development plan. Hence, BNetzA is not in a position to assess the project and therefore takes a neutral position. In case the project involves the repurposing of a natural gas infrastructure, the assessment is neutral subject to the condition that it would not trigger significant additional investment in the gas system to ensure the integrity of the natural gas system.</i>

HI WEST Hydrogen storage facilities

PCI/PMI candidate	Project number	Project name	NRA comments
PCI	HYD-N-1238	Danish Hydrogen Storage (Denmark)	
PCI	HYD-N-1279	Hystock Opslag H2 storage (Netherlands)	
PCI	HYD-N-934	Salthy hydrogen storage Harsefeld (Germany)	<i>BNetzA does not approve H2 projects as part of the (natural) gas network development plan. Hence, BNetzA is not in a position to assess the project and therefore takes a neutral position. In case the project involves the repurposing of a natural gas infrastructure, the assessment is neutral subject to the condition that it would not trigger significant additional investment in the gas system to ensure the integrity of the natural gas system.</i>
PCI	HYD-N-767	H2 Storage Gronau-Epe (Germany)	<i>BNetzA does not approve H2 projects as part of the (natural) gas network development plan. Hence, BNetzA is not in a position to assess the project and therefore takes a neutral position. In case the project involves the repurposing of a natural gas infrastructure, the assessment is neutral subject to the condition that it would not trigger significant additional investment in the gas system to ensure the integrity of the natural gas system.</i>
PCI	HYD-N-565	Storage GeoH2 (France)	
PCI	HYD-N-508	H2 storage North-1 (Spain)	<i>CNMC is not competent on H2 and doesn't receive information on these projects. Up to date, in Spain there are an H2 roadmap and a draft Spanish National Energy and Climate Plan 2023-2030 (currently under public consultation). This last one includes objectives on H2 production and use in industry and transport, as well as references to the Iberian Hydrogen Corridor and H2MED projects. Spain does not have a NDP for the H2 yet. In any case, CNMC considers it is important to assure</i>

			<i>there is enough demand for H2 to avoid possible overinvestments.</i>
PCI	HYD-N-1152	H2 storage North-2 (Spain)	<i>CNMC is not competent on H2 and doesn't receive information on these projects. Up to date, in Spain there are an H2 roadmap and a draft Spanish National Energy and Climate Plan 2023-2030 (currently under public consultation). This last one includes objectives on H2 production and use in industry and transport, as well as references to the Iberian Hydrogen Corridor and H2MED projects. Spain does not have a NDP for the H2 yet. In any case, CNMC considers it is important to assure there is enough demand for H2 to avoid possible overinvestments.</i>

HI EAST Hydrogen transmission projects

PCI/PMI candidate	Project number	Project name	NRA comments
PCI		Hydrogen Corridor Italy-Austria-Germany:	
	HYD-N-1205	- Italian H2 Backbone except section Poggio Renatico to Gries Pass	<i>At present ARERA(IT NRA) has no competence on assessing H2 projects, therefore ARERA takes a neutral position.</i>
	HYD-N-986	- H2 Readiness of the TAG pipeline system	<i>E-Control (AT NRA): HYD-N-986 is included in the Austrian NDP 2022 as a planning project. The Austrian NDP was approved by E-Control in June 2023.</i>
	HYD-N-757	- H2 Backbone WAG + Penta West	<i>E-Control (AT NRA): HYD-N-757 is included in the Austrian NDP 2022. The Austrian NDP was approved by E-Control in June 2023.</i>
	HYD-N-642	- HyPipe Bavaria – The Hydrogen Hub	<i>BNetzA does not approve H2 projects as part of the (natural) gas network development plan. Hence, BNetzA is not in a position to assess the project and therefore takes a neutral position. In case the project involves the repurposing of a natural gas infrastructure, the assessment is neutral subject to the condition that it</i>

			<i>would not trigger significant additional investment in the gas system to ensure the integrity of the natural gas system.</i>
PCI		Czech German Hydrogen Interconnection (Route from Baltic region):	<i>BNetzA does not approve H2 projects as part of the (natural) gas network development plan. Hence, BNetzA is not in a position to assess the project and therefore takes a neutral position. In case the project involves the repurposing of a natural gas infrastructure, the assessment is neutral subject to the condition that it would not trigger significant additional investment in the gas system to ensure the integrity of the natural gas system.</i>
	HYD-N-796	- FLOW East - Making Hydrogen Happen	<i>BNetzA does not approve H2 projects as part of the (natural) gas network development plan. Hence, BNetzA is not in a position to assess the project and therefore takes a neutral position. In case the project involves the repurposing of a natural gas infrastructure, the assessment is neutral subject to the condition that it would not trigger significant additional investment in the gas system to ensure the integrity of the natural gas system.</i>
	HYD-N-1034	- Czech German Hydrogen Interconnector (CZ part)	<i>ERÚ (CZ NRA): Having in mind, that updated Energy Act will be put in force in 2024, which will introduce an inclusion of hydrogen in the current definition of gas, the legislative framework will be in place to approve hydrogen projects. Therefore, ERÚ does not see any obstacles in repurposing of this pipeline to pure hydrogen in case of sufficient demand. Overall, 5 years to the deadline of 2029 seems sufficient for pipeline repurposing – given the technical and administrative steps needed to commission the new pipeline ERÚ can conclude that the pipeline is not extensively used at the moment, all land rights will stay valid. No EIA would have to be conducted, as well as no extra permitting process. As CAPEX is concerned, ERÚ is not able to decide whether the costs are justifiable, hydrogen technology is rather new topic.</i>

			<p><i>However, amongst other project of the same extent throughout the EU, this project seems rather efficient in costs and justifiable in comparison with other projects.</i></p> <p><i>However, this assessment is currently strictly non-binding, as the NRA is still not competent in the matter of hydrogen.</i></p> <p><i>BNetzA does not approve H2 projects as part of the (natural) gas network development plan. Hence, BNetzA is not in a position to assess the project and therefore takes a neutral position. In case the project involves the repurposing of a natural gas infrastructure, the assessment is neutral subject to the condition that it would not trigger significant additional investment in the gas system to ensure the integrity of the natural gas system.</i></p>
PCI		Hydrogen Interconnection Bulgaria -Greece:	
	HYD-N-970	- Dedicated H2 Pipeline in Greece except section Karperi to Komotini	
	HYD-N-788	- H2 transmission system in Bulgaria	
PCI/PMI	No TYNDP number	Generic Corridor between Ukraine, Slovakia, Czechia, Austria, and Germany	<p><i>URSO(SK NRA): this innovative project is in line with the transitions and decarbonisation goals of EU. Present significant diversification of sources. At this stage, when the H2 legislative framework is still missing, the assessment of the project cannot be properly provided only as a “general benefit”. Slovakia set out “Action plan” supporting the implementation of “National H2 strategy” covering also development of projects in transmission infrastructure and storage for H2, but with a limited period 2023-2026, and this project is exceeding this limit.</i></p> <p><i>ERÚ (CZ NRA) - CZ part: The same support as for project HYD-N-1034 applies.</i></p>

			<p><i>Having in mind, that updated Energy Act will be put in force in 2024, which will introduce an inclusion of hydrogen in the current definition of gas, the legislative framework will be in place to approve hydrogen projects. Therefore, ERÚ does not see any obstacles in repurposing of this pipeline to pure hydrogen in case of sufficient demand. Overall, 5 years to the deadline of 2029 seems sufficient for pipeline repurposing – given the technical and administrative steps needed to commission the new pipeline ERÚ can conclude that the pipeline is not extensively used at the moment, all land rights will stay valid. No EIA would have to be conducted, as well as no extra permitting process.</i></p> <p><i>As CAPEX is concerned, ERÚ is not able to decide whether the costs are justifiable, hydrogen technology is rather new topic. However, amongst other project of the same extent throughout the EU, this project seems rather efficient in costs and justifiable in comparison with other projects.</i></p> <p><i>However, this assessment is currently strictly non-binding, as the NRA is still not competent in the matter of hydrogen.</i></p> <p><i>BNetzA does not approve H2 projects as part of the (natural) gas network development plan. Hence, BNetzA is not in a position to assess the project and therefore takes a neutral position. In case the project involves the repurposing of a natural gas infrastructure, the assessment is neutral subject to the condition that it would not trigger significant additional investment in the gas system to ensure the integrity of the natural gas system.</i></p>
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BEMIP H2 transmission projects

PCI/PMI candidate	Project number	Project name	NRA comments
PCI	HYD-N-1171, HYD-N-1136, HYD-N-1172, HYD-N-1350	Hydrogen interconnector between Sweden and Finland (known as Nordic Hydrogen Route – Bothnian Bay) except section Kiruna to Lulea (SE)	
PCI	HYD-N-1122, HYD-N-1144, HYD-N-1239, HYD-N-1280, HYD-N-1310, HYD-N-443, HYD-N-1036	Hydrogen interconnector between Finland, Estonia, Latvia, Lithuania, Poland and Germany (known as Nordic-Baltic Hydrogen Corridor) except for: <ul style="list-style-type: none"> - 4 internal sections of the FI pipeline Kyröskoski ; Imatra; Loviisa, through Kotka and Porvoo through Tolkinen (geographical references are approximate and solely given as indications) - Internal line in LT connecting to Klaipeda - One section of the DE pipeline from Magdeburg to Potsdam (geographical references are approximate and solely given as indications) 	<i>BNetzA does not approve H2 projects as part of the (natural) gas network development plan. Hence, BNetzA is not in a position to assess the project and therefore takes a neutral position. In case the project involves the repurposing of a natural gas infrastructure, the assessment is neutral subject to the condition that it would not trigger significant additional investment in the gas system to ensure the integrity of the natural gas system.</i>
PCI	HYD-N-1355, HYD-N-926, HYD-N-848, HYD-N-931	Interconnection between Sweden, Finland and Germany (known as the Baltic Sea Hydrogen Collector)	<i>BNetzA does not approve H2 projects as part of the (natural) gas network development plan. Hence, BNetzA is not in a position to assess the project and therefore takes a neutral position. In case the project involves the repurposing of a natural gas infrastructure, the assessment is neutral subject to the condition that it</i>



			<i>would not trigger significant additional investment in the gas system to ensure the integrity of the natural gas system.</i>
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Projects that maintain their status of a PCI (Article 24 derogation)

PCI/PMI candidate	Project number	Project name	NRA comments
PCI	PCI 5.19	Connection of Malta to the European gas network – pipeline interconnection with Italy at Gela	
PCI	PCI 7.3.1	Pipeline from the East Mediterranean gas reserves to Greece mainland via Cyprus and Crete [currently known as “EastMed Pipeline”], with metering and regulating station at Megalopoli	