Public consultation report of ENTSOG's draft Hydrogen Infrastructure Gaps Identification Report for TYNDP 2024

Contents

1. Introduction

The present consultation report concerns the public consultation of ENTSOG's draft Hydrogen Infrastructure Gaps Identification (H2IGI) Report for TYNDP 2024. The report was presented together with the following supporting documents[1]:

- **TYNDP H2IGI maps** – displaying the used infrastructure levels;
- **TYNDP 2024 Infrastructure report** – a detailed overview of the collected hydrogen and natural gas projects.
- **Annex A** (published in May 2024) – a list of infrastructure projects that are part of the TYNDP 2024.
- **Annex B** – Infrastructure maps for hydrogen and natural gas, each by specific sub-category.
- **Annex C** – Infrastructure capacity data for hydrogen and natural gas.
- **Annex D** – Guidance documents for the TYNDP 2024 that provide a comprehensive description of the methodologies and assumptions being used:
  - **Annex D1: Implementation Guidelines** for the project-specific cost-benefit analysis (PS-CBA) of candidates for the status of Project of Common Interest (PCI) or Project of Mutual Interest (PMI).
  - **Annex D2: Infrastructure Gaps Identification methodology** for the Infrastructure Gaps Identification report.
  - **Annex D3: System Assessment methodology** for deliveries that do not feed the PCI/PMI selection process.

Feedback was requested from stakeholders during a consultation period between 18 December 2024 and 22 January 2025 via an online form. This consultation report details the received inputs from stakeholders as well as a statement by ENTSOG on how this input was considered. As part of the consultation process, ENTSOG also organised a dedicated public stakeholder event on 15 January 2025[2].

This is the third consultation report prepared by ENTSOG for the TYNDP 2024. The first one concerned the public consultation of the draft TYNDP 2024 Guidelines for Project inclusion (GPI)[3].

[1] Link to the draft documents: https://www.entsog.eu/tyndp#entsog-ten-year-network-development-plan-2024 – under section "Public consultation on draft Hydrogen Infrastructure Gaps Identification (H2IGI) report"

[2] Link to stakeholder webinar website: https://www.entsog.eu/entsogs-tyndp-2024-infrastructure-gaps-identification-report-presentation-discussion-event#welcome

[3] Link to the consultation report on the GPI: https://www.entsog.eu/sites/default/files/2023-10/TYNDP%202024%20Guidelines%20for%20Project%20Inclusion%20Consultation%20Report.pdf

The second consultation report concerned guidance documentation, that cover the methodologies and assumptions[4].

The TYNDP 2024 cycle will have one final public consultation, on the remaining set of documents of the draft TYNDP.

2. Legal background

Article 29(1) of Regulation nr. 2024/1789, on the internal markets for renewable gas, natural gas and hydrogen (GHR) states: *"While preparing […] the draft [TYNDP] for natural gas […], [ENTSOG] shall conduct an extensive public consultation process, at an early stage and in an open and transparent manner, involving all relevant market participants, and, in particular, the organisations representing all stakeholders, in accordance with the rules of procedure referred to in Article 25(1). That consultation shall also involve regulatory authorities and other national authorities, supply and production undertakings, network users including customers, distribution system operators, including relevant industry associations, technical bodies and stakeholder platforms. [ENTSOG] shall publish drafts of […] the [TYNDP] for natural gas […] for comments by the stakeholders and provide sufficient time for them to participate in the consultation process effectively. The aim of that consultation is to identify the views and proposals of the relevant stakeholders during the decision-making process."*

From Article 29(3) of the GHR it follows that in general a consultation report is not mandatory for the TYNDP-related consultations detailed in Article 29(1) of the GHR. However, Regulation nr. 2022/869 on Guidelines for trans-European energy infrastructure (TEN-E Regulation) stipulates mandatory consultation reports for the preparation of the Cost-Benefit Analysis (CBA) methodology (see Article 11)[5], for the preparation of the TYNDP scenarios (see Article 12)[6], and for the preparation of the infrastructure gaps identification report (see Article 13).

[4] https://www.entsog.eu/sites/default/files/2024-12/Public%20consultation%20report%20%E2%80%93%20Annex%20D.pdf

[5] Link to the consultation report on ENTSOG's preliminary draft hydrogen CBA methodology: https://www.entsog.eu/sites/default/files/2023-06/Consultation%20report%20accompanying%20ENTSOG%27s%20draft%20CBA%20methodology_Final.pdf

[6] Link to the consultation report on ENTSOG's and ENTSO-E's joint TYNDP 2024 scenarios: https://2024.entsos-tyndp-scenarios.eu/wp-content/uploads/2024/01/TYNDP_2024_Scenarios_Input_Data-Public_Consultation_Summary_Report.pdf

More specifically, Article 13 of the TEN-E Regulation states:

"1. […] Prior to publishing their respective reports, [ENTSO-E] and [ENTSOG] shall conduct an extensive consultation process involving all relevant stakeholders, including the EU DSO entity, associations involved in electricity, gas and hydrogen markets, heating and cooling, carbon capture and storage and carbon capture and utilisation stakeholders, independent aggregators, demand-response operators, organisations involved in energy efficiency solutions and, energy consumer associations, civil society representatives, [ACER] and all the Member States' representatives that are part of the relevant energy infrastructure priority corridors that are set out in Annex I […].

[…]

3. Within three months of receipt of the infrastructure gaps report together with the input received in the consultation process and ***a report on how it was taken into account****, [ACER] shall submit its opinion to […] [ENTSOG], the Commission and Member States and make it publicly available."*

The public consultation of the draft TYNDP 2024 Annex D contained assumptions of relevance for the Hydrogen Infrastructure Gaps Identification report. It covers, as mandatory part, the inputs of relevance to the H2IGI report, i.e., parts of Annex D1 and the full Annex D2.

This public consultation report adds another level of stakeholder feedback, on the draft H2IGI report, which was established in line with the previously consulted and finalised Annex D1 and Annex D2.

3. Overview of changes to the draft H2IGI report

A series of corrections shall be made to the report. These were detected after the start of the stakeholder consultation and are listed below:

- **1.1 Infrastructure levels (Introduction):**
  - Tables Extra-EU import capacities via pipelines and Liquid imports for PCI and ADV ILs were corrected (Tables 2, 3, 5 and 6 the extra-EU hydrogen supply potential was corrected, as NCV/GCV conversion factor was applied twice);
- **Correction of distribution of hydrogen production, demand and hydrogen imports per country:**
  - Tables 8, 10, 15, 17, 24, 26, 31, 33 H2 production via electrolysis column was corrected (GCV factor applied);
- **Correction of electrolysis production figures:**
  - Figures 3, 6, 12, 15, 21, 24, 30 and 33;
- **Supply and demand balance in the PCI/PMI hydrogen infrastructure level:**
  - Table 25 values were corrected;
- **Maximum utilisation rates of interconnections in the PCI/PMI hydrogen infrastructure level and in the Advanced hydrogen infrastructure level:**
  - Tables 21, 22, 38, 39 values were updated;
- **Annex II and III values were corrected:**
  - Corrected values for ADV stressful weather year 2030;
  - The GCV factor was applied.

ENTSOG received an additional assessment request from ACER, namely with the assumption of unlimited import capacity. This simulation will be added to the set of simulations with a hypothetical infrastructure approach, namely, unlimited intra-EU transport capacity and additional storage capacity in the EU. They will be performed in a second stage, after the public consultation of the TYNDP 2024 draft Hydrogen Infrastructure Gaps Identification report and after submission of the report for ACER opinion, in line with the methodology described by steps 2 to 3 in section 6 of the TYNDP 2024 Annex D2.

4. Inputs from the stakeholder consultation

Informal feedback received from the EC and ACER was considered and is mentioned in this section. Most of the recommendations have been implemented. ENTSOG only decided to not implement the feedback if the non-inclusion was considered justified.

4.1. Question 1: What is the primary use of the H2IGI Report for your organisation?

Nr.	Organisation	Answer	ENTSOG's reply
1	AquaVentus Förderverein	Information purposes and project realisation impact	ENTSOG thanks stakeholders for explaining the use cases for the H2IGI report. According to feedback received, the report is used to steer strategic decisions regarding infrastructure project development, in its multiple dimensions: impact assessment of the project in the European energy system, in line with corridor development requirements, project maturity and risk assessment.
2	H2GZ energizing	The H2 IGI Report serves as a critical resource for identifying infrastructure gaps essential for the success of the H2GZ AREA VIVEIRO project. It informs strategic decisions related to integrating innovative green hydrogen production technologies, such as electromagnetically controlled artificial tornadoes, into existing and future infrastructure. The report also helps align our project with European hydrogen infrastructure development goals.	
3	Energy Infrastructure Partners AG	Planning of investments and long-term strategy	
4	Plinovodi d.o.o.	Identification of infrastructure capacity gaps to address them by developing suitable infrastructure projects which will be included in national/ENTSOG TYNDP and submitted for PCI status.	
5	EDF	EDF supports a selective and cautious development of the hydrogen infrastructure. Prioritizing key strategic and necessary corridors, like the first connections between France and Germany, will enable to give first mature projects the financial and administrative support they need and make sure that the pipelines are duly constructed in an appropriate timeframe. In a second step and according to a robust assessment of hydrogen demand´s evolution, further development should be considered.	
6	Uniper Energy Storage GmbH	The H2 IGI Report is essential for Uniper Storage in strategic planning, market analysis, and aligning our hydrogen storage projects with market trends, regulatory frameworks, and decarbonization goals. It supports risk assessment, stakeholder engagement, and informed decision-making in our transition to hydrogen.	
7	EDP	For EDP, the H2 IGI Report is an important tool for understanding the gaps and opportunities within Europe's emerging hydrogen infrastructure. This report informs our	

Nr.	Organisation	Answer	ENTSOG's reply
		strategic planning and investment decisions, ensuring alignment with European objectives and regulatory frameworks. It also serves as a valuable reference for assessing how our projects contribute to a cohesive and resilient hydrogen network in Europe.	
8	Hydrogen Europe	Advocacy	

4.2. Question 2: Which, if any, changes would you make to the structure of the H2IGI Report?

Nr.	Organisation	Answer	ENTSOG's reply
1	AquaVentus Förderverein	None	
2	H2GZ energizing	A dedicated section on the feasibility of incorporating disruptive technologies, such as advanced hydrogen production systems driven by kinetic energy and thermolysis, would be beneficial. Additionally, more detailed regional analysis focusing on strategic hubs like Viveiro, Spain, could provide insights into localized infrastructure needs for innovative pilot projects.	We do understand that a review on the impact of disruptive technologies could be of general interest. The TYNDP, as a long-term planning exercise, includes existing infrastructure plus additional developments with a documented probability of being built. The provision of more detailed regional information in the H2IGI report is possible in principle, but requires the respective project promoters to submit this information as part of a project during the TYNDP project data collection.
3	Energy Infrastructure Partners AG	n/a	-

Nr.	Organisation	Answer	ENTSOG's reply
4	Plinovodi d.o.o.	In case PCI/PMI and advanced infrastructure category projects are not sufficient to satisfy hydrogen demand and enable reliable and secure supply of hydrogen, a separate scenario with additional less advanced projects should be included, to highlight which less advanced projects need to be prioritized and develop/commissioned sooner to bridge critical infrastructure gaps, recognized in the IGI Report.	In the context of the project-specific CBAs, also less advanced PCI and PMI candidates will be analysed. During the public consultation of Annex D2, ENTSOG asked if a less advanced hydrogen infrastructure level should be created for the H2IGI report. Due to ACER's negative feedback, this was not implemented.
5	EDF	Connecting supply and demand to make hydrogen a commodity is a crucial step to ensure a prompt and efficient development of the market in Europe. However, EDF would like to express some comments on the methodology used in the H2 IGI report to justify the development of the European Hydrogen Backbone as well as the need to deploy additional infrastructures in new geographical areas. Indeed, the infrastructure needs must be carefully assessed to drive the support towards the necessary ones and ensure stranded assets are avoided. This will give visibility to project developers as well as potential hydrogen offtakers and help the concretization of the hydrogen market.	-
6	Uniper Energy Storage GmbH	The structure of the report is well-designed and meets the needs effectively.	-
7	EDP	We consider the current structure of the H2 IGI Report to be clear and comprehensive. However, we suggest that future iterations include additional focus on the prioritization of domestic renewable hydrogen production and distribution over imports from other continents. This approach would not only strengthen Europe's energy independence but also bolster local industries, create jobs, and reduce the carbon footprint associated with long-distance hydrogen transport.	Hydrogen supply options and their prices are based on the TYNDP 2024 scenarios that were approved by the European Commission.
8	Hydrogen Europe	The structure is fine but the sections on recommendations and conclusions should be expanded.	

4.3. Question 3: Do you have any remark regarding the H2 IGI Report? If yes, please specify.

Nr.	Organisation	Answer	ENTSOG's reply
1	AquaVentus Förderverein	As AquaVentus Förderverein, we understand that offshore H2 pipelines are a required element of the future European energy infrastructure. The German contribution with the AquaDuctus H2 pipeline is a initial starting pipeline to a greater North Sea H2 pipeline network. AquaVentus supports this approach fully.	-
2	H2GZ energizing	The H2 IGI Report should adopt a more exponential vision, highlighting how pilot projects are not just experimental phases but the foundation of profound change in Europe's energy infrastructure. It is crucial to value and empower the visionaries behind these projects, who challenge current technological and conceptual limits. In this context, the creator of the H2GZ AREA VIVEIRO project is not merely seeking support but opening a door to a new dimension of innovation in green hydrogen production. We propose that ENTSOG take a leading role as a catalyst for this transformation, creating a space for unified criteria and giving visibility to disruptive projects. Imagine a major European event, with simultaneous translation and participation from creators and innovators across Europe, where ideas intertwine like molecules in motion, sparking the ignition of a global project that redefines the energy future. From Viveiro, Spain, powered by the "echo of the tornado," this pilot project not only aims to revolutionize green hydrogen production but to inspire an explosion of creativity and collaboration that positions Europe as the undisputed leader in the energy transition. ENTSOG can be the epicenter of this transformative vision, bringing together people and projects that together achieve what was once unimaginable.	While we agree to the importance of potentially disruptive technologies for long-term market improvement, these are outside the scope of the H2IGI Report. From the moment project information is submitted to the TYDNP however, project-specific assessment is performed ("PS-CBA"), according to a standard set of criteria.
3	Energy Infrastructure Partners AG	The report does not address the question of redundant supply. Some regions will have very limited diversification options if one supply route would be disturbed (based on current news, for example if the Baltic Sea route supplying Germany, CZ and Austria were disturbed through hostile actions in the Baltic sea). The report should take into account considerations of alternative supply routes.	Indeed, redundancy of supply routes is not in the scope of the H2IGI report. This is due to the steer from the European Commission and ACER, reflecting the non-existence of a hydrogen security of supply standard in EU law (see consultation report on methodological documents[7]).

[7] https://www.entsog.eu/sites/default/files/2024-12/Public%20consultation%20report%20%E2%80%93%20Annex%20D.pdf

Nr.	Organisation	Answer	ENTSOG's reply
			For other parts of the TYNDP 2024, certain "S-1" simulations will be performed (see TYNDP 2024 Annex D3[8]).
4	Plinovodi d.o.o.	Some countries, including Slovenia, are lacking projects in PCI/PMI and advanced project category, mainly due to the commissioning date after 31 December 2029. In such case those projects should be considered in the appropriate simulation period after the commissioning date, since they will be in operation and will reduce the recognized infrastructure gaps significantly and thus improve IGI indicators. We suggest to include intra-EU connection projects Italy-Slovenia-Hungary H2 corridor (HYD-N-1356) and Croatia-Slovenia-Austria H2 corridor (HYD-N-1237) in section "4.2.3 Identification of projects that solved or mitigated infrastructure gaps" as they would improve indicators for Slovenia and neighbouring countries since Slovenia would not be considered isolated after 2040 and would be able to meet national demand from combined domestic production and imports.	The report analyses PCI and Advanced infrastructure levels, whereas impact of Less-Advanced projects are analyzed separately, during the PS-CBA phase. Projects HYD-N-1356 and HYD-N-1237 belong to the Less-Advanced maturity status.
5	EDF	Firstly, the normative levels of hydrogen demand considered for 2030-2040 are questionable. The level of 620 TWh of hydrogen demand by 2030 seems based on the official EU targets set out in the 2022 RePower EU plan, which have now been disapproved by a broad consensus. In its special report on hydrogen in 2024, the European Court of Auditors found that these targets were not based on a robust analysis and assessed them as extremely ambitious and probably unachievable, with only 200+MW of electrolyzers installed by the end of 2023 versus a need for 100+GW in 2030. The "reality-check" the ECA calls for points to a significant delay and slowdown in the deployment of the hydrogen industry in Europe and all around the world. Instead, in our Net Zero Emission scenario for Europe, EDF assesses a level of demand of 600 TWh of renewable or low-carbon hydrogen and e-fuels by 2050, distributed between 420 TWh for energy use, mainly for serving international bunkers in the aviation and maritime sectors, and 180 TWh for industrial uses as a raw material.	On the level of hydrogen demand: the RePowerEU plan set out 10 mT of renewable hydrogen production in Europe and 10 mT of imports of renewable hydrogen to Europe in 2030. This is equivalent to 788 TWh (GCV). In the H2IGI report, a lower amount of the demand is covered by renewable hydrogen: 339 TWh (PCI/PMI hydrogen infrastructure level and reference weather year), 306 TWh (PCI/PMI hydrogen infrastructure level and stressful weather year), 370 TWh (Advanced hydrogen infrastructure level and reference weather year),

[8] https://www.entsog.eu/sites/default/files/2024-12/TYNDP%202024%20Annex%20D3%20-%20System%20Assessment%20methodology_0.pdf

Nr.	Organisation	Answer	ENTSOG's reply
		Secondly, the methodology retained to evaluate the hydrogen production costs is questionable and does not reflect the total costs, thus not allowing an economic justification for the development of the volumes of infrastructure considered. In particular, it is assumed that hydrogen production units (let it be electrolytic or gas related) as well as renewable and nuclear capacities are already present, as taken into account in the TYNDP, and are therefore not considered in the calculations of the clearing costs of H2. The assumptions that market clearing price will be equal to hydrogen marginal prices seems overly optimistic considering the maturity of the market. It does not take into account development costs, electrolysers flexibility constraints as well as long-term electricity sourcing. The integration of such elements would directly affect hydrogen market prices, impacting both the merit order of hydrogen supply sources as well as the results of the current modelling optimization. As a result, the report's conclusions are difficult to justify as cost-effective. Thirdly, a robust analysis of this emerging market tends to conclude that all the identified infrastructures are unlikely to be technically necessary or economically justified. Hydrogen infrastructures must be sized based on real market needs and a robust assessment of the levels of hydrogen supply and demand. The H2 IGI report considers that infrastructures which have obtained the PCI/PMI status are more certain to be deployed compared to other EHB infrastructure projects, which is a questionable assumption. While this status grants faster and easier permitting processes, it does not automatically guarantee neither an access to EU subsidies, nor that these investments with a high risk of stranded costs are feasible or economically viable. For instance, the project of an offshore hydrogen pipeline between Norway and Germany (known as the CHE Pipeline) is one of the winning project selected in the sixth PCI-PMI list of TEN-E projects, and as such appears in the infrastructure map included in the H2 IGI report. However, this project has since been officially cancelled by its promoters. Lastly, it seems highly unlikely that first deliveries of hydrogen imports by pipeline could be made from Algeria to Germany via the Italian-Austrian corridor by	342 TWh (Advanced hydrogen infrastructure level and stressful weather year). The hydrogen demand is based on the TYNDP 2024 scenarios that were approved by the European Commission. On hydrogen production costs: for the costs of hydrogen imports, external studies have been used that consider the cost of production units. For EU-internal hydrogen production, the same approach was used for hydrogen as for electricity. This is in line with the TYNDP 2024 scenarios that were approved by the European Commission as well as with the publicly consulted Annex D1 and Annex D2. While not all considered electrolysers may be economically feasible without support schemes, their capacity is based on national inputs. While the total cost of hydrogen production may therefore be higher, the presented methodology captures well the differences in the availability of low-carbon electricity in different regions of Europe (based on national inputs about generation assets) that create market price differences. For the H2IGI exercise, it is therefore the price spread and not the absolute value that is used as an indicator.

Nr.	Organisation	Answer	ENTSOG's reply
		2030, as considered in the scenario for a configuration of "advanced infrastructures", given that no large-scale electrolysers have yet been deployed in North Africa or are likely to be deployed by this time. Extra-European imports by pipeline should be considered available, at best, from 2040 onwards, as envisaged in the scenario for the configuration of "PCI-PMI infrastructures".	On the hydrogen infrastructure level: an infrastructure level is not a forecast of the future, but a basis for the analysis. The definition of the hydrogen infrastructure levels for the H2IGI report was prescribed by the European Commission and publicly consulted as part of the consultation of the TYNDP methodologies.
6	Uniper Energy Storage GmbH	Yes, we have the following remarks regarding the H2 IGI Report: The projects UST Hydrogen Storage Epe (H2S-A-1295) and UST Hydrogen Storage Krummhörn (H2S-A-1244) are missing from the appendices map of the H2 IGI Report (H2 IGI – Map PCI Status + Advanced Status, without H2E). These projects were previously registered and listed on the H2 Infra Map, which was accessible through the review page at www.h2inframap.eu/map-review-before-live. The Hydrogen Pilot Cavern Krummhörn, listed in the appendices map under the infrastructure project name H2S-A-1244, seems to overlap with the UST Hydrogen Storage Krummhörn project. This overlap may have caused the exclusion of UST Hydrogen Storage Krummhörn from the appendices map. We kindly request a review and update to ensure that all three (3) registered projects (1. UST Hydrogen Storage Epe, 2. UST Hydrogen Storage Krummhörn and 3. Hydrogen Pilot Cavern Krummhorn) listed on the H2 Infra Map are accurately included in the appendices map of the H2 IGI Report and that any discrepancies, such as overlapping project names, are resolved. Thank you for your attention to this important matter.	Project UST Hydrogen Storage Krummhörn (H2S-A-1244) was represented under an incorrect name, as "Hydrogen Pilot Cavern Krummhorn". This will be corrected. UST Hydrogen Storage Epe (H2S-A-1295) is less-advanced. It should therefore not therefore be included on the map. Information for the third project, "Hydrogen Pilot Cavern Krummhorn", was not submitted to TYNDP 2024 and therefore cannot be considered in any TYNDP 2024 publications. We invite this project information to be submitted as part of the next cycle – TYNDP 2026.
7	EDP	We fully support the objectives outlined in the H2 IGI Report and recognize the importance of ENTSOG assessment of hydrogen infrastructure needs. EDP believes that accelerating the development of a robust and interconnected hydrogen network in Europe is essential to achieving the EU's climate goals and ensuring a sustainable	The hydrogen prices and flows in the DHEM are linked to the merit order of hydrogen supply options as well as hydrogen demand associated with end users' willingness to pay for

Nr.	Organisation	Answer	ENTSOG's reply
		energy future. However, we also want to emphasize the importance of developing the whole hydrogen supply chain in Europe. Promoting measures for prioritizing green hydrogen production from renewable sources within Europe will not only make EU Hydrogen more cost competitive but also contribute to Europe's local economic growth, resilience, and energy independence. Additionally, on the sustainability side, the hydrogen imports from extra-EU may not always meet the same standards as in EU, even with CBAM addressing the carbon leakage risks considering its traceability difficulties. Nevertheless, it's essential to have an adequate regulatory framework as well as remuneration schemes to promote the European renewable hydrogen development. Finally, we want to thank for the opportunity to participate in this consultation, with an appreciation note to ENTSOG's efforts to engage stakeholders in this critical discussion and remain committed to supporting the development of a clean, sustainable, and secure hydrogen economy in Europe.	hydrogen (WTP_{H2}), as defined in Annex D1. Hydrogen supply options do consider local production based on renewable capacity installed in Europe. This option is activated whenever it's price falls below end users' WTP_{H2} and is below that of alternatives, including imports. Electrolytic hydrogen production costs are linked to the price of the used electricity and the water price in the respective country as well as the process efficiency. Regarding CBAM, while we understand that traceability might represent a challenge, the model can only incorporate such a factor if consensual evidence in this sense were available.
8	Hydrogen Europe	Overall we found the report to be very good and comprehensive – even if very data heavy and thus rather impenetrable. The report confirms major industry expectations with regards to where the key infrastructure bottlenecks are and which are the main H2 transport corridors – both facilitating intra EU trade as well as hydrogen imports. Such alignment lends credibility to the report and validate its results. However, there are a number of shortcomings (or question marks) we would like to point out: 1. The fact that hydrogen production via offgrid distributed RES with a direct connection to electrolyser is limited to Spain only does not reflect what can be observed in the project pipeline, where such setup is much more common across the entire EU (reflecting the RFNBO DA requirements).	1. The "dedicated renewables" assumption is indeed limited to Spain in the 2024 cycle. This modelling choice was agreed among all ENTSOG members during the Scenarios 2024 process, used as base for the H2IGI simulations. In the 2026 cycle we will perform a data collection for dedicated RES resources.

Nr.	Organisation	Answer	ENTSOG's reply
		2. Similarly to the previous point we think, that the current completely market driven electricity price setting for electrolysers does not reflect project realities. While this might not be an issue for 2040, in the interim stage, so at least by 2030, driven by the RFNBO DA requirements, majority of electrolysis projects in the EU will have secured electricity supply via PPAs.	2. We acknowledge the use of PPAs in the current, early-development stage of the hydrogen market. PPA contracts, being bilaterally negotiated, are generally untransparent. Hence, market-based prices were considered as the only objective reference for hydrogen prices, in both the early (2030) and more developed (2040) stage of the market.
		3. Furthermore, while the approach that the DHEM aims at maximising the joint market rents in the electricity sector and in the hydrogen is sound from modelling point of view it is not clear whether the rents in the hydrogen sector include potential contractual penalties for failing to deliver H2 for industrial offtakers with inflexible demand profiles or loss of RFNBO H2 green premium that could be a result of trading off fully renewable electricity on the electricity markets.	3. In the Dual Hydrogen and Electricity Model (DHEM), the rents associated to the hydrogen sector do not include potential contractual penalties for failing to deliver hydrogen for industrial offtakers with inflexible demand profiles or loss of any premia, as for RFNBO hydrogen traded directly on renewable electricity markets. The model only considers a European willingness to pay value.
		4. We find that it is insufficient to stop at the step the two indicators. As the authors say themselves these just show that there are inadequacies to which "potential solutions may in principle involve import projects, production projects, transmission projects, and storage projects". It would be welcome if the analysis went a step further and would provide insights into which type of investments would address the bottlenecks in the most cost-efficient way, as storage, transmission pipelines, intra-EU interconnectors and import terminals all provide different capacities to the system.	4. The role of the H2IGI indicators is to provide a measurement of the infrastructure need. In most cases, an infrastructure gap can be reduced by making different kinds of investments; both storage and a pipeline, for instance, can contribute to the reduction of the same

Nr.	Organisation	Answer	ENTSOG's reply
			infrastructure gap. To differentiate between such investments, a project-specific cost-benefit analysis is performed after the H2IGI assessment, listing results for all projects that apply for PCI/PMI status.
		5. For storage in particular it would be a welcome addition to go beyond the two indicators which are strongly linked with the hydrogen market and add another one which would reflect potential needs for seasonal storage for the electricity markets, that are not currently addressed either by the PCI/PMI or the advanced infrastructure levels.	5. The needs for seasonal storage are considered inherently in the model as the electricity model starts with ENTSO-E's TYNDP model and considered both hydro and battery storage. Furthermore, it is out of ENTSOG's scope to report on needs of the electricity system.
		6. It is not always clear what is the source of the assumed SMR/ATR capacities and if those include both facilities with and without CCS. The values would require further explanations as in some countries the assumed natural gas based capacities are smaller than current installed capacities (SMR) while in others these are almost 4x higher than what is currently in operation (e.g. RO).	6. Each country's total electrolyser and SMR/ATR capacities are specified in the TYNDP 2024 NT+ scenario, approved by the European Commission on 14 December 2025. The specific source used for the SMR/ATR data is the Fuel Cell and Hydrogen Observatory[9]. At the moment of extraction, only two (SMR) facilities had CCS, both refineries, in France and respectively, the Netherlands.

[9] The current name if the source is "European Hydrogen Observatory", available at: https://observatory.clean-hydrogen.europa.eu/

Nr.	Organisation	Answer	ENTSOG's reply
		7. Similar remark could be made about the assumed electrolytic hydrogen production capacities where, in case of some countries, the assumed production capacity exceeds multiple times the total current projects pipeline (e.g. the assumed production capacity in Croatia are 40-times higher than all current projects in that country and 90-times higher than Hydrogen Europe's outlook for 2030 in the 'Current Trajectory' scenario – see Clean Hydrogen Monitor 2024).	As for differences in values, even material ones as for the example given, this is likely to have occurred due to differences in source and methodology used. Specifically, in the Clean Hydrogen Monitor 2024, it is mentioned: "Hydrogen production capacity data is collected mostly from public sources, with the validation from national associations and/or companies whenever possible"[10]. 7. As mentioned at point 6, total electrolyser capacities are specified in the TYNDP 2024 NT+ scenario, approved by the European Commission. Most TSOs provided their inputs directly to ENTSOG. Since the values were those expected for 2030 and 2040 at end-year 2022, differences exist sometimes of significant order, compared to recently updated data, as Hydrogen Europe's project pipeline and Clean Hydrogen Monitor 2024. Additionally, the sources of data used by Hydrogen Europe, as well as its adjustment methodology differ from those used in

[10] Slide 26, https://hydrogeneurope.eu/wp-content/uploads/2024/11/Clean_Hydrogen_Monitor_11-2024_V2_DIGITAL_draft3-1.pdf

Nr.	Organisation	Answer	ENTSOG's reply
			ENTSOG's Scenarios 2024 exercise.

6. Next steps

ENTSOG shall publish the final versions of the H2IGI report on its website and on the dedicated TYNDP 2024 website, together with this consultation report. The H2IGI report is then subject to the opinions of ACER, Member States, and the EC, as outlined in Article 13 of the TEN-E Regulation.