

TYNDP 2022

The Hydrogen and
Natural Gas TYNDP

Infrastructure Report



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1 INTRODUCTION

This ENTSOE TYNDP, together with the Project of Common Interest (PCI) selection process (which is the responsibility of the European Commission), is a key step for the development of European gas infrastructures. Gas infrastructures, along with the implementation of harmonised business rules, are fundamental for the strengthening of the European Internal Energy Market.

The TYNDP provides transparent and comprehensive information to stakeholders. From one edition to another, ENTSOE is constantly improving its TYNDP process, taking into account all the valuable feedback received by stakeholders.

FUTURE GAS INFRASTRUCTURE EVOLUTION

Gas infrastructure is an essential part of the future energy system, enabling the implementation of both existing and innovative carbon neutral gas technologies. **The TYNDP 2022 provides a view of the future gas infrastructure developments, while also taking into consideration the ongoing decarbonisation efforts and a need to reduce Russian gas supply dependence.**

The work on this TYNDP started in 2021, more than two years ago. Since then, rapid changes in the European gas market have occurred and the increased hydrogen ambitions of many countries and commercial players were observed, causing

sudden announcements of new projects. It should therefore be noted that this infrastructure report cannot reflect all latest developments even at its publication date, while multiple major developments of 2022 could be captured.

Already in the previous TYNDP edition, ENTSOE introduced a new project infrastructure category for Energy Transition Projects. In response to the EU Green Deal and the revision process of the TEN-E Regulation (EU) 2022/869, ENTSOE decided to further update this category by substituting it by four new categories to provide additional insights, including development trends.



Picture courtesy of Teréga

RENEWABLE AND LOW-CARBON HYDROGEN

Renewable and low-carbon hydrogen will be key to decarbonise the hard-to-abate sector in the next

years. The role of biomethane and hydrogen is thereby expected to gain further relevance.

PROJECT SUBMISSION

For TYNDP 2022, an initial project submission took place between 18 October and 12 November 2021. Due to the Russian invasion of Ukraine and the commencement of new infrastructure initiatives to reduce the European dependence on Russian gas supply (including those outlined in the REPowerEU Plan), ENTSOG exceptionally re-opened the project collection process with the purpose of including relevant projects that were now being considered in light of security of supply needs. Between 30 May and 24 June 2022, project promoters had the opportunity to submit new projects aiming to both strengthen Europe's security of supply and contributing to the energy transition, as well as offering project promoters the opportunity to update already existing projects with the latest available information. The project information as

reported in Annex A and the TYNDP 2022 maps are reflecting therefore the status of the projects during the end of the project collection phase for TYNDP 2022.

In addition to the above-mentioned TYNDP project collection phases, hydrogen infrastructure projects have been complemented in a final call between 18 October and 15 December 2022. This collection was necessary to allow for updates or submissions of PCI candidates under the revised TEN-E Regulation.

Projects submitted to the TYNDP 2022 have different levels of maturity and their inclusion in the TYNDP does not make their development legally binding and should not be interpreted as an endorsement by ENTSOG or an EU body.

PROJECT COMPLIANCE

Submitted projects have to comply with specific administrative and technical criteria for their inclusion in the TYNDP, as defined in the "ENTSOG Practical implementation document (PID) for developing the 10-year network development plan 2022"¹. This document follows the European Commission's recommendation on "Guidelines on equal treatment and transparency criteria to be

applied by ENTSO-E and ENTSOG when developing their TYNDPs", as set out in Annex III.2 (5) of Regulation (EU) No 347/2013 (TEN-E)². Since this TYNDP 2022 was developed in a transition period of the TEN-E Regulation, anticipated changes were taken into account as much as possible. The PID was consulted in a dedicated workshop on 2 June 2021.

¹ https://www.entsog.eu/sites/default/files/2021-09/TYNDP0075-21_TYNDP_2022_PID_FINAL.pdf

² <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex%3A32013R0347>

2 GAS INFRASTRUCTURE AND EUROPEAN ENERGY POLICY

Existing European gas infrastructures already provide a high level of market integration, security of supply, and competition in many parts of Europe. Recent changes in the geopolitical context prove that further developments in some specific areas are necessary in order to ensure that such benefits will be strengthened and maintained including independence from Russia, improving diversification, and taking into account the acceleration of hydrogen deployment communicated in REPowerEU³.

MARKET-BASED DEVELOPMENT OF GAS INFRASTRUCTURES

The Third Energy Package ensured a sound climate for a market-based development of gas infrastructures. In this context the TEN-E Regulation⁴ aims at facilitating the delivery of key infrastructures. Published in June 2022, the revised TEN-E Regulation lays down new EU rules for cross-border energy infrastructure. It promotes integration of renewables and new clean energy technologies into the energy system in the light of the European Green Deal⁵, the connection of regions currently

isolated from European energy markets, strengthening of existing cross-border interconnections, and cooperation with partner countries.

New infrastructure projects may contribute to sustainability, decarbonisation, market integration, competition and diversification of gas supply sources or routes. It is therefore important that the European regulatory framework continues ensuring adequate support to infrastructure developments that will allow to meet current and future needs.

THE REVISED TEN-E REGULATION

With regards to the gas PCI process, the revised TEN-E Regulation clearly states that new natural gas projects will not be eligible for the PCI status already for the 6th PCI list (1st PCI/PMI under the revised TEN-E). At the same time, it defines the rules for the assessments starting in 2024. This TYNDP 2022 spans the revised and previous

version of the TEN-E Regulation, and ENTSOG proactively is taking initiative for already designing infrastructure assessments for the cross-border infrastructure by grasping both, existing natural gas and future hydrogen networks. This is to properly and carefully represent interactions and synergies between different energy infrastructure categories.

3 https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/repower-eu-affordable-secure-and-sustainable-energy-europe_en

4 <https://eur-lex.europa.eu/eli/reg/2022/869/oj>

5 https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en



THE REPowerEU PLAN

REPowerEU is addressing the European Commission's response to the hardships and global energy market disruptions caused by Russia's invasion of Ukraine. It is a plan for saving energy, producing clean energy and diversifying energy supplies aiming at the reduction of Europe's dependency on the Russian supplies of natural gas. The REPowerEU plan sets out a series of measures to rapidly reduce dependence on Russian fossil fuels and fast forward

the green transition, while increasing the resilience of the EU-wide energy system. In its defined measures, increased production of biomethane, targeted investments for natural gas infrastructure and LNG and hydrogen purchases from alternative supply sources are listed. The TYNDP 2022 development was adjusted and modified along the process to include these ambitions into the perspective of the infrastructure development and its assessment.

GAS INFRASTRUCTURE – A FLEXIBLE SYSTEM

Regarding the sustainability pillar of the EU Energy Policy, gas infrastructures already offer a flexible system able to support the development of renewable energies. These infrastructures are able to transport a fuel that is less carbon-intensive than coal and oil to support the development of intermittent renewable power production and enable a large-scale injection of non-fossil gas (such as biomethane, hydrogen, or synthetic methane). Gas infrastructures provide the advantage of storing renewable energy, providing opportunities for

up to seasonal balancing of energy systems, as well as transporting energy at relatively low costs. New investments into and accelerated deployment of hydrogen will establish advanced integration of renewable sources and achieve a higher level of decarbonisation. All technologies that contribute to the decarbonisation of the energy system, including those which enable renewable and decarbonised gases, should benefit from an objective treatment, assuring a level playing field between energy carriers.

COORDINATED AND COHERENT INTERACTION

To achieve climate goals under the European Green Deal in a cost-efficient way, a coordinated and coherent interaction between electricity and gases (including natural gas, biomethane, synthetic methane, and hydrogen) is essential.

Such an integrated approach should address how to develop the infrastructure necessary for the future in an efficient and technology-neutral manner, which also reflects the increasing demand for hydrogen and the essential role of power-to-gas technologies.

3 EXISTING CAPACITIES AND PROJECT DATA COLLECTION PROCESS

ENTSOG has improved the transparency of the process, strengthened the communication with project promoters and upgraded its Project Data Portal to ensure the best possible availability, consistency and quality of the collected project data. This in exchange ensures the quality of the assessment.

For each TYNDP, ENTSOG collects information on existing firm capacities directly from TSOs (for transmission infrastructures) as well as from GIE⁶ (for LNG regasification terminals and storage facilities). For TYNDP 2022, existing firm capacities were collected as of 1 January 2023.

In order to provide a holistic view of the European gas system over the next 20 years, it is important that all relevant infrastructure projects are incorporated into the TYNDP. ENTSOG has endeavoured to run an open and transparent data collection processes, and actively encouraged project promoters to submit their projects.

As the submission of comprehensive project data is a critical prerequisite for the infrastructure analysis, ENTSOG provides a Project Data Portal open to all project promoters to support the process.

Only projects actively (re)submitted by promoters through the Project Data Portal have been considered in this edition of the TYNDP. This process ensures transparency and non-discrimination between projects. Ahead of the submission phase, to better support project promoters, ENTSOG provided a documentation kit with a handbook⁷ on how to use the Project Data Portal and organised dedicated webinars for project promoters.

In order to increase transparency and accuracy of the information and to facilitate coordination among promoters, the ENTSOG Project Data Portal offers promoters capacity monitoring interfaces. This allows project promoters to actively monitor their submission through specific reports and check the final capacity value resulting from the application of the “lesser-of-rule”⁸.

When submitting projects, the promoters commit to report accurate and up-to-date information. In very few instances ENTSOG has directly undertaken corrective actions in line with pre-defined rules. Furthermore, for a given project, the related TYNDP code is assigned automatically by the Project Data Portal when the project is first submitted. Updates of the project in future TYNDPs are handled by the promoter under the same project code. This allows using the project code as another key for the monitoring of projects along the different TYNDP editions and for the PCI selection process.

To ensure as much consistency as possible, ENTSOG encouraged promoters intending to resubmit projects that were already part of the TYNDP 2020 to update the already existing information while keeping the same TYNDP project code. In this way it has been possible to better link the different TYNDP editions and monitor the project evolution. Promoters were also requested to provide comprehensive information including detailed project implementation schedules (→ [sections 6.4.3 and 7.5.3](#)) and estimated costs (→ [sections 6.4.3 and 7.5.4](#)).

For the TYNDP 2022, an initial project submission took place between 18 October and 12 November 2021. The submission phase was followed by a check and correction phase (from 15 November to 10 December 2021) where both ENTSOG and promoters could verify and amend the submitted information. Additionally, in order to ensure a more careful consistency check on submitted projects' data, during the TYNDP 2022 project data collection, ENTSOG liaised with ACER and National Regulatory Authorities (NRAs) after the first initial data collection. Promoters were informed about

6 Gas Infrastructure Europe

7 https://www.entsog.eu/sites/default/files/2022-05/TYNDP076-21_2022_Project_Submission_Handbook.zip

8 The “lesser-of-rule” means that, on a Point with Entry and Exit capacities, the minimum of the two values will be considered as the firm capacity available for use. Example: Promoter A submits an Exit capacity on Point P in the value of 100. Promoter B submits an Entry capacity on the other side of the Point P, in the value of 200. After the application of the rule, the firm capacity considered for modelling will be 100.

the comments provided by ACER and NRAs and allowed to amend the information provided during the project data collection if deemed necessary. The same information was also shared with the European Commission.

Due to the Russian invasion of Ukraine and the commencement of new infrastructure initiatives to reduce Europe's dependence on Russian gas supply (including the REPowerEU targets), ENTSOG decided to reopen the project collection process with the purpose of including relevant projects in light of security of supply. Between 30 May and 24 June 2022 project promoters had the opportunity to submit additional projects aiming to strengthen Europe's security of supply, the diversification

of Europe's energy sources and contributing to the energy transition, as well as to update existing projects with the latest available information. The project information as reported in Annex A and TYNDP 2022 maps are reflecting therefore the status of the projects during the end of the project collection phase for TYNDP 2022.

In addition to the above-mentioned TYNDP project collection phases, hydrogen infrastructure projects have been complemented in a final call between 18 October and 15 December 2022. This collection was necessary to allow for updates or submissions of PCI candidates under the revised TEN-E Regulation.

3.1 DIFFERENCES BETWEEN TYNDP AND ENTSOG TRANSPARENCY PLATFORM DATA

Regulation (EC) no. 715/2009 and its amendments require ENTSOG to provide a Union-wide platform where all Transmission System Operators for gas shall make their relevant data publicly available.

The Transparency Platform provides technical and commercial data on gas transmission systems on a daily and hourly basis, which include interconnection points and connections with storages, LNG facilities, distribution networks, final consumers and production facilities.

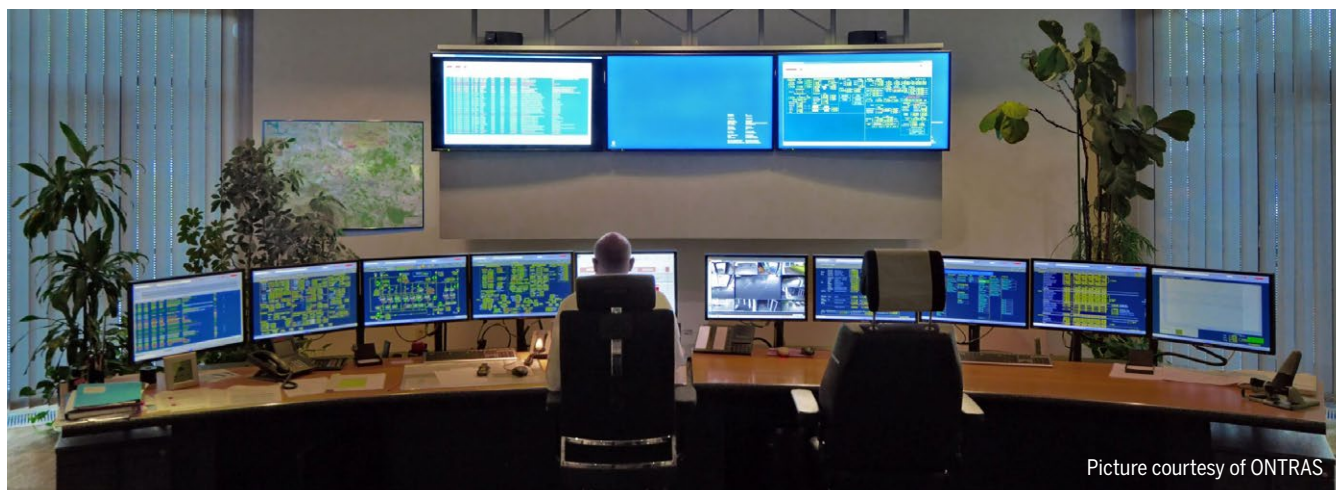
The platform is available on web address:

<https://transparency.entsog.eu>

where the interested parties are able to access valuable information uploaded by all TSOs.

Firm technical capacity data collected and used for the TYNDP might differ from the capacity data published on the ENTSOG Transparency Platform for the three main following reasons:

- though the modelling mostly uses the ENTSOG Transparency Platform topology, in some cases the topology used in the TYNDP differs from the latter. This is to better serve simulations purposes;
- both existing capacity and project capacities are not constantly updated during the TYNDP process but have a specific time stamp (1 January 2023 for existing infrastructure while for projects the closure day of the data collection);
- capacities are modelled in the TYNDP after the application of the Lesser-of-Rule.



Picture courtesy of ONTRAS

4 PROJECT STATUS AND INFRASTRUCTURE LEVELS

4.1 PROJECT STATUS

Projects are categorised along two different project status: FID and non-FID. As for TYNDP 2020 the non-FID status has been sub-categorised into non-FID Advanced (hereafter Advanced) and non-FID Less-Advanced (hereafter Less Advanced).

Each project status is directly derived from the information provided by its promoter and according to the rules set in the ENTSG Practical Implementation Document:

- ▲ The FID status of a project corresponds to a project that has taken the final investment decision before the closure of TYNDP project collection period. Projects with FID status are identified in TYNDP project code with a F (e.g. TRA-F-000);
- ▲ The Advanced status is applied to all non-FID projects that fulfils the following conditions:
 - commissioning year expected at the latest by 31 December of the year of the TYNDP project data collection + 6 (e.g. 2028 in case of TYNDP 2022 for which the latest data collection was done in 2022)
 - and
 - whose permitting phase has started ahead of the TYNDP project data collection
 - OR
 - FEED⁹ has started (or the project has been selected for receiving CEF¹⁰ grants for FEED) ahead of the TYNDP project data collection.

Projects with Advanced status are identified in TYNDP project code with an A (e.g. TRA-A-000)

- ▲ All projects that do not meet the FID or Advanced criteria are considered as having the Non-Advanced status. Projects with Non-Advanced status are identified in TYNDP project code with an N (e.g. TRA-N-000).

Based on past TYNDP process experience and the recommendations expressed by ACER in their Opinions, the Advanced status was already introduced in the 2017 edition¹¹ and allows to better reflect the different project maturities. This status was defined in close cooperation with ACER and the European Commission, and in consultation with stakeholders.

To enable meaningful simulation for system needs assessments, ENTSG decided to move forward the project status of around 15 projects from less advanced to advanced. Most of these projects have been initiated directly after the Russian invasion of Ukraine aiming to bring additional supply to Europe or solving internal system bottlenecks. All respective projects have a common point: that the commission date and the realisation is very likely in the near future but based on the ad hoc planning all information on FEED and/or permitting could not be provided during the second project submission phase. Examples for this are investments at the border between France and Germany enabling reverse flow and the construction of FSRU's in several European Countries. This decision was well discussed with all concerned project promoters.

Additionally, the PCI status is assigned to natural gas projects that are part of the latest approved 5th Union list of Projects of common interest (the PCI list) referred in Article 3 of the Regulation (EU) 347/2013, irrespective of the above-mentioned project status.

9 Front End Engineering Design as the basic engineering activity conducted after completion of the conceptual design or the (pre-)feasibility study.

10 The Connecting Europe Facility (CEF) is an EU funding instrument defined in Art. 14 of Regulation (EU) 347/2013.

11 http://www.acer.europa.eu/official_documents/acts_of_the_agency/opinions/opinions/acer%20Opinion%2011-2015.pdf

4.2 INFRASTRUCTURE LEVELS

4.2.1 NATURAL GAS INFRASTRUCTURE LEVELS

As in previous TYNDP editions, project status is the basis for the definition of natural gas infrastructure levels:

Existing infrastructure level

Existing infrastructure level is composed of the existing network + FID projects having their commissioning date no later than 31 December 2022.

Existing infrastructure level will be the basis for the following infrastructure levels (PCI and Advanced), as it represents the minimum level of natural gas infrastructure development that will be considered in the TYNDP 2022 System Assessment.

Advanced infrastructure level

Advanced infrastructure level is composed of existing infrastructure level + FID projects + Advanced projects.

The advanced infrastructure level broadens the range of the TYNDP 2022 System assessment, by including the natural gas advanced projects on top of the existing and FID infrastructure allowing for a better and more complete infrastructure gaps identification.

PCI infrastructure level

PCI infrastructure level is composed of existing infrastructure level + FID projects + natural gas infrastructure projects included in the 5th PCI list.

The PCI infrastructure level is composed by existing infrastructures, infrastructure projects having FID status (whatever their PCI status is) and infrastructure projects labelled as PCIs in the 5th PCI selection process (not having their FID taken yet). Although it includes projects of different maturity, this infrastructure level allows to build a bridge between past PCI selection processes and it also enables the assessment of the 5th list of PCI natural gas projects.

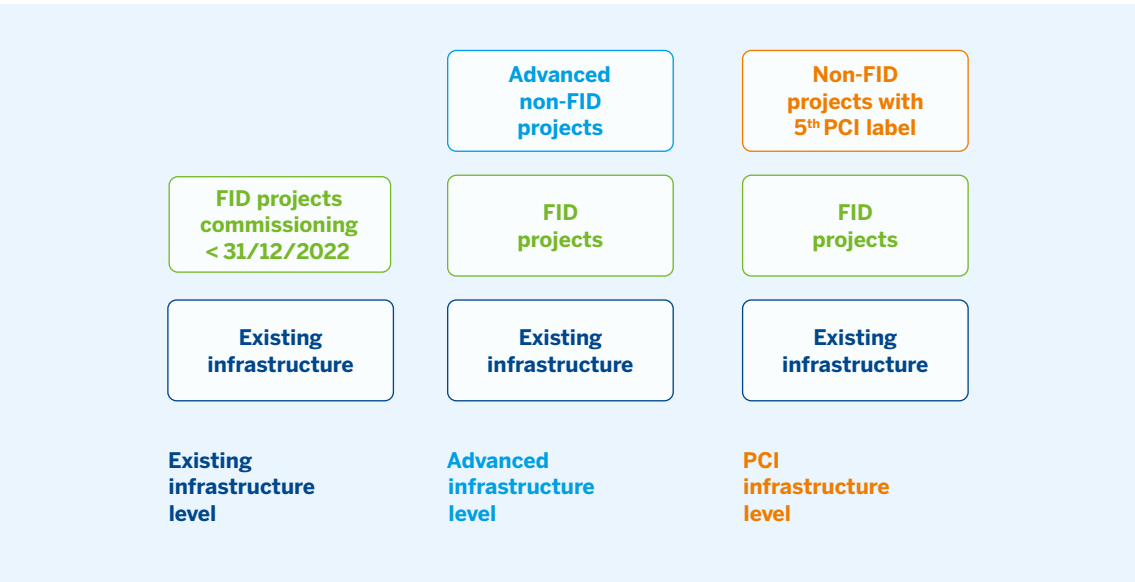


Figure 1: Natural gas infrastructure levels in TYNDP 2022

4.2.2 HYDROGEN INFRASTRUCTURE LEVELS

Unlike natural gas, hydrogen infrastructure levels can only be defined with the consideration of planned projects, as there is no existing infrastructure in place.

After the inclusion of ETR project category (Energy Transition projects) in the TYNDP2020, and in order to provide a more accurate and up to date representation of the latest infrastructure developments ENTSOG extended the projects categories of ETR projects into four new separate categories in TYNDP 2022. Among these new infrastructure categories further detailed in → [section 5.1](#) "Types of infrastructures", Hydrogen infrastructure projects were collected as part of the dedicated new hydrogen project category.

In addition, hydrogen projects included different subcategories of hydrogen infrastructure projects, such as:

- ▲ On-shore or off-shore Hydrogen transmission pipelines (newly constructed or repurposed from natural gas pipelines) including pipelines enabling hydrogen imports from extra-EU countries.
- ▲ Newly constructed or repurposed liquefied hydrogen terminal including hydrogen embedded in other chemical substances with the objective of injecting the hydrogen into the grid.
- ▲ Hydrogen storages (newly constructed or repurposed from natural gas infrastructure).

Extensive data collection carried out for TYNDP 2022, allowed for the consideration of hydrogen infrastructure levels as a first step on the assessment and analysis of hydrogen infrastructure.

For the first time, in the TYNDP 2022 edition, ENTSOG has introduced Hydrogen infrastructure levels, that includes not only Hydrogen infrastructure projects (as defined in the Practical Implementation document of TYNDP 2022) submitted

to TYNDP 2022, but it is also complemented by additional Hydrogen infrastructure projects submitted to the first PCI selection process under revised TEN-E (for which project collection closed in December 2022).

The addition of hydrogen projects submitted to the PCI project submission in the TYNDP 2022 edition is explained by the specific relationship between the TYNDP 2022 cycle and the ongoing first PCI selection process. As for the first PCI selection process, previous project submission to the TYNDP 2022 edition was not set a mandatory condition, unlike previous and future TYNDP/PCI processes.

It is also important to highlight that considering PCI project submission information as part of TYNDP 2022 infrastructure levels, has also allowed to update TYNDP 2022 project data of hydrogen infrastructure with the best available information from project promoters. This is also reflected in the TYNDP 2022 System and Project-specific CBA assessment and will enable a fair and non-discriminatory analysis of future hydrogen infrastructure.

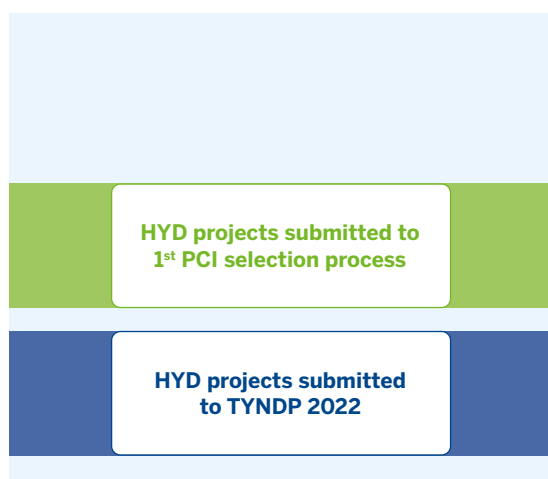
In addition, and as further detailed in the definition of the Hydrogen infrastructure levels some additional infrastructure assumptions are included for H₂ infrastructure level 2.

Unlike natural gas infrastructure levels, hydrogen infrastructure levels are not based on project-status. As hydrogen infrastructure being at an early stages of development compared to natural gas infrastructure that has been gradually developed reaching already in the existing infrastructure level considerable level of development for most European countries.

As described later in → [section 7.5.1](#) "Overview of project status", most hydrogen projects have non-FID less-advanced project status, whereas only few submissions have non-FID advanced project status and only one project has FID status.

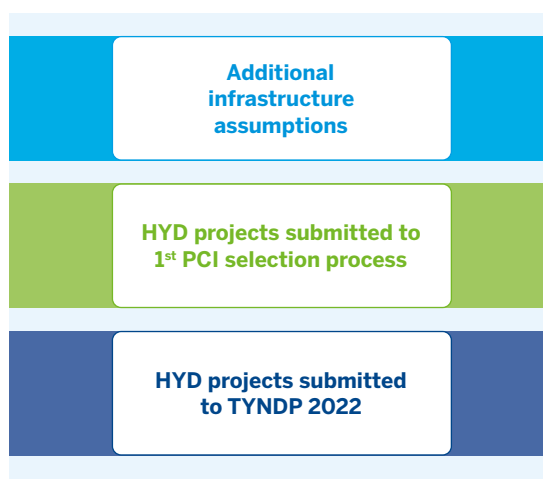
In TYNDP 2022 two contrasted hydrogen infrastructure levels were included¹²:

▲ Hydrogen infrastructure level 1:



Hydrogen infrastructure level 1 is a project-based infrastructure level, is composed of all TYNDP 2022 hydrogen projects (including also TYNDP 2022 hydrogen-ready infrastructure), as well as hydrogen projects submitted to the first PCI selection process that were not previously submitted to TYNDP 2022.

▲ Hydrogen infrastructure level 2:



Hydrogen infrastructure level 2 is defined as a policy-based infrastructure, is composed of Hydrogen infrastructure level 1 and additional infrastructure assumptions based on TSOs' need to enable policy objectives, such as the 2030 hydrogen imports targets defined the RePowerEU Plan.

Figure 2: Hydrogen infrastructure levels in TYNDP 2022

Infrastructure levels are the basis for the identification of infrastructure gaps in the TYNDP 2022 System assessment. For the first time, TYNDP 2022 will include a dual assessment of natural gas and hydrogen infrastructure: by combining each natural gas infrastructure level with both hydrogen infrastructure levels in the TYNDP System assessment. As for the hydrogen system an existing infrastructure level is not yet available. ENTSG has identified a possible hydrogen network according to the information provided by promoters in their project submission for TYNDP/PCI process (i. e. H₂ infrastructure levels). For this reason, it should be clear that the System Assessment shows results

that could be reached (in 2030, 2040, 2050) under the hypothesis of a full commissioning of H₂ planned infrastructures that are not yet in place. Therefore, even in configurations where no demand curtailment are identified these results should not be read as the absence of H₂ infrastructure needs. On the other hand, it is assumed a full availability of the infrastructures composing the H₂ infra levels in order to avoid demand curtailment. Indeed, if planned infrastructure is not developed, demand curtailment would materialise at rates progressively increasing together with the number of planned project not actually realised.

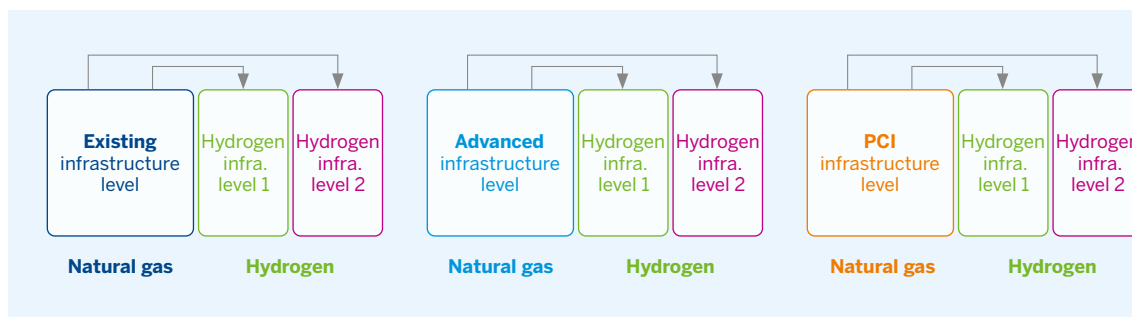


Figure 3: Natural gas and Hydrogen infrastructure levels in the System Assessment

¹² Detailed capacities of Hydrogen Infrastructure levels 1 and 2 can be found on the Annex C2

5 ANALYSIS OF PROMOTERS' SUBMISSIONS

Overall, 358 investments have been included to TYNDP 2022 by more than 60 different project promoters including both TSOs and third-party promoters. The below graph provides the overview for this submission, compared to the previous TYNDP editions.

The full details of the project information included in the TYNDP 2022 can be found in Annex A of this Report. This section of the report provides a general

information of the received submissions. Submissions are further analysed in Chapter 6 and 7.

Natural Gas = TRA + LNG + UGS

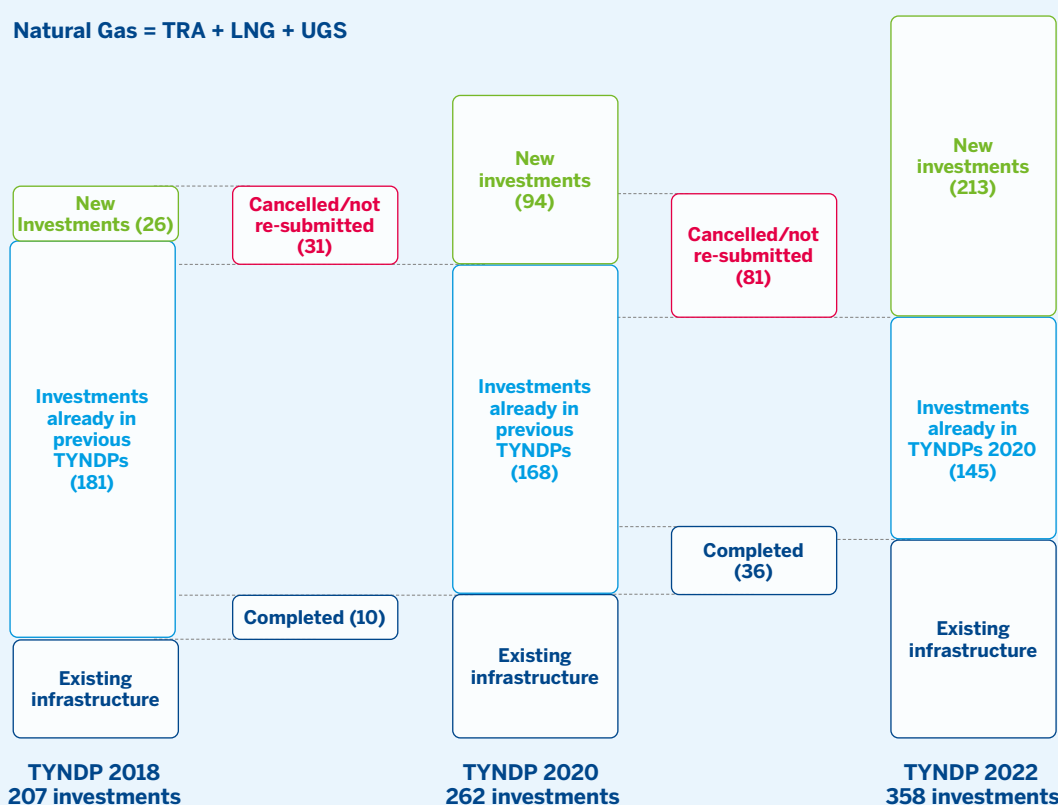


Figure 4: Comparison between TYNDP 2018, TYNDP 2020 and TYNDP 2022

5.1 TYPE OF INFRASTRUCTURES

For the previous TYNDP edition ENTSG introduced for the first time a new project infrastructure category for Energy Transition Projects. TYNDP 2020 already included 75 Energy Transitions Projects. Following the EU Green Deal and the revision process of the TEN-E regulation, ENTSG

decided to further evolve this category by replacing it with four new categories allowing more insights and reflection of development trends. Projects are classified in TYNDP 2022 according to the following infrastructure categories.

PROJECTS ARE CLASSIFIED IN TYNDP 2022 ACCORDING TO THE FOLLOWING INFRASTRUCTURE CATEGORIES:

- ▲ Gas Transmission pipeline including Compressor Stations (TRA)
- ▲ Reception and storage and regasification or decompression facilities for liquified naturals gas or compressed natural gas (LNG)
- ▲ Underground storage facility (UGS)
- ▲ New or repurposed infrastructure to carry hydrogen (HYD)
- ▲ Projects for retrofitting infrastructure to further integrate hydrogen (RET)
- ▲ Biomethane development projects (BIO)
- ▲ Other infrastructure related projects (OTH)

Renewable and low-carbon hydrogen will be key to decarbonise the hard-to-abate sector in the next years but alternatively some European countries can still reduce their carbon footprint by replacing more carbon intensive fuels. Investments falling under the TRA, UGS and LNG infrastructure category thus need to be technically suitable to transport, store or receive safely, securely, and efficiently increasing percentages of H₂ (possibly up to 100 %) or contribute to the fuel-gas-switch within a country/area.

Figure 5 provides an overview of the submitted investment per Type of Infrastructure.

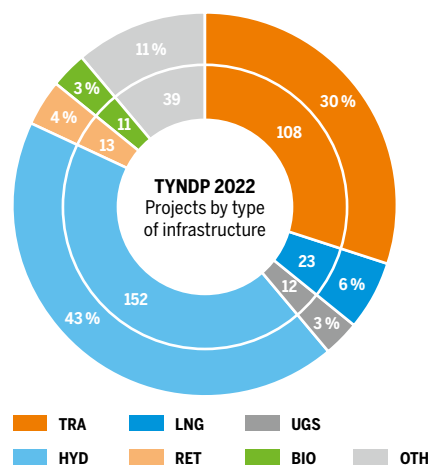


Figure 5: Investment inclusion in TYNDP 2022 by type of infrastructure

5.2 PROJECTS COMMISSIONED SINCE TYNDP 2020

The following map shows all projects that, from the last TYNDP edition, have been completed.



Figure 6: Map of projects commissioned since 2020

32 investments already part of TYNDP 2020 were completed over the years between both TYNDP editions. The commissioning of all these investments further contributes to the development of the European gas system, enhancing the level of market integration, security of supply and competition. Four of these projects are contributing to the energy transition.

Some of the above projects have been submitted to TYNDP 2022 but have been commissioned in the following months directly after the end of the project submission phase (commissioning date < 31.12.2022) and will be therefore considered in the TYNDP 2022 Existing infrastructure level and is no longer part of the promoter submission analyses in the next chapters.

5.3 PROJECTS FORESEEN TO BE COMMISSIONED SOON

In addition to the 32 commissioned investments, 25 investments with either FID or Advanced status and commissioning year 2023 have been submitted to TYNDP 2022. These projects are further contributing to the security of supply. A list of these projects is presented below:

Project code	Project name	Promoter	Country	Commissioning year
TRA-F-342	Enhancement of Latvia–Lithuania interconnection (Lithuanian part)	AB Amber Grid	LT	2023
TRA-F-382	Enhancement of Latvia–Lithuania interconnection (Latvian part)	Conexus Baltic Grid, JSC	LV	2023
TRA-A-1199	LNG Terminal Brunsbüttel – Grid Integration	Gasunie Deutschland Transport Service GmbH	DE	2023
TRA-F-814	Upgrade for IP Deutschneudorf et al. for More Capacity	ONTRAS Gastransport GmbH	DE	2023
LNG-A-62	LNG terminal in northern Greece/Alexandroupolis – LNG Section	Gastrade S.A.	GR	2023
TRA-A-63	LNG terminal in northern Greece/Alexandroupolis – Pipeline Section	Gastrade S.A.	GR	2023
TRA-A-988	LNG Terminal Stade – Grid Integration	Gasunie Deutschland Transport Service GmbH	DE	2023
TRA-F-539	FSRU 1 Connection	Snam Rete Gas S.p.A.	IT	2023
LNG-F-1134	FSRU 1 – SNAM	Snam Rete Gas S.p.A.	IT	2023
LNG-F-272	Upgrade of LNG terminal in Świnoujście	GAZ-SYSTEM S.A.	PL	2023
TRA-F-329	ZEELINK	Open Grid Europe GmbH and Thyssengas GmbH	DE	2023
TRA-F-362	Development on the Romanian territory of the Southern Transmission Corridor	SNTGN Transgaz SA	RO	2023
TRA-F-755	CS Rimpar	GRTgaz Deutschland GmbH and Open Grid Europe GmbH	DE	2023
TRA-A-1090	Metering and Regulating Station at Alexandroupoli	DESFA S.A.	GR	2023
TRA-F-1115	WAL	Open Grid Europe GmbH	DE	2023
TRA-F-1276	Upgrade of Nea Mesimvria Compressor Station	DESFA S.A.	GR	2023
TRA-F-1278	Compressor station at Ambelia	DESFA S.A.	GR	2023
OTH-A-430	Porthos	Porthos Development CV	NL	2023
HYD-A-562	Energy Park Bad Lauchstädt	ONTRAS Gastransport GmbH	DE	2023
TRA-A-809	Reallocation H-Gas towards NL: Bunde/Oude to Zone Oude Statenzijl H	Gasunie Deutschland Transport Services GmbH	DE	2023
OTH-A-924	Power to Methanol Antwerp	Power to Methanol Antwerp BV	BE	2023
TRA-A-1268	Romania–Serbia Interconnection	SNTGN Tranzgaz SA	RO	2023
TRA-A-564	FSRU in Le Havre connection	GRTgaz	FR	2023
LNG-A-1123	Expansion of Revithoussa LNG Terminal via installation of FSU	DESFA S.A.	GR	2023
LNG-F-178	Musel LNG terminal	Enagas Transport S.A.U.	ES	2023
TRA-A-1275	Zeebrugge Opwijk	Fluxys Belgium	BE	2023

Table 1: Investments included in TYNDP 2022 whose expected commissioning year is 2023

6 PROMOTERS' SUBMISSIONS FOR NATURAL GAS FOR TYNDP 2022

Following the information provided by promoters, ENTSOG has aggregated the submitted investments according to a strictly functional-related criteria.

FOR EXAMPLE:

- ▲ In case of an interconnector connecting two (or more) countries, two (or more) different promoters are usually involved;
- ▲ A new LNG terminal or storage may need a new evacuation pipeline to connect them to the gas network and in some cases the two investments might be promoted by different entities;
- ▲ In some cases, projects connecting the EU to new supply sources are composed of different projects (and in some cases promoted by different subjects) whose full realisation is a prerequisite to connect the new source.

In all above cases, investments carried on by different promoters need to be implemented together for the overall project to materialise. These should then be considered as a single “aggregated” project.

Based on this, for TYNDP 2022 promoters submitted **112 gas infrastructure projects i.e. transmission, UGS and LNG projects**. In TYNDP 2020 promoters submitted 142 gas infrastructure projects



Picture courtesy of Moldovatransgaz

6.1 GAS TRANSMISSION PIPELINE PROJECTS INCLUDING COMPRESSOR STATIONS (TRA)

Today in EU and UK around 205,090 km of transmission pipelines exist. The data included in the map represent the total length of 46 TSOs transmission pipeline. The definition of transmission pipeline might differ country by country.

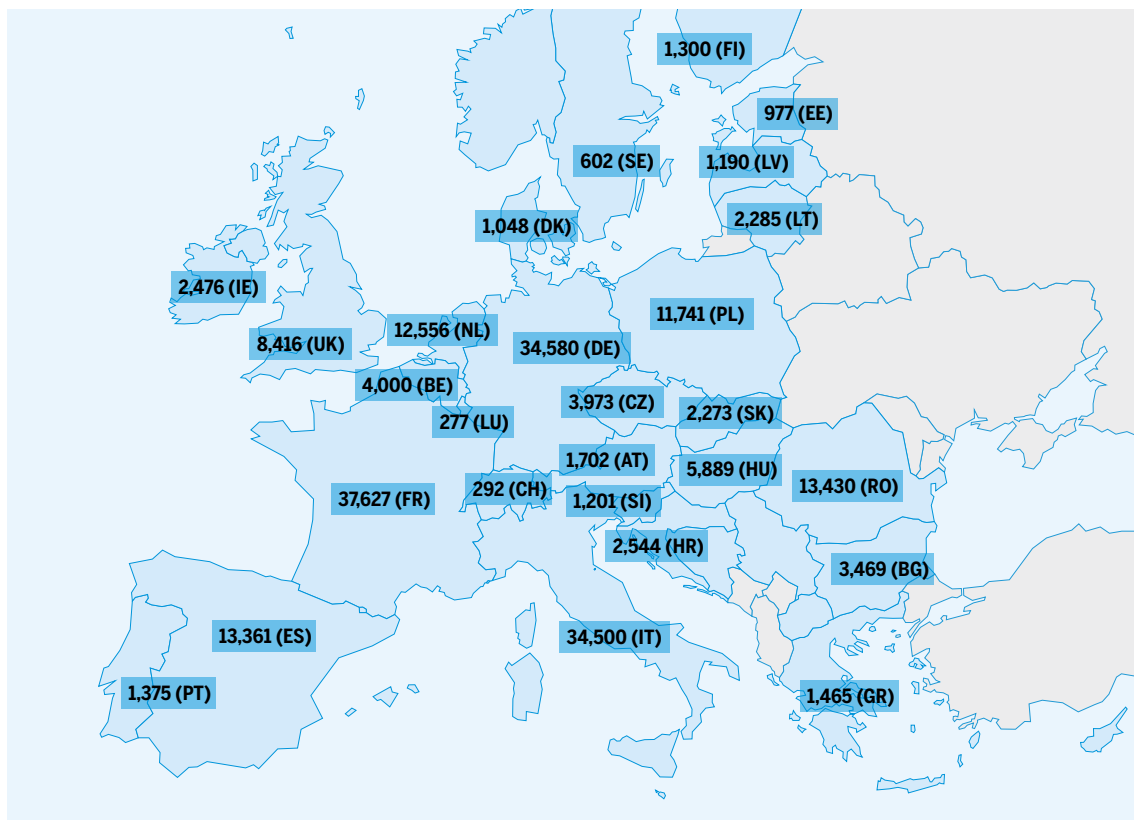


Figure 7: Transmission length in EU and UK in km (year 2022)

80 transmission and compressor stations projects have been submitted to TYNDP 2022. These projects can be summarised according to the following categories:

- ▲ 25 interconnection projects between two or more countries. In some cases, only one side of the interconnection has been submitted since the other part is already existing or the project consists of the creation of additional capacity at the same IP where an interconnection already exists;
- ▲ 20 projects related to the construction of compressor or metering stations;
- ▲ 5 projects related to new import or production development;
- ▲ 20 projects concerning upgrade, modernisation or enhancement of the system
- ▲ 3 reverse flow projects;
- ▲ 6 infrastructure projects supporting the switch from low-calorific gas to high-calorific gas in Germany, France, Netherlands and Belgium;
- ▲ 1 project concerning methanisation of new areas (Sardinia).

The following map shows the list of all projects concerning transmission and compressor (or metering) stations development. Evacuation pipelines to connect regasification terminals or storages are considered as part of [sections 6.2 or 6.3](#).

MAP FOR TRANSMISSION AND COMPRESSOR STATION PROJECTS IN TYNDP 2022

TRANSPORT BY PIPELINES (INCL. COMPRESSOR STATIONS)				
TRA-F-137	Interconnection Bulgaria - Serbia	BULGARTRANGAZ	FID	PCI
TRA-F-298	Modernization and rehabilitation of the Bulgarian GTS	BULGARTRANGAZ	FID	PCI
TRA-F-342	Enhancement of Latvia-Lithuania interconnection (Lithuania's part)	Amber Grid	FID	PCI
TRA-F-362	Devt. on the Romanian territory of Southern Transmission Corridor	TRANSAGAZ	FID	PCI
TRA-F-382	Enhancement of Latvia-Lithuania interconnection (Latvian part)	conexus	FID	PCI
TRA-F-245	North - South Gas Corridor in Eastern Poland	OPRE	FID	Non-PCI
TRA-F-329	ZEELINK	OGE Thysengas	FID	Non-PCI
TRA-F-394	Norwegian tie-in to Danish upstream system	ENERGINET	FID	Non-PCI
TRA-F-402	TENP Security of Supply	fluxys OGE	FID	Non-PCI
TRA-F-409	Larino - Chieti	SGI	FID	Non-PCI
TRA-F-500	L/H Conversion Belgium	fluxys	FID	Non-PCI
TRA-F-539	FSRU 1 Connection	SGI	FID	Non-PCI
TRA-F-755	CS Rimpar	GRGgaz OGE	FID	Non-PCI
TRA-F-814	Upgrade for IP Deutschneudorf et al. for More Capacity	ONTRAS	FID	Non-PCI
TRA-F-873	Additional import at Oude StatenZijl area	gasunie	FID	Non-PCI
TRA-F-971	Booster Compressor Station for TAP in Nea Messimvria	gasunie	FID	Non-PCI
TRA-F-1090	Metering and Regulating Station at Alexandroupoli	gasunie	FID	Non-PCI
TRA-F-1095	TENP Security of Supply plus	fluxys OGE	FID	Non-PCI
TRA-F-1115	WAL	OGE	FID	Non-PCI
TRA-F-1118	Lubmin 2 GPCM station	fluxys gasunie ONTRAS	FID	Non-PCI
TRA-F-1254	CS Elten	OGE Thysengas	FID	Non-PCI
TRA-F-1271	Compressor Station Krummhoern	OGE	FID	Non-PCI
TRA-F-1276	Upgrade of Nea Mesimvria Compressor Station	gasunie	FID	Non-PCI
TRA-F-1278	Compressor station at Ambellia	gasunie	FID	Non-PCI
TRA-A-7	Development for new import from the South (Adriatica Line)	gasunie	Advanced	PCI
TRA-A-10	Poseidon Pipeline	IGI Poseidon	Advanced	PCI
TRA-A-31	Melita TransGas Hydrogen Ready Pipeline	INTERCONNECT	Advanced	PCI
TRA-A-86	Interconnection Croatia/Slovenia (Lučko - Zabok - Jezerišće - Sotla)	plinaero	Advanced	PCI
TRA-A-128	Compressor Station Komotini (former Kipi)	gasunie	Advanced	PCI
TRA-A-330	EastMed Pipeline	IGI Poseidon	Advanced	PCI
TRA-A-1091	Metering and Regulating station at Megalopoli for East Med	gasunie	Advanced	PCI
TRA-A-1322	Devt. on Romanian territory of NTS (BG-RO-HU-AT) - Phase II	TRANSAGAZ	Advanced	PCI
TRA-A-47	Capacity from France to Germany at Obergaillbach	GRGgaz	Advanced	Non-PCI
TRA-A-63	LNG terminal northern Greece / Alexandroupolis - Pipeline Section	gastrade	Advanced	Non-PCI
TRA-A-66	Int. Croatia - Bosnia and Herzegovina (Slobodnica- Bosanski Brod)	plinaero	Advanced	Non-PCI
TRA-A-68	Ionian Adriatic Pipeline	plinaero	Advanced	Non-PCI
TRA-A-70	Interconnection Croatia/Serbia (Slobodnica-Sotin-Bačko Novo Selo)	plinaero	Advanced	Non-PCI
TRA-A-75	LNG evacuation pipeline Zlobin-Bosiljevo-Sisak-Kozarac	plinaero	Advanced	Non-PCI
TRA-A-258	Developments for Montoir LNG terminal 2.5 bcm expansion	GRGgaz	Advanced	Non-PCI
TRA-A-302	Interconnection Croatia-Bosnia and Herzegovina (South)	plinaero	Advanced	Non-PCI
TRA-A-339	Trans-Caspian	W-Stream	Advanced	Non-PCI

TRA-A-439	Stazione di Spinta "San Marco"	SGI	Advanced	Non-PCI
TRA-A-457	Medelsheim deodorisation station	GRGgaz	Advanced	Non-PCI
TRA-A-496	Increase of Gas Transport to the Netherlands	gasunie	Advanced	Non-PCI
TRA-A-505	Lucera - San Paolo	SGI	Advanced	Non-PCI
TRA-A-564	FSRU in Le Havre connection	GRGgaz	Advanced	Non-PCI
TRA-A-566	FSRU 2 Connection	gasunie	Advanced	Non-PCI
TRA-A-598	NTS developments in North-West Romania	TRANSAGAZ	Advanced	Non-PCI
TRA-A-607	Transmission Hybrid Compressor Stations	gasunie	Advanced	Non-PCI
TRA-A-628	Eastring - Slovakia	eustream	Advanced	Non-PCI
TRA-A-655	Eastring - Romania	TRANSAGAZ	Advanced	Non-PCI
TRA-A-656	Eastring - Hungary	gasunie	Advanced	Non-PCI
TRA-A-786	Capacity Expansion for the German LNG Terminals	gasunie	Advanced	Non-PCI
TRA-A-809	Realloc. H-Gas towards NL: Bunde/Oude to Zone Oude Statenzijl H	gasunie	Advanced	Non-PCI
TRA-A-851	Southern Interconnection pipeline BiH/CRO	DH-GAI	Advanced	Non-PCI
TRA-A-951	Embedding CS Folmhusen in H-Gas	gasunie	Advanced	Non-PCI
TRA-A-967	Nea-Messimvria to Evzoni/Gevgelija pipeline (IGNM) and BMS	gasunie	Advanced	Non-PCI
TRA-A-988	LNG Terminal Stade - Grid Integration	gasunie	Advanced	Non-PCI
TRA-A-1009	Czech-Polish Bidirectional Interconnection	plinaero	Advanced	Non-PCI
TRA-A-1058	LNG Evacuation Pipeline Kozarac-Slobodnica	plinaero	Advanced	Non-PCI
TRA-A-1060	NEL (Middle) compressor station	NEL fluxys gasunie	Advanced	Non-PCI
TRA-A-1109	Greifswald GPCM station	NEL fluxys gasunie	Advanced	Non-PCI
TRA-A-1114	Grid extension for LNG Wilhelmshaven	OGE	Advanced	Non-PCI
TRA-A-1141	Czech-Polish Gas Interconnection - PL section	OPRE	Advanced	Non-PCI
TRA-A-1181	Connecting pipe to LNG terminal in Latvia	conexus	Advanced	Non-PCI
TRA-A-1199	LNG Terminal Brunsbuettel - Grid Integration	gasunie	Advanced	Non-PCI
TRA-A-1268	Romania-Serbia Interconnection	TRANSAGAZ	Advanced	Non-PCI
TRA-A-1275	Zeebrugge-Opwijk	fluxys	Advanced	Non-PCI
TRA-N-94	CS Kidričevo, 2nd phase of upgrade	Plinovodi	Less-Adv.	PCI
TRA-N-377	Romanian-Hungarian reverse flow Hungarian section 2nd stage	gasunie	Less-Adv.	PCI
TRA-N-390	Upgrade of Rogatec interconnection (M1A/1 Interconn. Rogatec)	Plinovodi	Less-Adv.	PCI
TRA-N-524	Enhancement of Transm. Capacity Slovak-Hungarian interconnector	gasunie	Less-Adv.	PCI
TRA-N-1092	Metering and Regulating Station at UGS South Kavala	gasunie	Less-Adv.	PCI
TRA-N-1195	Matagiola - Massafra pipeline	gasunie	Less-Adv.	PCI
TRA-N-8	Import developments from North-East	gasunie	Less-Adv.	Non-PCI
TRA-N-92	CS Ajdovščina, 1st phase of upgrade	Plinovodi	Less-Adv.	Non-PCI
TRA-N-108	M3 pipeline reconstruction CS Ajdovščina to Šempeter/Gorizia	Plinovodi	Less-Adv.	Non-PCI
TRA-N-112	R15/1 Pince - Lendava - Kidričevo	Plinovodi	Less-Adv.	Non-PCI
TRA-N-224	Gaspipeline Brod - Zenica	DH-GAI	Less-Adv.	Non-PCI
TRA-N-303	Interconnection Croatia-Bosnia and Herzegovina (west)	plinaero	Less-Adv.	Non-PCI
TRA-N-325	Slovenian-Hungarian interconnector (HU hydrogen corridor III)	gasunie	Less-Adv.	Non-PCI
TRA-N-389	Upgrade of Murfeld/Ceršak interconn. (M1/3 Interconn. Ceršak)	Plinovodi	Less-Adv.	Non-PCI
TRA-N-570	Expansion Compressor Station Rehden	gasunie	Less-Adv.	Non-PCI

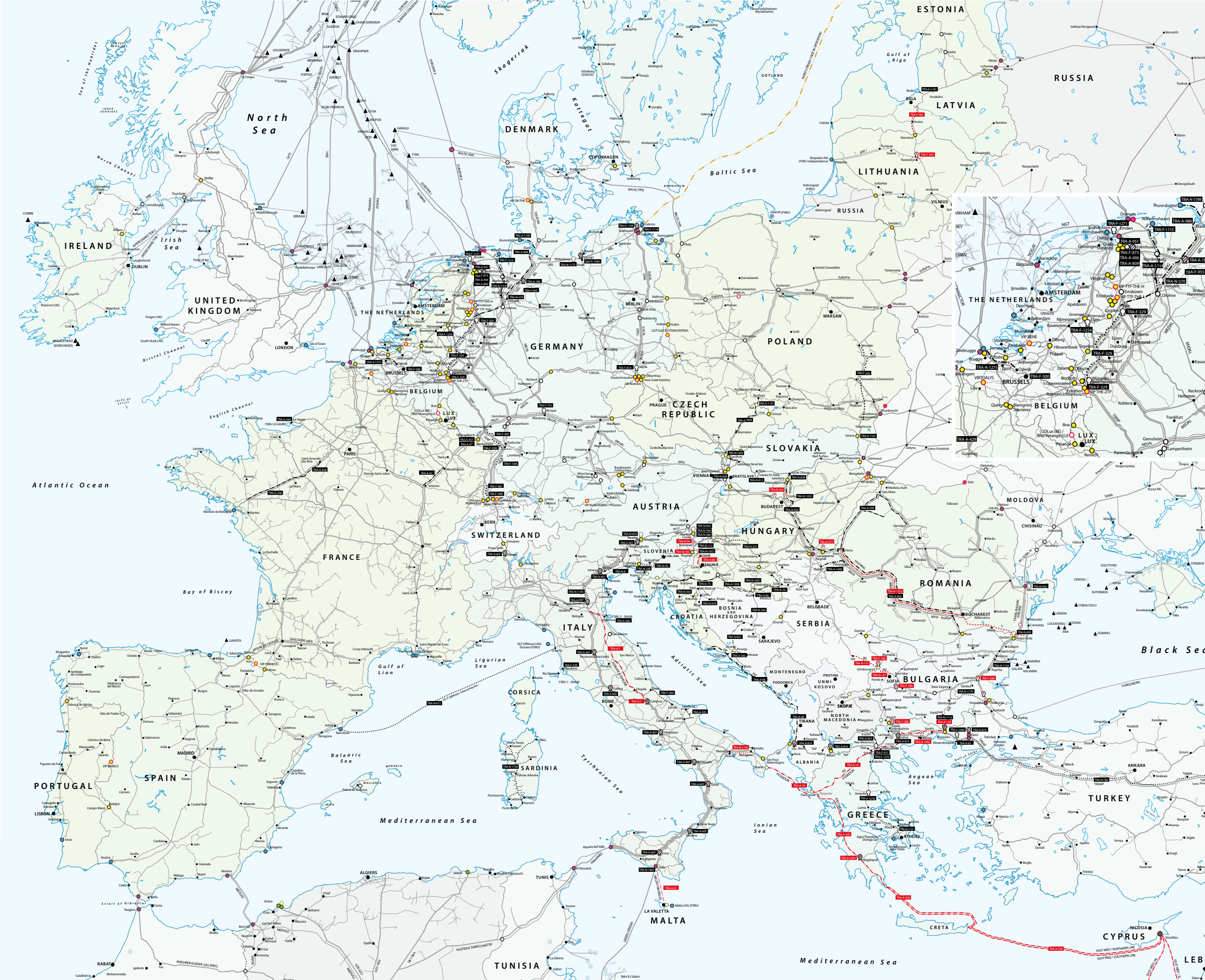
TRA-N-600	Czech-Austrian Interconnection (AT)	GAS CONNECT AUSTRIA	Less-Adv.	Non-PCI
TRA-N-602	Upgrading GMS Isaccea 2 and GMS Negru Voda 2	TRANSAGAZ	Less-Adv.	Non-PCI
TRA-N-612	ES-IT Offshore-Interconnector	gasunie	Less-Adv.	Non-PCI
TRA-N-766	Entry Murfeld	GAS CONNECT AUSTRIA	Less-Adv.	Non-PCI
TRA-N-782	TANAP X - Expansion Trans Anatolian Natural Gas Pipeline Project	SOCAR	Less-Adv.	Non-PCI
TRA-N-810	TAP Expansion	Trans Adriatic Pipeline	Less-Adv.	Non-PCI
TRA-N-910	West Interconnection BiH/CRO	DH-GAI	Less-Adv.	Non-PCI
TRA-N-913	Modification NP23 MW turboset to H2-ready low-emissions at CS04	eustream	Less-Adv.	Non-PCI
TRA-N-954	TAG Reverse Flow	TA Trans Adriatic Gas	Less-Adv.	Non-PCI
TRA-N-955	GUD: Complete conversion to H-gas (North-West Germany)	gasunie	Less-Adv.	Non-PCI
TRA-N-1057	Compressor stations 2 and 3 at Croatian gas transmission system	plinaero	Less-Adv.	Non-PCI
TRA-N-1059	Czech-Austrian Interconnection (CZ)	gasunie	Less-Adv.	Non-PCI
TRA-N-1063	Export to Malta	gasunie	Less-Adv.	Non-PCI
TRA-N-1112	Upgrade of Compressor Station at Komotini	gasunie	Less-Adv.	Non-PCI
TRA-N-1124	Capacity increase Bulgaria to Romania (Rupcha-Vetrino Looping)	BULGARTRANGAZ	Less-Adv.	Non-PCI
TRA-N-1131	Reinforcement of NNGTS-South section	gasunie	Less-Adv.	Non-PCI
TRA-N-1138	South Caucasus Pipeline Future Expansion (SCPFEX)	SOCAR	Less-Adv.	Non-PCI
TRA-N-1140	Technical capacity increase gas transm. GR to BG and BG to NM	BULGARTRANGAZ	Less-Adv.	Non-PCI
TRA-N-1143	Capacity intensification of the Poland – Slovak Interconnector	eustream	Less-Adv.	Non-PCI
TRA-N-1145	Export enhancements	gasunie	Less-Adv.	Non-PCI
TRA-N-1170	Maritsa East hydrogen ready pipeline	BULGARTRANGAZ	Less-Adv.	Non-PCI
TRA-N-1175	NEL Compressor Station Wittenburg	gasunie fluxys NEL	Less-Adv.	Non-PCI
TRA-N-1194	Sardinia Methanization	Enura	Less-Adv.	Non-PCI
TRA-N-1235	Firm transmission capacity increase at the IP Velké Zlieve	eustream	Less-Adv.	Non-PCI

Figure 8: Map for transmission and compressor station projects in TYNDP 2022

Download the map from [ENTSOG website](#):

Just click on the icon.





6.2 RECEPTION AND STORAGE AND REGASIFICATION OR DECOMPRESSION FACILITIES FOR LIQUIFIED NATURAL GAS OR COMPRESSED NATURAL GAS (LNG)

For TYNDP 2022 promoters submitted 20 projects related to LNG terminals. For five of these projects the respective evacuation pipeline projects connecting the terminal to the gas grid were submitted by different promoters. In case of LNG-Terminal Rostock (LNG-N-413 and LNG-N-1196) the project is only focusing on the connecting pipes.

MAP FOR LNG REGASIFICATION TERMINALS (including evacuation pipelines)























LNG IMPORT TERMINALS				
LNG-F-50	Gate terminal phase 3		FID	Non-PCI
LNG-F-178	Musel LNG terminal		FID	Non-PCI
LNG-F-272	Upgrade of LNG terminal in Świnoujście		FID	Non-PCI
LNG-F-1117	Zeebrugge LNG Terminal - Additional regasification capacity		FID	Non-PCI
LNG-F-1134	FSRU 1 - SNAM		FID	Non-PCI
LNG-A-947	FSRU Polish Baltic Sea Coast		Advanced	PCI
LNG-A-1146	Cyprus LNG Import Terminal (CyprusGas2EU)		Advanced	PCI
LNG-A-62	LNG terminal in northern Greece / Alexandroupolis - LNG Section		Advanced	Non-PCI
LNG-A-225	Montoir LNG Terminal Expansion		Advanced	Non-PCI
LNG-A-227	Fos Cavaou LNG Terminal Expansion		Advanced	Non-PCI
LNG-A-304	Italy-Sardinia Virtual Pipeline		Advanced	Non-PCI
LNG-A-559	Hanseatic Energy Hub (Stade)		Advanced	Non-PCI
LNG-A-610	Extension of the LNG Terminal Krk 1st phase		Advanced	Non-PCI
LNG-A-792	Gate terminal phase 4		Advanced	Non-PCI
LNG-A-912	Skulte LNG		Advanced	Non-PCI
LNG-A-1005	Thrace LNG Terminal		Advanced	Non-PCI
LNG-A-1123	Expansion of Revithoussa LNG Terminal via installation of FSU		Advanced	Non-PCI
LNG-A-1142	FSRU 2 - SNAM		Advanced	Non-PCI
LNG-A-1198	LNG Terminal Brunsbüttel		Advanced	Non-PCI
LNG-N-413	Grid Connection LNG Terminal Rostock		Less-Adv.	Non-PCI
LNG-N-815	LNG terminal Krk 2nd phase		Less-Adv.	Non-PCI
LNG-N-1196	Tie-In LNG Rostock		Less-Adv.	Non-PCI

Figure 9: Map for LNG reagsification terminals (including evacuation pipelines)

Download the map from ENTSG website:

Just click on the icon.



KEYS

Cross-border points / intra-country or intra balancing zone points

Cross-border interconnection point within Europe or export point to non-EU country

Cross-border interconnection point with third country (import)

Cross-border third country (import) Under construction or Planned

Intra-country or intra balancing zone points

Third country cross-border interconnection point

Virtual point

Gas Reserve areas

Drilling platform

Gas field

Countries

EU Countries

Other Countries

Transport by pipeline

Existing infrastructure:

Diameter < 600 mm

Diameter 600 - 900 mm

Diameter > 900mm

Not operational

Project categories:

FID projects

Non-FID, advanced projects

Non-FID, less-advanced projects

Project is part of 5th PCI list:

FID projects

Non-FID, advanced projects

Non-FID, less-advanced projects

Project identification:

ENTSO-G project code

LNG Terminals and Plants

LNG Terminals' entry point into transmission system Operational

LNG Plants' export point

Project categories:

FID projects

Non-FID, advanced projects

Non-FID, less-advanced projects

Project is part of 5th PCI list:

FID projects

Non-FID, advanced projects

Non-FID, advanced export projects

Non-FID, less-advanced projects

Project identification:

ENTSO-G project code

Storage facilities

Acquifer

Salt cavity - cavern

Depleted (Gas) field on shore / offshore

Other type

Unknown

Project categories:

FID projects

Non-FID, advanced projects

Non-FID, less-advanced projects

Project is part of 5th PCI list:

FID projects

Non-FID, advanced projects

Non-FID, less-advanced projects

Project identification:

ENTSO-G project code

Compressor stations

Project categories:

FID projects

Non-FID, advanced projects

Non-FID, less-advanced projects

Project is part of 5th PCI list:

FID projects

Non-FID, advanced projects

Non-FID, less-advanced projects

Project identification:

ENTSO-G project code

TRA-F-137

Interconnection Bulgaria - Serbia

BULGARTRANS-GAS

FID

PCI

Project ENTSG code

Project Name

Project Promoter

Project status codes

Project not marked on map

Exact project location is not available or is marked as confidential

Exact project locations not marked on map

Project has several locations/points. The indicated location is for representation purposes only and does not indicate the exact location of the project

Project ENTSG codes / color:

TRA-N-000

Project is part of 5th PCI list

TRA-N-000

Project is not part of 5th PCI list

Project status codes:

The project advancement status is based on project collection conducted in Oct-Nov 2021 and/or June 2022.

PCI

Non-PCI

FID

Advanced

Less-Adv.

PCI status (Project of Common Interest)

FID status (Final Investment Decision)

Advanced status is applied to all projects that, based on the information submitted, have:

- commissioning year expected at the latest by 31st December of the year of the TYNDP project data collection + 6 (e.g. 2028 in case of TYNDP 2022, for which projects are collected in 2022)

- and whose permitting phase has started ahead of the TYNDP project data collection - OR - FEED has started (or the project has been selected for receiving CEF grants for FEED ahead of the TYNDP project data collection)

ENTSO-G currently comprises 43 TSO members,
2 Associated Partners from 27 European Countries and 10 Observers

When the same point is affected by several projects, the point is shown with the highest project status (operational, FID, advanced, non-FID), the status from single projects can vary from that.
The projects are shown with the planning status reported in their TYNDP 2022 submission.
All data provided on this map is for information purposes and shall be treated as indicative and non-contractual in nature, without pre-empting different outcomes of any possible discussion held at regional level. Under no circumstances shall it be regarded as information intended for commercial use.

Version : March 2023
WGS 84 / Pseudo-Mercator projection

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6.3 UNDERGROUND STORAGE FACILITY (UGS)

For TYNDP 2022 promoters submitted 12 projects related to gas storage facilities (UGS).

MAP FOR GAS STORAGE PROJECTS IN TYNDP 2022














UNDERGROUND GAS STORAGE FACILITIES				
UGS-F-311	Bilciuresti daily withdrawal capacity increase		FID	PCI
UGS-F-374	Enhancement of Incukalns UGS		FID	PCI
UGS-F-260	System Enhancements - Stogit - on-shore gas fields		FID	Non-PCI
UGS-F-347	Underground gas storage Grubisno Polje		FID	Non-PCI
UGS-F-398	Ghercesti underground gas storage in Romania		FID	Non-PCI
UGS-A-138	UGS Chiren Expansion		Advanced	PCI
UGS-A-233	Depomures		Advanced	PCI
UGS-A-356	Underground Gas Storage Velke Kapusany		Advanced	Non-PCI
UGS-A-371	Sarmasel underground gas storage in Romania		Advanced	Non-PCI
UGS-N-385	South Kavala Underground Gas Storage facility		Less-Adv.	PCI
UGS-N-399	Falticeni UGS		Less-Adv.	Non-PCI
UGS-N-606	Modernization of natural gas storage infrastr. - Balaceanca UGS		Less-Adv.	Non-PCI
UGS-N-1182	Alfonsine UGS Enhancement		Less-Adv.	Non-PCI

Figure 10: Map for gas storage projects in TYNDP 2022

Download the map from ENTSGO website:

Just click on the icon.



KEYS

Cross-border points / intra-country or intra balancing zone points

Cross-border interconnection point within Europe or export point to non-EU country

Cross-border interconnection point with third country (import)

Intra-country or intra balancing zone points

Virtual point

Cross-border interconnection point within Europe or export point to non-EU country Under construction or Planned

Cross-border third country (import) Under construction or Planned

Third country cross-border interconnection point

Gas Reserve areas

Drilling platform

Gas field

Countries

EU Countries

Other Countries

Transport by pipeline

Existing infrastructure:

Diameter < 600 mm

Diameter 600 - 900 mm

Diameter > 900mm

Not operational

Project categories:

FID projects

Non-FID, advanced projects

Non-FID, less-advanced projects

Project is part of 5th PCI list:

FID projects

Non-FID, advanced projects

Non-FID, advanced export projects

Non-FID, less-advanced projects

Project identification:

ENTSO-G project code

LNG Terminals and Plants

LNG Terminals' entry point into transmission system Operational

LNG Plants' export point

Project categories:

FID projects

Non-FID, advanced projects

Non-FID, less-advanced projects

Project is part of 5th PCI list:

FID projects

Non-FID, advanced projects

Non-FID, advanced export projects

Non-FID, less-advanced projects

Project identification:

ENTSO-G project code

Storage facilities

Acquifer

Salt cavity - cavern

Depleted (Gas) field on shore / offshore

Other type

Unknown

Project categories:

FID projects

Non-FID, advanced projects

Non-FID, less-advanced projects

Project is part of 5th PCI list:

FID projects

Non-FID, advanced projects

Non-FID, less-advanced projects

Project identification:

ENTSO-G project code

Compressor stations

Project categories:

FID projects

Non-FID, advanced projects

Non-FID, less-advanced projects

Project is part of 5th PCI list:

FID projects

Non-FID, advanced projects

Non-FID, less-advanced projects

Project identification:

ENTSO-G project code

TRA-F-137

Interconnection Bulgaria - Serbia

BULGARTRANS-GAS

FID

PCI

Project ENSO-G code

Project Name

Project Promoter

Project status codes

Project not marked on map

Exact project location is not available or is marked as confidential

Exact project locations not marked on map

Project has several locations/points. The indicated location is for representation purposes only and does not indicate the exact location of the project

Project status codes:

The project advancement status is based on project collection conducted in Oct-Nov 2021 and/or June 2022.

PCI

Non-PCI

FID

Advanced

Less-Adv.

PCI status (Project of Common Interest)

FID status (Final Investment Decision)

Advanced status is applied to all projects that, based on the information submitted, have:

- commissioning year expected at the latest by 31st December of the year of the TYNDP project data collection + 6 (e.g. 2028 in case of TYNDP 2022, for which projects are collected in 2022)

- and whose permitting phase has started ahead of the TYNDP project data collection - OR - FEED has started (or the project has been selected for receiving CEF grants for FEED ahead of the TYNDP project data collection)

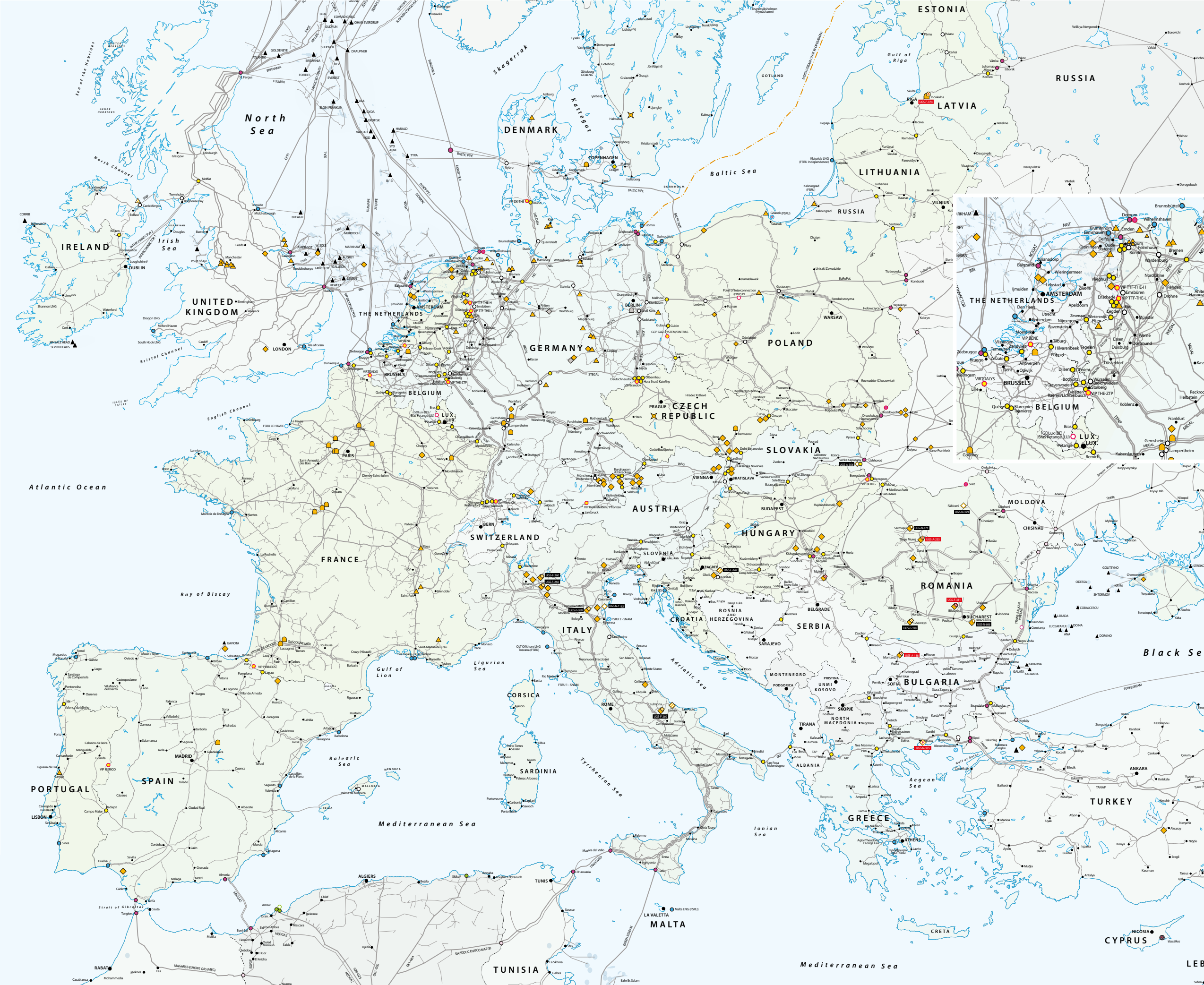
ENTSO-G currently comprises 43 TSO members,
2 Associated Partners from 27 European Countries and 10 Observers

When the same point is affected by several projects, the point is shown with the highest project status (operational, FID, advanced, non-FID), the status from single projects can vary from that.

The projects are shown with the planning status reported in their TYNDP 2022 submission.

All data provided on this map is for information purposes and shall be treated as indicative and non-contractual in nature, without pre-empting different outcomes of any possible discussion held at regional level. Under no circumstances shall it be regarded as information intended for commercial use.

Version : March 2023
WGS 84 / Pseudo-Mercator projection



6.4 FURTHER DETAILS ON THE TYNDP 2022 PROMOTERS' SUBMISSIONS FOR NATURAL GAS PROJECTS

This chapter provides more details on the investments submitted to TYNDP 2022 aiming to transport, receive or storage natural gas.

In order to provide more detailed and transparent information, all the statistics described in the following sections consider:

- ▲ Individual investments submitted by different promoter not aggregated as described in → [section 6](#) but considered as many projects as promoters submitting the investment. To each of these investments an individual TYNDP code is assigned. For example, for an interconnector between two countries two separate investments are considered. The same approach is applied for LNG terminals (or UGS projects) and the evacuation pipeline(s) needed to connect the terminal (or the storage) to the gas grid;
- ▲ For projects developed in different phases, each phase as an individual investment and the whole project as multiple projects;
- ▲ Some promoters have submitted individual facilities as separate investments (e.g. compressor station and pipe as individual project submissions) whereas others have joined together a number of investment in one project (e.g. compressor station and pipe under a single project submission).

Therefore, the high level of investments should be considered in the context of the above considerations.

143 Investments aim to transport, store or receive natural gas, also in liquid form.

Figure 11 provides the overview for this submission, compared to the previous TYNDP editions, emphasising the comparison for natural gas submissions (NG).



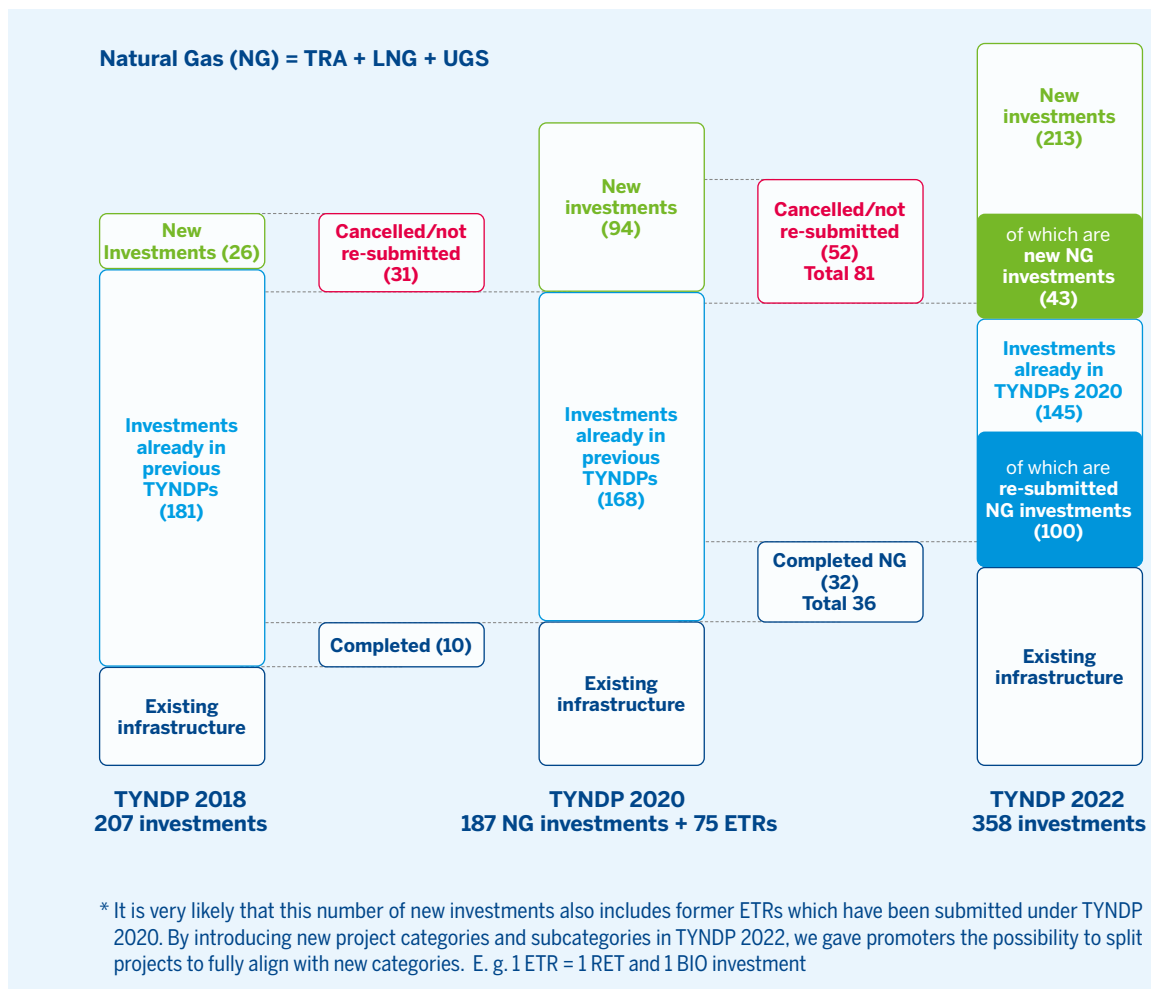


Figure 11: Comparison between TYNDP 2018, TYNDP 2020 and TYNDP 2022 – Natural Gas

From the graph the following conclusions can be drawn:

- Due to the completion of 32 investments since TYNDP 2020 and to the investments with commissioning years 2023, the European infrastructure is reinforced and has shown the resilience in the energy crisis following Russian invasion in Ukraine;
- The total number of natural gas investments are declining, showing that the European gas infrastructure is well advanced. In particular during the second project collection, new investments have been submitted with the objective to mitigate internal bottlenecks (change in flow directions) and bring additional LNG to Europe to ensure security of supply also in phases of high demand following the decrease of Russian supply;
- As further elaborated in the assessment chapters, the aggregated number of existing and planned infrastructures in TYNDP 2022 confirms that more infrastructure development is needed in some specific areas to strengthen the security of supply and to improve diversification.

6.4.1 OVERVIEW PER TYPE AND STATUS

From the total of 358 Investments included in TYNDP 2022, 143 natural gas Investments have been submitted for the categories TRA, LNG and UGS (40 %).

Compared to 187 Investments in these three categories in TYNDP 2020 it can be observed for this TYNDP 2022 edition that there is a reduction to 143 investments. This reduction is relevant for all three categories TRA, LNG and UGS. The reduction stems from:

- ▲ The application of the ENTSG PID that sets clear administrative and technical criteria to be matched by promoters and projects in order to be considered eligible for inclusion in the TYNDP;
- ▲ Completed projects have in the meantime further contributed to the reduction of the infrastructure gaps;
- ▲ Development and inclusion of hydrogen becomes more and more important.

The following figures and tables provide a statistical overview of promoters' submissions (see TYNDP Annex A for further details) based on information such as the type of infrastructure or the FID/PCI status. The Annex A reports reflect all the details entered as part of the data collection process by project promoters.

Figure 12 presents an overview of all the investments accepted for inclusion in TYNDP 2022 per type of infrastructure for natural gas.

Investments by infrastructure type

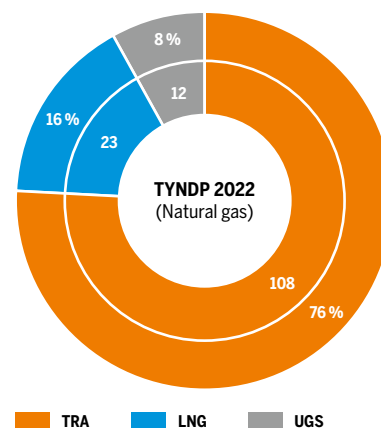


Figure 12: Investment inclusion in TYNDP 2022 by type of infrastructure – Natural Gas. The inner circle represents absolute numbers of investments; the outer circle represents the share of each project type.

Figure 13 shows the breakdown of TYNDP 2022 natural gas projects by project maturity status.

Natural gas investments by status

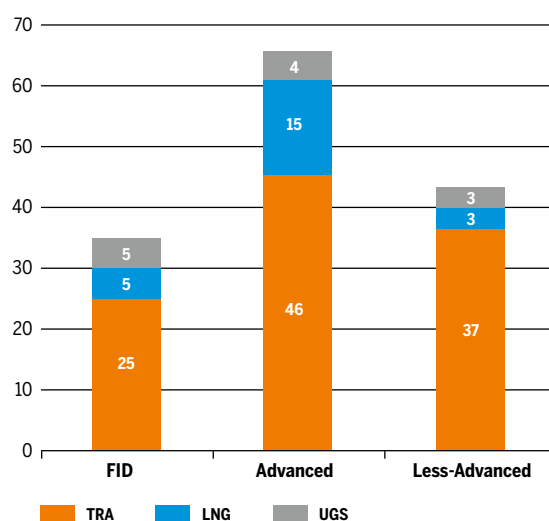


Figure 13: Promoters submission for natural gas by maturity status

Due to the information collected, it has been possible to identify investments submitted for TYNDP 2020 that were not active anymore but for which promoters had missed to previously report the information to ENTSG or that were deleted or not resubmitted.

Status	TRA	LNG	UGS
Completed	31	1	0
Still planned	78	12	10
Cancelled	12	0	1
Not resubmitted	29	9	1
New projects	30	11	2

Table 2: Number of investments for natural gas from TYNDP 2020 completed, still planned, not-resubmitted and cancelled

Regarding transmission investments an overall reduction of number of investments can be seen, 31 have been completed since TYNDP 2020, while 41 investments have been cancelled or not resubmitted and 30 new TRA investments have been submitted.

Considering LNG projects, 1 LNG terminal related investment (LNG terminal Krk 1st phase) has been commissioned since TYNDP 2020 while nine investments were not resubmitted. However, eleven new LNG investments were newly submitted. Most of this new LNG investments have been submitted in the second project collection phase. The need

for additional import possibilities has been mainly driven by security of supply issues after the Russian invasion of Ukraine and the aim of EU Member States to reduce Russian supply dependency.

Among the UGS submissions evolution from TYNDP 2020 to TYNDP 2022, two TYNDP 2020 investments have been cancelled or not been resubmitted while two new investments in TYNDP 2022 are planned. The new UGS projects are an enhancement project in Italy (UGS-N-1182) and a storage modernisation in Romania (UGS-N-606). Ten Investments were resubmitted and thus the amount of UGS submissions is very stable. The UGS project South Kavala has been resubmitted but under the project category HYD with the objective to store pure hydrogen in the future (HYD-N-385).

The next table provides an overview of all cancelled projects. It should be noted that project TRA-A-283 "3rd IP between Portugal and Spain (pipeline Celorico-Spanish border)" submitted by Portuguese TSO Ren and Project UGS-N-914 'UGS Damasławek' submitted by Polish TSO GAZ-SYSTEM have been cancelled for natural gas but have been re-introduced to TYNDP 2022 as new projects aiming to transport or storage direct from the commissioning pure hydrogen (HYD-N-1156 & HYD-N-981):

Project code	Project name	Status
TRA-N-9	Additional Southern developments	Cancelled
LNG-A-32	Project GO4LNG LNG terminal Gothenburg	Cancelled
TRA-A-273	Poland - Czech Republic Gas Interconnection (PL section)	Cancelled
TRA-A-283	3 rd IP between Portugal and Spain (pipeline Celorico-Spanish border)	Cancelled
TRA-A-320	Carregado Compressor Station	Cancelled
TRA-N-354	Interconnection with Slovenia	Cancelled
TRA-N-596	Interconnection between the RO and the UA gas transmission systems	Cancelled
TRA-A-621	Poland - Ukraine Gas Interconnection (PL section)*	Cancelled
UGS-N-914	UGS Damasławek	Cancelled
TRA-F-937	Nord Stream 2	Cancelled
TRA-N-1202	GCP GAZ-SYSTEM/ONTRAS – incremental capacity project	Cancelled
TRA-F-1241	Interconnection with production in Gela	Cancelled
TRA-N-1246	Greece-Italy interconnection	Cancelled
TRA-N-1227	Gorizia plant upgrade	Cancelled

*The extension of capacities at Poland-Ukraine interconnection is now considered as part of TRA-F-245 - North-South Gas Corridor in Eastern Poland.

Table 3: Cancelled Investments for natural gas from TYNDP 2020



In order to be able to make a comparison at the maturity level between the TYNDP 2020 and the TYNDP 2022 submission, the graph below shows for TYNDP 2020 the project status only for the natural gas projects i.e. transmission, LNG and UGS.

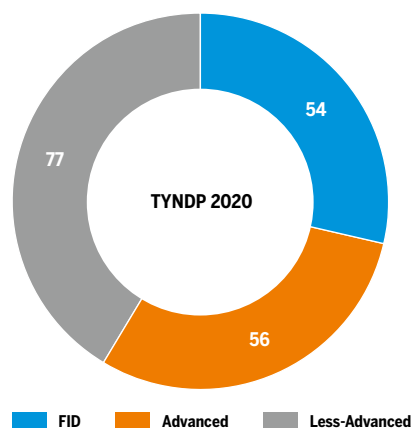
For this TYNDP a majority of TRA, LNG and UGS projects is in the advanced status. In the previous TYNDP 2020 the highest number of projects were recorded in status “less advanced”. For status FID a reduction can be seen, which can be interpreted by the high number of commissioned projects.

More in details, of the 35 FID natural gas initiatives in TYNDP 2022

- 15 were already FID in TYNDP 2020
- 9 with Advanced status in TYNDP 2020 took the FID
- 6 with Less-Advanced status in TYNDP 2020 took the FID
- 5 were not submitted for TYNDP 2022

Submissions with the Less-Advanced status show a decrease based on one hand of project maturity progress as some projects reached the advanced or even the FID status and on the other hand the decrease is reported because many projects with this maturity status have not been resubmitted for TYNDP 2022.

Projects by status – TRA/LNG/UGS projects only



Projects by status – TRA/LNG/UGS projects only

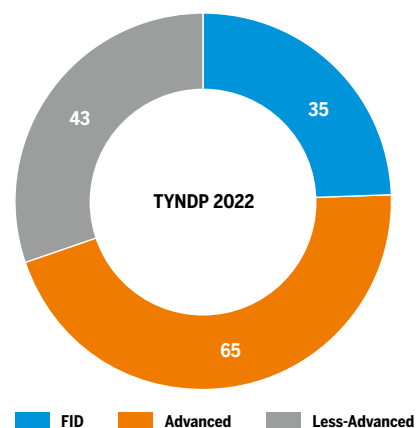


Figure 14: Comparison of submissions in TYNDP 2022 and TYNDP 2020 per status.



Picture courtesy of TAP

6.4.2 OVERVIEW OF PROMOTERS' INVESTMENTS PER GEOGRAPHICAL LOCATION

The following charts provide a summary of promoters' submissions based on their geographical location, infrastructure type and maturity status for investments in the area of natural gas categories.

For this TYNDP edition, 143 initiatives falling under the categories TRA, LNG and UGS were submitted concerning 24 countries, of which 4 countries¹³ not being part of the EU.

Some of these countries are part of the Energy Community¹⁴ (as contracting parties or observers).

Non-EU projects can in fact be submitted to TYNDP in the below cases:

- ▲ Projects at least partially located in one of the TYNDP geographical perimeter countries;
- ▲ Supply chain projects bringing additional gas sources to EU border;
- ▲ Projects whose promoter is an ENTSOG Observer;

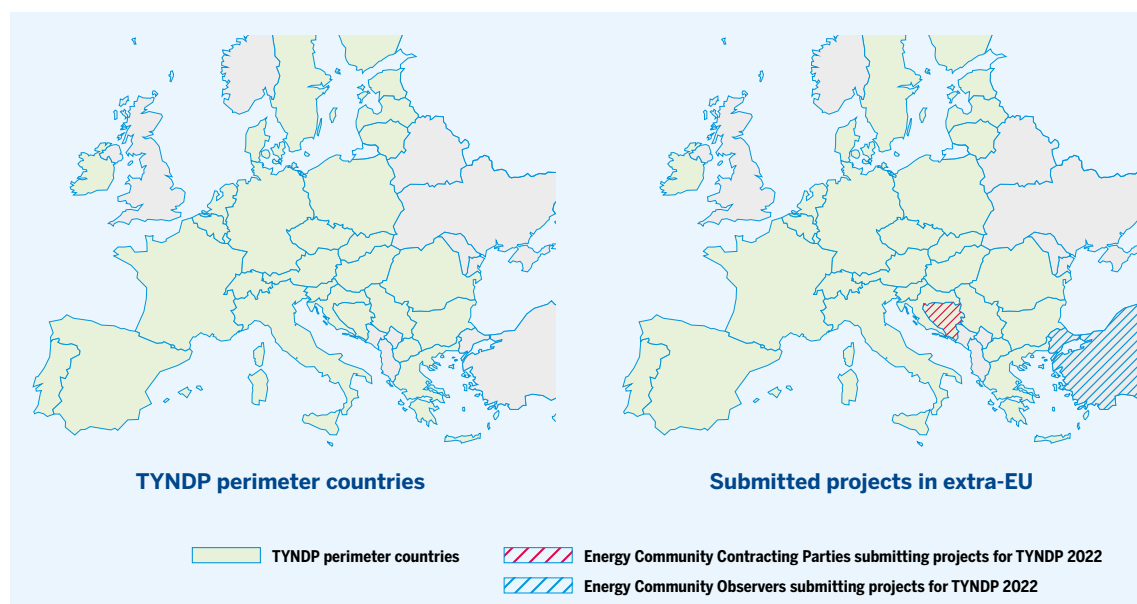


Figure 15: TYNDP perimeter countries and countries outside European Union for which initiatives were submitted in TYNDP 2022

¹³ Azerbaijan, Bosnia Herzegovina, Turkey, and Turkmenistan.

¹⁴ The Energy Community is an international organisation which brings together the European Union and its neighbours to create an integrated pan-European energy market (<https://www.energy-community.org/>)

However, only six submissions (4 %) of the 143 submissions actually refer to non-EU Member States. Most of the submitted investments remain focused in the EU countries.

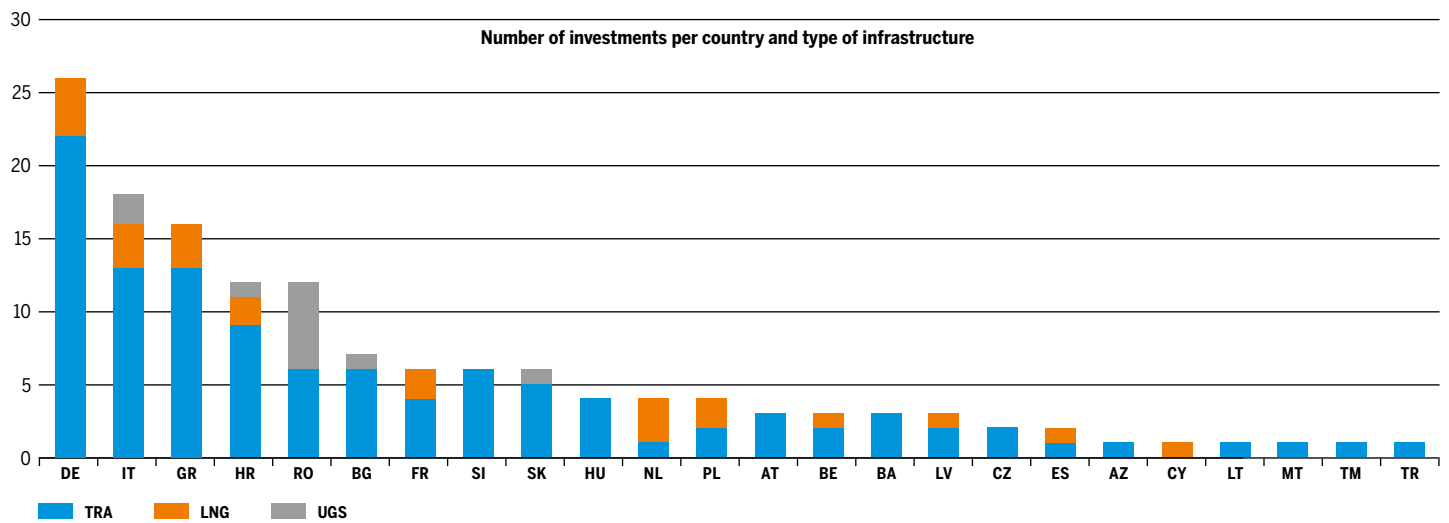


Figure 16: Number of investments per country and type of infrastructure

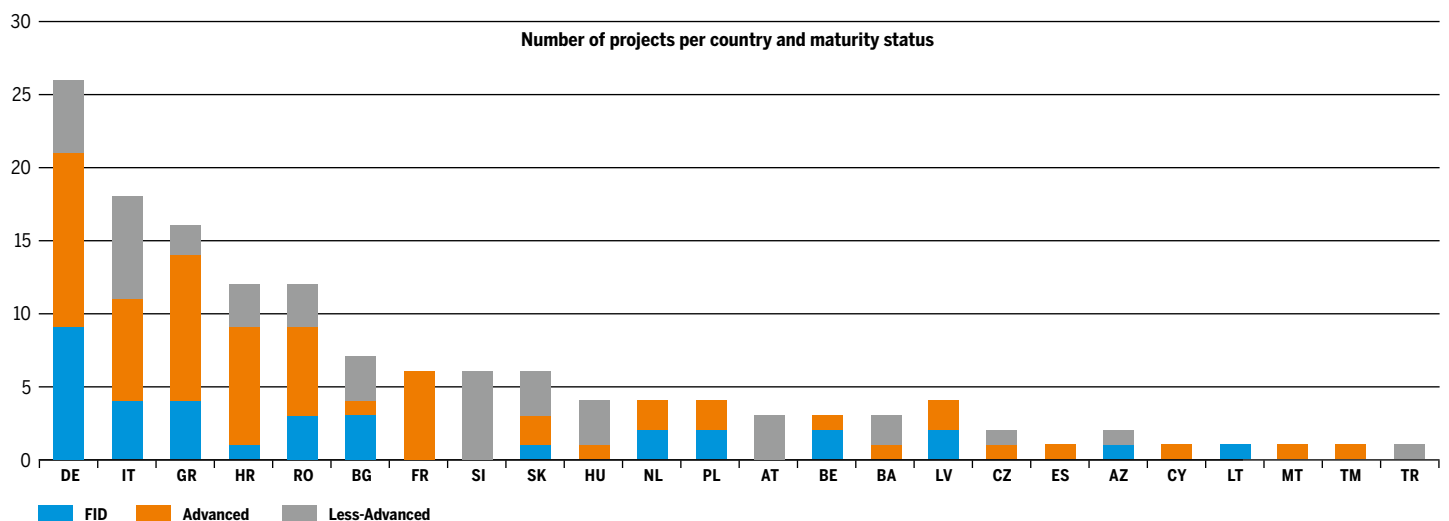


Figure 17: Number of investments per country and maturity status

It should also be noted that the high number of submissions is in the context that in some countries, TSOs are required to ensure some consistency between projects included in the National Development Plans and projects included in the ENTSG TYNDP.

6.4.3 ANALYSIS OF PROJECTS SCHEDULE

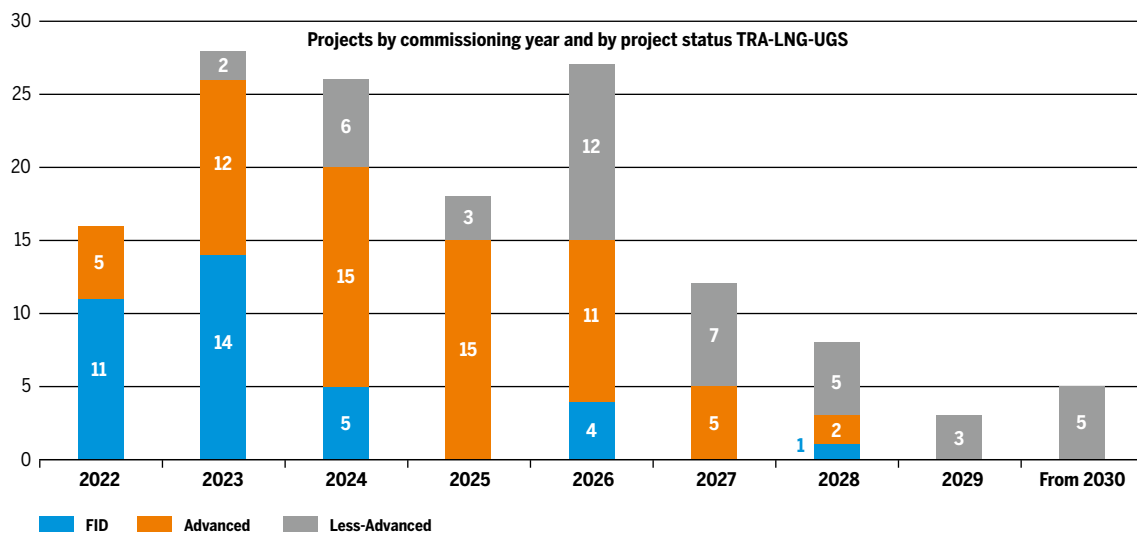


Figure 18: Investments by commissioning year and by project status

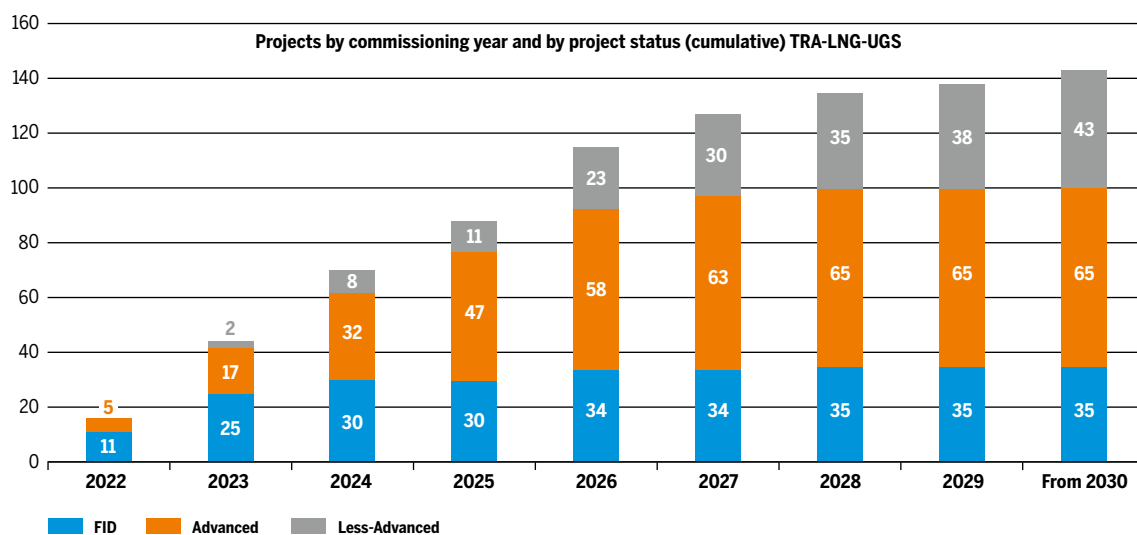


Figure 19: Investments by commissioning year (cumulative) and by infrastructure level

Figures 18 and 19 show the distribution of projects included in TYNDP according to the expected (first) commissioning year, also in an aggregated way.

Around 62 % of the submitted initiatives are expected to be commissioned not later than 2025 for a

total of 88 investments out of the 143 submitted. Among these, 77 investments are well underway, presenting FID or Advanced status.

Most of the ones having FID or Advanced status are expected to be commissioned in the next five years.

Feasibility, FEED, Permitting, FID, Construction and Commissioning

As part of the project collection, promoters have to provide information (except for some specific situations) about the projects' schedules of the main project phases and milestones (Feasibility, FEED, Permitting, FID, Construction and Commissioning). ENTSO-G has analysed these data with the purpose

to have an overview on the average duration for each project phase and the average completion date for the main milestones.

In case of the Feasibility Study phase, the start and end dates, either past or expected, have been provided for 107 investments.

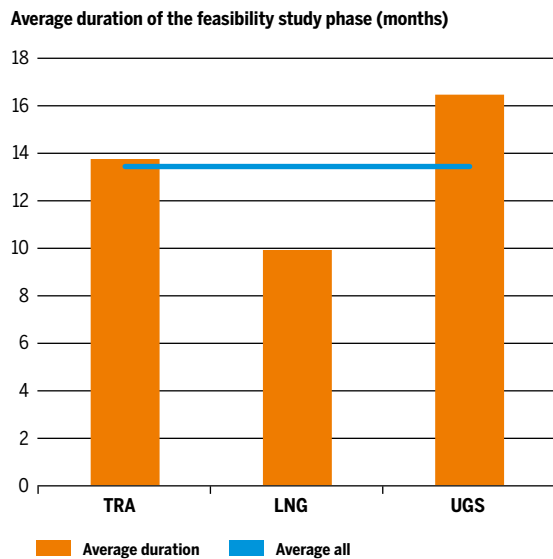


Figure 20: Average duration of the feasibility study phase per type of infrastructure

The **average duration** of the Feasibility Study phase for these projects is 13.6 months, with the highest average duration in case of UGS projects (16.5 months) and lowest duration in case of LNG projects (10 months), see figure 20.

85 investments have conducted their feasibility study before the end of the project collection for TYNDP 2022. The remaining 22 investments indicated the end of the feasibility study after the end of the project collection with the latest date in May 2026.

Regarding the **FEED phase**, the start and end dates, either past or expected, have been provided for 102 investments. The average duration of the FEED phase for these projects is 20 months, with the highest average duration in case of TRA projects (21 months) and the lowest average duration in case of LNG projects (13.3 months). UGS investments have an average duration of 19 months, see figure 21.

52 investments have concluded their FEED phase before the end of the project collection for TYNDP 2022. The 50 investments indicated the end of FEED after the end of the project collection with the latest date in May 2027.

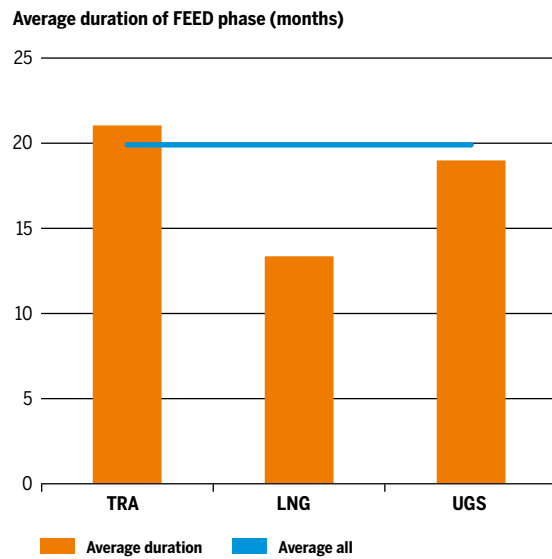


Figure 21: Average duration of the FEED phase per type of infrastructure (TRA–LNG–UGS)

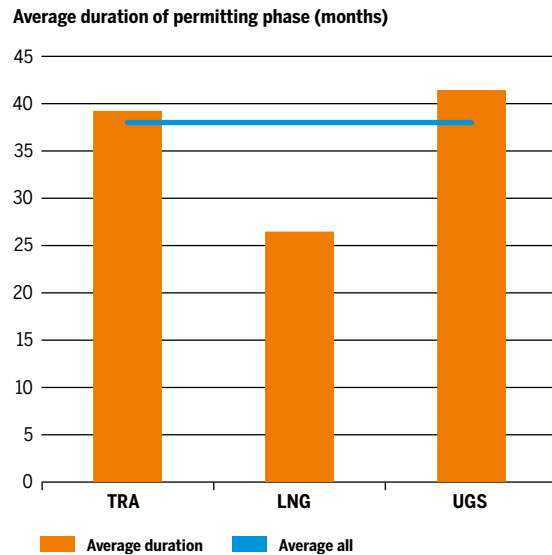


Figure 22: Average duration of the Permitting phase per type of infrastructure (TRA–LNG–UGS)

In case of the **Permitting phase**, the start and end dates, either past or expected, have been provided for 97 investments. The average duration of the Permitting phase for these projects is 38 months, with the highest average duration in case of UGS projects (41 months) and the lowest average duration in case of LNG projects (26.5 months). TRA projects have an average duration of 39 months, see figure 22.

51 investments have completed the permitting phase before the end of the project collection for TYNDP 2022. The 46 investments indicated the end of the Permitting phase after the end of the project collection with the latest date in June 2027.

FID date for TRA–LNG–UGS projects included in TYNDP 2022

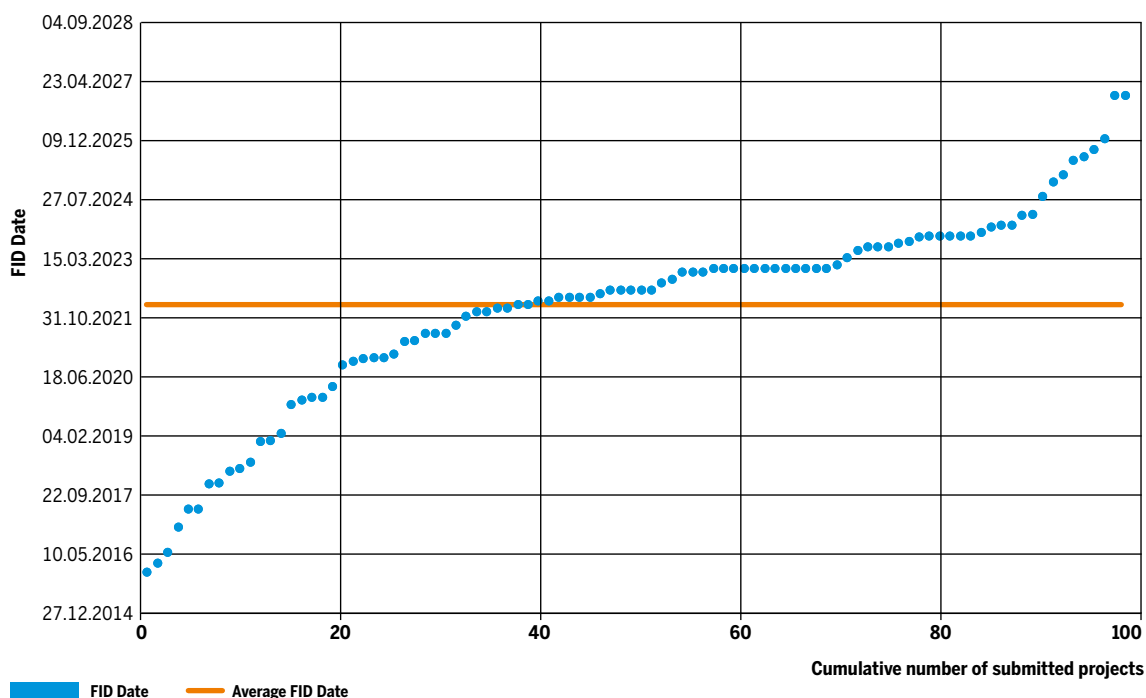


Figure 23: Distribution of projects per FID date TRA–LNG–UGS

The **FID date**, either past or expected, has been provided for 97 investments. The graph below shows the distribution of projects per FID date. The average FID date is 04/03/2022 (see figure 23).

Regarding the **Construction phase**, the start and end dates, either past or expected, have been provided for 111 investments. The average duration of the Construction phase for these projects is 30 months, with the highest average duration in case of UGS projects (43.5 months) and the lowest average duration in case of LNG projects (28 months). TRA projects have an average duration of 29 months (see figure 24).

35 Investments have started their construction prior the end of the project collection for TYNDP 2022. From this two have already completed the construction. The remaining 76 investment have foreseen the start of the construction after the end of the project collection with the latest end date in December 2029.

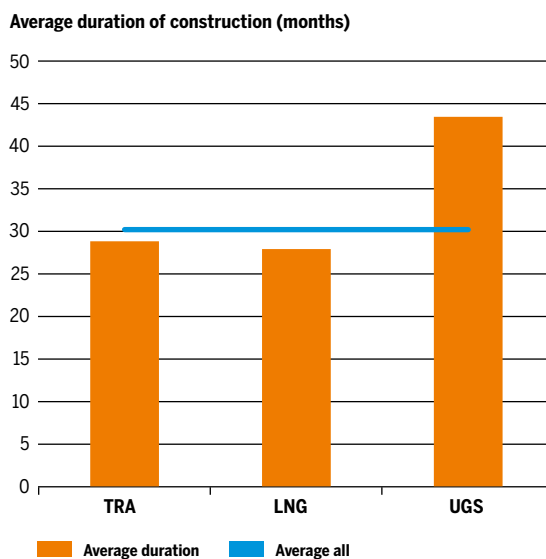


Figure 24: Average duration of the construction phase per type of infrastructure

Commissioning ends for TRA-LNG-UGS projects included in TYNDP 2022

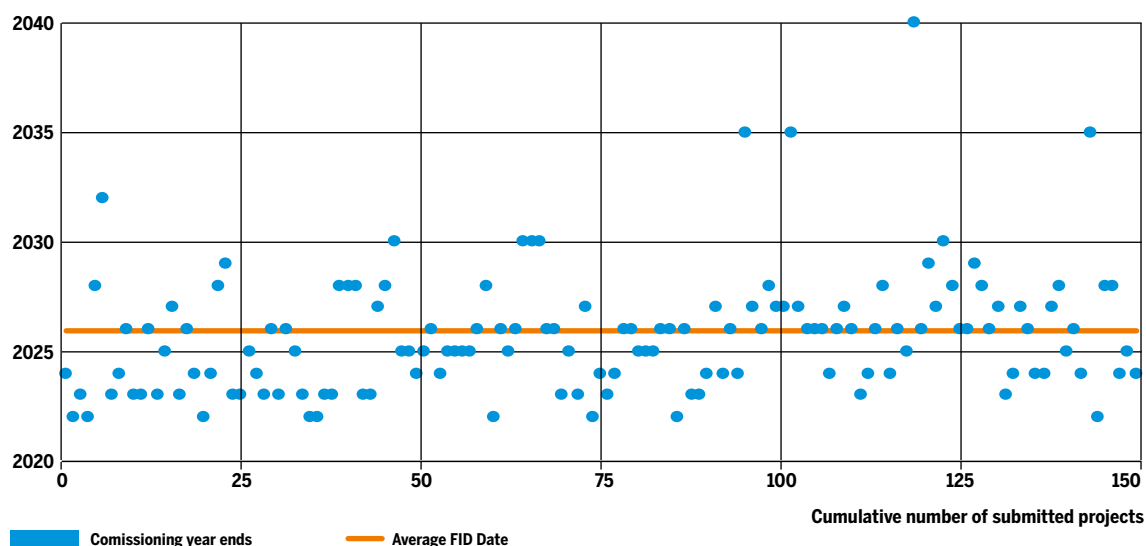


Figure 25: Distribution of projects per end commissioning year

The **Commissioning year** has been provided for 141 investments out of 143 included in TYNDP 2022. The average Commissioning year for these projects

is 2026 with 101 investments expected to be commissioned by the end of 2026 while the remaining 40 will be commissioned after 2026.

Status	Completed in TYNDP 2022	FID in TYNDP 2022	Advanced in TYNDP 2022	Less-Advanced in TYNDP 2022	Cancelled/Not-resubmitted	Total
FID (TYNDP 2020)	30	19	0	2	12	63
Advanced (TYNDP 2020)	5	6	24	2	23	60
Less-Advanced (TYNDP 2020)	1	9	31	52	46	139
Total	36	34	55	56	81	262

Table 4: Evolution of projects from TYNDP 2020 to TYNDP 2022 (All Categories)

Status	Completed in TYNDP 2022	FID in TYNDP 2022	Advanced in TYNDP 2022	Less-Advanced in TYNDP 2022	Cancelled/Not-resubmitted	Total
FID (TYNDP 2020)	28	16	0	1	9	54
Advanced (TYNDP 2020)	4	5	22	2	23	56
Less-Advanced (TYNDP 2020)	0	9	22	25	21	77
Total	32	30	44	28	53	187

Table 5: Evolution of projects from TYNDP 2020 to TYNDP 2022 (TRA, LNG & UGS)

Of the 54 investments submitted for TRA, LNG and UGS already having the FID status in TYNDP 2020:

- ▲ 28 were completed;
- ▲ 16 are still planned with FID status in TYNDP 2022;
- ▲ 1 is still planned but no more FID;
- ▲ TRA-N-954¹⁵ present in TYNDP 2022 has a Less-Advanced status while in TYNDP 2020 it was FID status. The promoter has changed the status since TYNDP 2020 and indicated a delay in the project based on internal replanning and alignment with matching project on the Italian site (TRA-N-1145)¹⁶;
- ▲ 9 projects have not been resubmitted (TRA-F-307, TRA-F-949, LNG-F-163, LNG-F-183, TRA-F-592, LNG-F-824, TRA-F-937, TRA-F-1169 and TRA-F-1241).

Of the 56 investments having the Advanced status in TYNDP 2020:

- ▲ 4 were completed;
- ▲ 6 got the FID after TYNDP 2020 project collection;
- ▲ 22 still have the Advanced status;
- ▲ 2 moved from Advanced to Less-Advanced mainly because the projects have been delayed or rescheduled (TRA-N-377 and TRA-N-782);
- ▲ 23 were not resubmitted (TRA-A-829, TRA-A-21, TRA-A-133, TRA-A-808, TRA-A-136, TRA-A-273, TRA-A-561, TRA-A-621, TRA-A-283, TRA-A-654, TRA-A-12, LNG-A-30, LNG-A-32, LNG-A-79, TRA-A-123, UGS-A-294, LNG-A-295, LNG-A-296, TRA-A-320, TRA-A-950, LNG-A-962, TRA-A-980 and TRA-A-1303).

Of the 77 TYNDP 2020 investments having Less-Advanced status:

- ▲ 9 got the FID after TYNDP 2020 project collection;
- ▲ 22 moved from Less-Advanced to Advanced status;
- ▲ 25 are still planned and present Less-Advanced status;
- ▲ 21 were cancelled/not-resubmitted.

For initiatives having already reached the FID before their submission to TYNDP 2020 (35 investments) the analysis of project submissions shows:

- ▲ 13 initiatives whose construction phase is expected to end within 3 years from when the FID was taken;
- ▲ 15 initiatives whose construction phase is expected to end within 4 to 7 years from when the FID was taken;
- ▲ 1 initiatives whose construction phase is expected to end after more than 7 years from when the FID was taken;
- ▲ 6 initiatives did not indicate the expected end of the construction phase.

Most of the FID projects are expected to be completed within four years from when the construction works will start.

The way FID is taken by each promoter may differ. Some may take FID after the granting of permits and some before initiating the permitting procedure. Those permitting procedures often make out the longest phase of the whole project schedule which often lasts more than five years. Therefore, the above analysis is not necessarily indicative of the project lead time for any future projects as there are, among the projects, some small and some very complex ones.

For investments not having gotten the FID yet but presenting an Advanced status (65 projects) the analysis shows:

- ▲ 46 investments for which promoters were able to provide the relevant information are expected to be commissioned within five years from when the FID is expected to be taken while other three submissions between six and twelve years;
- ▲ An average of almost two years between the year when the construction works are expected to start and when the project is expected to be commissioned.

¹⁵ TAG Reverse Flow

¹⁶ Export enhancements



Share of scheduled status for resubmitted projects

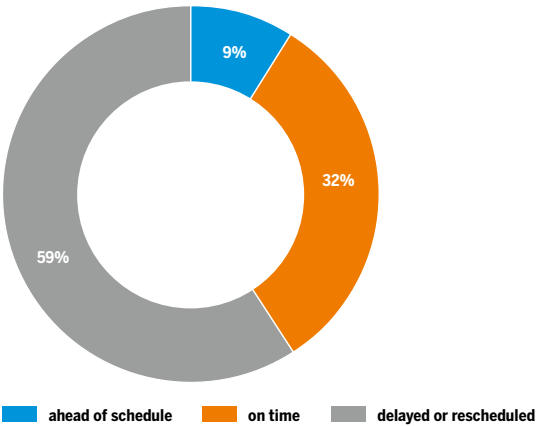


Figure 26: Share per scheduled status for resubmitted projects

Finally, with regards to **investments presenting a Less-Advanced status**, information may not be always fully available or reliable making it effectively impossible to build any statistics.

Figures 26 and 27 illustrate the status of those common projects according to TYNDP 2020 and TYNDP 2022 submissions. The charts show the share of those projects for which a delay has been reported regarding their expected commissioning date and the length of this delay.

Among the projects without delay (64 % in total), nine have been submitted with an earlier commissioning date.

Reported delays of projects from TYNDP 2020 to TYNDP 2022

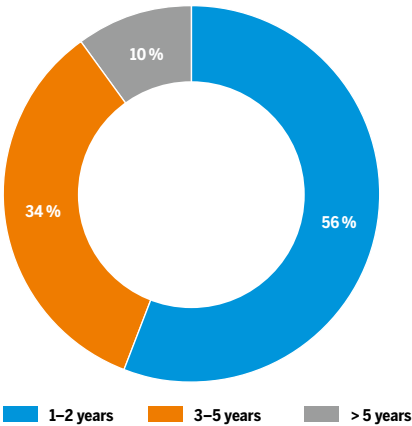


Figure 27: Reported delays from TYNDP 2020 to TYNDP 2022

More than half of the submissions in TYNDP 2022 have reported experiencing delays since the last edition. Listed below are the main reasons for delays indicated by project promoters:

- Worsened and uncertain market conditions
- Delays in permitting/authorisations from competent authorities
- Lack of coordination between hosting countries/political uncertainties
- Delays in contract award procedure and/or procurement process
- Lack of funds/financing
- Interdependencies with other (delayed) projects;
- Delay following findings from concluded pre-feasibility study

6.4.4 INVESTMENT COSTS

Investment costs are for project promoters in many cases commercially sensitive information and might have the potential to negatively affect the competitive position of project promoters vis-à-vis contractors.

As part of the transparency process adopted, ENTSOG has collected information from promoters on indicative investment costs for all submitted projects.

In line with the ENTSOG Practical Implementation Document, the cost data submitted by the project promoters for the projects to be included in the TYNDPs is made public by ENTSOG unless the data is deemed confidential by the respective project promoters.

However, the values shown in figures 28 and 29 are based only on cost information provided as non-confidential by Promoters.

The highest share of costs is represented in the advance status (66 %) while the share of advanced project for TRA, LNG and UGS is only around 45 %.

Transmission projects, representing also the majority of the submitted projects (76 %), cover 90 % of the total costs. According to project promoters' submission, investments are highly concentrated in 2025–2028 (with a peak in 2025 of more than 10 billion €), with around 74 % of the total expected cost to be experienced in those years (see figure 30).

Overview of total cost by project status (billion Euro)

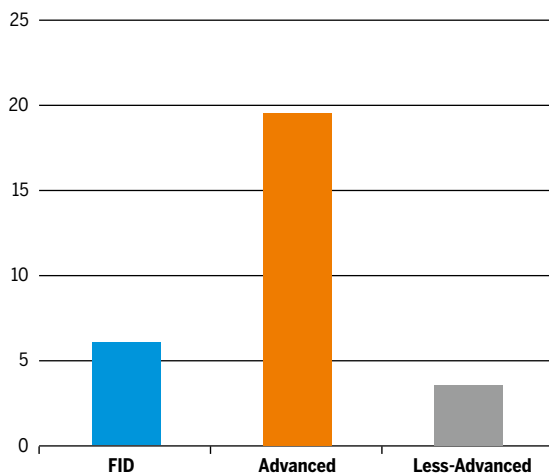


Figure 28: Overview of total cost by project status for TRA, LNG and UGS

Overview of total cost by project status by infrastructure type (billion Euro)

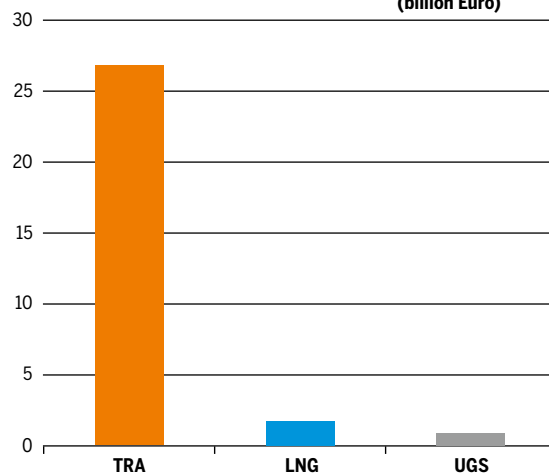


Figure 29: Overview of total cost by type of projects

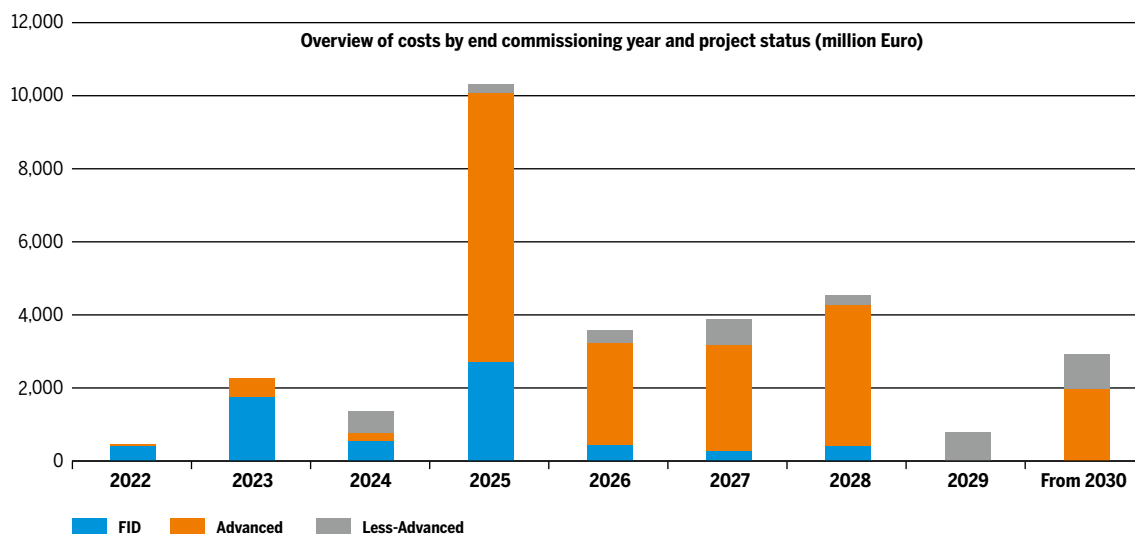


Figure 30: Overview of total cost by last commissioning year and project status (TRA, LNG & UGS)

6.4.5 TYNDP 2022 SUBMISSIONS AND NATIONAL DEVELOPMENT PLANS

According to Article 8 of Regulation (EC) No. 715/2009, the Community-wide network development plan is required to build on national investment plans. This does not prevent, from a legal perspective, projects being submitted to the TYNDP although they are not part of a national development plan (NDP), being the TYNDP a non-binding exercise.

Following ACER recommendation, project promoters have been requested to always indicate if their initiatives are part of the NDP. If not, the project promoters had to indicate the reason for its project not being part of the NDP.

Furthermore, ENTSOG initiated a feedback loop with ACER and National Regulatory Authorities (NRAs) to collect relevant feedback and comments.

Country	Part of NDP	NOT Part of NDP	Country	Part of NDP	NOT Part of NDP
AT	3	–	HU	4	–
AZ	–	1	IT	15	2
BA	3	–	LT	1	–
BE	3	–	LV	–	4
BG	5	2	MT	1	–
CY	–	1	NL	3	1
CZ	2	–	PL	3	1
DE	24	2	RO	11	1
ES	1	1	SI	6	–
FR	5	1	SK	5	1
GR	8	8	TM	–	1
HR	10	2	TR	–	1

Table 6: Overview of projects being part or not of NDPs by country (TRA, LNG & UGS)

For the projects reported as not part of any NDP, promoters have generally indicated one of the following reasons:

- ▲ The NDP was prepared at an earlier date and the project will be proposed for inclusion in the next NDP edition¹⁷;
 - ▲ No NDP exists in the country where the project will be built;
 - ▲ The operators are not required to prepare and publish an NDP.
- The provided reasons show that, in most of the cases, a project is not part of any NDP for reasons lying outside the control of the project promoters himself. For further details, please refer to TYNDP 2022 Annex A.

¹⁷ It should be noted that the second project collection took place seven months after the first one, therefore it might be that the new projects submitted in June 2022 were not included in their respective NDPs.



6.5 TYNDP 2022 PROJECTS BEING PART OF THE 5TH PCI LIST

Every TYNDP edition ENTSOE collects information also related to projects having already the PCI status and projects that intend to apply to the following PCI selection process (see → [section 7.6](#)).

While the initial Project Collection for TYNDP 2022 was ongoing, European Commission published the 5th PCI List in November 2021. Subsequently ENTSOE needed to review the relevant PCI information and when necessary updated the information accordingly to be in line with the 5th PCI List.

In TYNDP 2022 there are 28 submissions with are part of the 5th PCI graphs below show the split of these projects per maturity status and infrastructure type:

Projects with PCI status in the 5th PCI list by maturity status

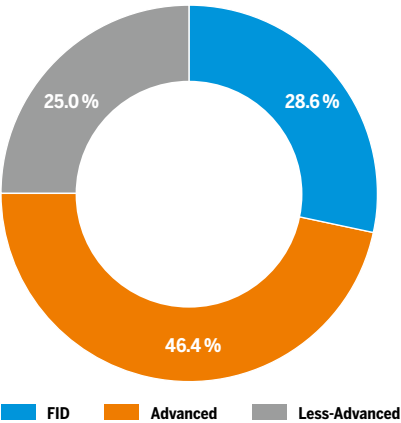


Figure 31: Projects having PCI status in the 5th PCI list by maturity type

Projects with PCI status in the 5th PCI list by infrastructure status

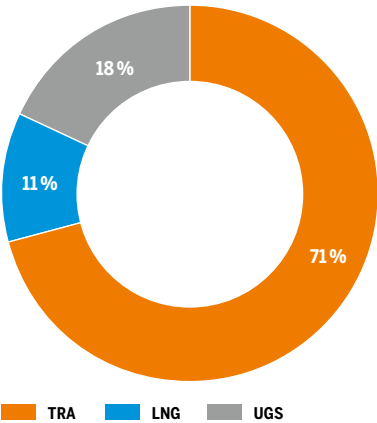


Figure 32: Projects having PCI status in the 5th PCI list by infrastructure type

7 PROMOTERS' SUBMISSIONS FOR HYD, RET, BIO AND OTH INVESTMENTS FOR TYNDP 2022

In TYNDP 2020 ENTSOG included a new but broad project category for Energy Transition projects. For TYNDP 2022 ENTSOG decided to replace the former ETR category with four new infrastructure categories.

The idea of this division was to allow more precise insights in different sector developments in particular in the evolving low carbon and green gases and to reflect the revision of the TEN-E:

- ▲ **New or repurposed infrastructure to carry hydrogen (HYD)**
- ▲ **Projects for retrofitting infrastructure to further integrate hydrogen (RET)**
- ▲ **Biomethane development projects (BIO)**
- ▲ **Other infrastructure related projects (OTH)**

The new four categories have been introduced to European Commission and ACER together with the revised Practical Implementation Document in a dedicated Webinar in June 2021.

161 projects consisting of 215 investments submissions have been included for TYNDP 2022 falling under the four above mentioned infrastructure categories.

7.1 HYD PROJECTS

For TYNDP 2022 promoters submitted 99 projects (152 investment submissions) related to new or repurposed infrastructure to carry hydrogen:

- ▲ 45 investments related to the repurposing of existing pipelines for hydrogen use;
 - ▲ 45 investments related to the construction of on- or offshore pipelines to enable the transport of pure hydrogen;
 - ▲ 3 investments related to the repurposing of existing storages to enable the storage of pure hydrogen;
 - ▲ 12 investments related to the construction of storages to enable the storage of pure hydrogen;
 - ▲ 12 investments related to new liquefied hydrogen terminal including hydrogen embedded in other chemical substances with the objective of injecting the hydrogen into the grid;
 - ▲ 7 investments related to equipment or installation essential for the hydrogen system to operate safely, securely and efficiently or to enable bi-directional capacity, including compressor stations;
 - ▲ 23 investments related to hydrogen production with network related function;
 - ▲ 2 investment enables the production, reception, injection, transportation, or end-use supply of hydrogen;
 - ▲ 4 other hydrogen related investments.
- see maps in figure 33 on pages 44/45 and figure 34 on pages 46/47



7.2 RET PROJECTS

For TYNDP 2022 promoters submitted 13 projects related to investments for retrofitting infrastructure to further integrate hydrogen:

- ▲ 8 investments regarding Retrofitting of existing gas pipelines and other network related assets for (bio-)methane-hydrogen blending;
 - ▲ 1 investment regarding Retrofitting of existing LNG terminal for blending (storage and/or injection to the natural gas grid).
 - ▲ 4 investments regarding Retrofitting of existing storages for H₂ blending;
- see maps in figure 33 on pages 44/45 and figure 34 on pages 46/47

7.3 BIO PROJECTS

For TYNDP 2022 promoters submitted ten biomethane development projects (eleven investment submissions):

- ▲ 3 projects enabling the reverse transportation between DSO and TSO of biomethane;
- ▲ 7 network development projects enabling biomethane production/injection into the gas grid.

→ see map in figure 35 on pages 48/49

7.4 OTH PROJECTS

For TYNDP 2022 promoters submitted 39 Projects related to other infrastructure related projects:

- ▲ 5 hydrogen production facilities other than the ones included in category HYD;
- ▲ 4 projects related to the transport sector (incl. road, railway, aviation and maritime transport);
- ▲ 3 projects enabling the production, reception, injection, transportation, or end-use supply of hydrogen;
- ▲ 4 projects enabling gas–electricity integration;
- ▲ 3 synthetic methane projects aiming at decarbonising the gas grids;
- ▲ 9 projects related to the conversion of natural gas network for CO₂ transport or storage;
- ▲ 9 dedicated projects to reduce methane emission in existing infrastructure;
- ▲ 2 any other infrastructure related projects.

→ see map in figure 35 on pages 48/49

MAP FOR HYDROGEN (HYD) AND RETROFITTED (RET) PROJECTS IN TYNDP 2022

HYDROGEN INFRASTRUCTURE			
HYD-F-1304	HYPSTER	storengy	FID
HYD-A-312	P2G Velke Kapusany	nafta	Advanced
HYD-A-315	G2F - Gas to Future	nafta	Advanced
HYD-A-396	Djewels 1	gasunieHyCC	Advanced
HYD-A-427	H2Pole	reganosa	Advanced
HYD-A-542	HyBRIDS	SGI	Advanced
HYD-A-549	Norway - Rotterdam Hydrogen Supply Chain		Advanced
HYD-A-562	Energy Park Bad Lauchstädt	ONTRAS	Advanced
HYD-A-745	GÖI - Green Octopus Storage	VNG Gasspeicher	Advanced
HYD-A-770	H2-Fifty	HyCC	Advanced
HYD-A-906	Vlieghuis-Ochtrup	Thyssengas	Advanced
HYD-A-968	GreenWilhelmshaven Terminal	YnPer	Advanced
HYD-A-992	GreenWilhelmshaven Electrolyser	YnPer	Advanced
HYD-A-996	Green Octopus Mitteldeutschland	ONTRASVNG Gasspeicher	Advanced
HYD-A-1238	DK Hydrogen Storage	ENERGINET	Advanced
HYD-A-1279	Hystock Opslag H2	gasunie	Advanced
HYD-N-385	South Kavala Underground Gas Storage facility		Less-Adv.
HYD-N-440	H2 Transmission pipelines HyDeal España	enagas	Less-Adv.
HYD-N-442	SLOP2G	Plininvest	Less-Adv.
HYD-N-443	Nordic-Baltic Hydrogen Corridor - FI section	GASGRID	Less-Adv.
HYD-N-468	National H2 Backbone	gasunie	Less-Adv.
HYD-N-508	H2 storage North-1	enagas	Less-Adv.
HYD-N-543	H2SinesRdam		Less-Adv.
HYD-N-544	Hydrogen Cifer	SIDERTOON	Less-Adv.
HYD-N-565	GeoH2	Geomethane	Less-Adv.
HYD-N-569	HY-FEN - H2 Corridor Spain - France - Germany connection	Qipgaz	Less-Adv.
HYD-N-601	Hydrogen Imports to Rotterdam		Less-Adv.
HYD-N-608	Black Sea - Podgor Pipeline modernization for hydrogen transm.	TRANSAGAZ	Less-Adv.
HYD-N-619	H2 interconnection Croatia/Slovenia (Lučko-Zabok-Rogatec)	punacro	Less-Adv.
HYD-N-625	Onesti - Ungheni corridor modernization for hydrogen transmission	TRANSAGAZ	Less-Adv.
HYD-N-626	Hydrogen Imports to Hamburg		Less-Adv.
HYD-N-633	GETH2-IPCEI	ThyssengasnowegaOGE	Less-Adv.
HYD-N-640	Isaccea - Jupa corridor modernization for hydrogen transmission	TRANSAGAZ	Less-Adv.
HYD-N-642	HyPipe Bavaria - The Hydrogen Hub	bayerngas	Less-Adv.
HYD-N-647	Vadu - T1 pipeline modernization for hydrogen transmission	TRANSAGAZ	Less-Adv.
HYD-N-648	Romania - Serbia Interconn. modernization for hydrogen transm.	TRANSAGAZ	Less-Adv.
HYD-N-661	Adjustment of existing eus pipeline SK-HU	eustream	Less-Adv.
HYD-N-664	Antwerp NH3 Import Terminal	fluxys	Less-Adv.
HYD-N-730	Coroi - Mediesu Aurit corridor modernization for hydrogen transm.	TRANSAGAZ	Less-Adv.
HYD-N-732	HU hydrogen corridor IV HU/SK		Less-Adv.
HYD-N-754	ACE Terminal	gasunie	Less-Adv.
HYD-N-756	Negru Voda - Isaccea corridor modernization for hydrogen transm.	TRANSAGAZ	Less-Adv.
HYD-N-757	H2 Backbone WAG + Penta West	GAS CONNECT AUSTRIA	Less-Adv.
HYD-N-767	RWE H2 Storage expansion Gronau-Epe	RWE	Less-Adv.
HYD-N-771	H2ermes	HyCC	Less-Adv.
HYD-N-772	Infrastructure repurpose for H2 transmission in Slovakia	eustream	Less-Adv.
HYD-N-788	H2 transmission system in Bulgaria	BULGARTRANSAGAZ	Less-Adv.
HYD-N-789	HU hydrogen corridor V HU/RO		Less-Adv.
HYD-N-790	Element Eins	ENES	Less-Adv.
HYD-N-793	Delta Rhine Corridor H2	Port of RotterdamBASF OGE	Less-Adv.

HYD-N-795	PoR import portfolio programme	Port of Rotterdam	Less-Adv.
HYD-N-796	FLOW East - Making Hydrogen Happen		Less-Adv.
HYD-N-800	H2 Interconnector Bornholm-Lubmin (IBL)		Less-Adv.
HYD-N-802	RWE H2 Storage Staßfurt	RWE	Less-Adv.
HYD-N-818	RWE H2 Storage Xanten	RWE	Less-Adv.
HYD-N-819	H2Med-BarMar (Teréga)	teréga	Less-Adv.
HYD-N-820	Dunkerque New Molecules development	dunkerque LNG	Less-Adv.
HYD-N-828	Green Hydrogen Hub Denmark - Electrolysis	corroenergy	Less-Adv.
HYD-N-830	Green Hydrogen Hub Zuidwending	corroenergy	Less-Adv.
HYD-N-833	Green Hydrogen Hub Drenthe	corroenergy	Less-Adv.
HYD-N-834	HyONE-DE	gasunie	Less-Adv.
HYD-N-835	SK-HU H2 corridor	eustream	Less-Adv.
HYD-N-846	Green Hydrogen Hub Harsefeld-Stade	corroenergy	Less-Adv.
HYD-N-848	Baltic Sea Hydrogen Collector - Equipment [BHC] - Finland	GASGRID	Less-Adv.
HYD-N-849	FLOW West - Making Hydrogen Happen		Less-Adv.
HYD-N-852	Green Hydrogen Hub Ahaus-Epe	corroenergy	Less-Adv.
HYD-N-854	H2 Interconnector Bornholm-Lubmin (Energinet)	ENERGINET	Less-Adv.
HYD-N-855	Xanten-Voerde-Oberhausen	Thyssengas	Less-Adv.
HYD-N-874	Green Hydrogen Hub Leer	corroenergy	Less-Adv.
HYD-N-876	Leverkusen-Cologne	Thyssengas	Less-Adv.
HYD-N-883	Green Hydrogen Hub Moerkow	corroenergy	Less-Adv.
HYD-N-884	CHE Pipeline	energinet	Less-Adv.
HYD-N-885	East-West Connection	Thyssengas	Less-Adv.
HYD-N-894	Green Hydrogen Hub Etzel	corroenergy	Less-Adv.
HYD-N-899	mosaHYc - Mosel Saar Hydrogen Conversion	Qipgaz	Less-Adv.
HYD-N-917	HyPerLink-Ruhr Area Connection	gasunieThyssengas	Less-Adv.
HYD-N-926	Baltic Sea Hydrogen Collector - Offshore Pipeline [BHC] - Sweden	NORDION ENERGY	Less-Adv.
HYD-N-931	Baltic Sea Hydrogen Collector - Equipment [BHC] - Sweden	NORDION ENERGY	Less-Adv.
HYD-N-933	Wilhelmshaven-HyPerLink-Connection	gasunie	Less-Adv.
HYD-N-934	Salthy Harsefeld	storengy	Less-Adv.
HYD-N-939	H2morrow Steel	ThyssengasOGE	Less-Adv.
HYD-N-942	Lacq Hydrogen	teréga	Less-Adv.
HYD-N-968	Green Wilhelmshaven Terminal/Storage/Cracker	YnPer	Less-Adv.
HYD-N-969	RHYN	Qipgaz	Less-Adv.
HYD-N-970	Dedicated H2 Pipeline	nafta	Less-Adv.
HYD-N-978	Portuguese Hydrogen Backbone	REN	Less-Adv.
HYD-N-981	Damaslawek Hydrogen Storage	GAS	Less-Adv.
HYD-N-983	Polish Hydrogen Backbone Infrastructure	GAS	Less-Adv.
HYD-N-986	H2 Readiness of the TAG pipeline system	Fluxys Austria Consulting	Less-Adv.
HYD-N-987	mosaHYc (Mosel Saar Hydrogen Conversion) - Germany	CREOS	Less-Adv.
HYD-N-989	doing hydrogen	ONTRAS	Less-Adv.
HYD-N-990	Central European Hydrogen Corridor (CZ part)		Less-Adv.
HYD-N-991	AquaDuctus	fluxys	Less-Adv.
HYD-N-999	Giurgiu - Nădlac corridor modernization for hydrogen transmission	TRANSAGAZ	Less-Adv.
HYD-N-1000	HyPerLink	gasunie	Less-Adv.
HYD-N-1001	Danish-German Hydrogen Network	gasunie	Less-Adv.
HYD-N-1006	HELIOS Valley	SGI	Less-Adv.
HYD-N-1011	HyONE Network NL	gasunie	Less-Adv.
HYD-N-1034	Czech German Hydrogen Interconnector (CZ part)		Less-Adv.
HYD-N-1035	Franco-Belgian H2 corridor	Qipgaz	Less-Adv.
HYD-N-1037	H2ercules Network North	OGE	Less-Adv.
HYD-N-1038	H2ercules Network West	OGE	Less-Adv.

HYD-N-1052	H2ercules Network South	QipgazOGE	Less-Adv.
HYD-N-1063	HU hydrogen corridor I HU/UA		Less-Adv.
HYD-N-1066	HU hydrogen corridor II HU/HR		Less-Adv.
HYD-N-1073	H2ercules Network North-West	ThyssengasOGE	Less-Adv.
HYD-N-1092	Metering and Regulating Station at UGS South Kavala		Less-Adv.
HYD-N-1096	RHYN Interco	termonets bva	Less-Adv.
HYD-N-1098	Hydrogen seasonal storage in Latvia	CONEXUS	Less-Adv.
HYD-N-1099	Ammonia Import Terminal Brunsbüttel	RWE	Less-Adv.
HYD-N-1100	Amplify Antwerp	vtiti	Less-Adv.
HYD-N-1120	Blue HyWest		Less-Adv.
HYD-N-1122	Nordic-Baltic Hydrogen Corridor - EE section	elering	Less-Adv.
HYD-N-1127	Amplify Rotterdam	vtiti	Less-Adv.
HYD-N-1136	Nordic Hydrogen Route - Bothnian Bay - Finnish section	GASGRID	Less-Adv.
HYD-N-1137	Central European Hydrogen Corridor (UKR part)	SECURITY SOLUTION	Less-Adv.
HYD-N-1144	Nordic-Baltic Hydrogen Corridor - PL section	GAS	Less-Adv.
HYD-N-1149	Spanish hydrogen backbone		Less-Adv.
HYD-N-1151	H2Med-BarMar (GRTgaz)	enagasTerégaQipgaz	Less-Adv.
HYD-N-1153	H2Med-BarMar (Enagás)	enagasTerégaQipgaz	Less-Adv.
HYD-N-1152	H2 storage North-2	enagas	Less-Adv.
HYD-N-1156	H2Med/CelZa	REN Gasodutos	Less-Adv.
HYD-N-1159	bp Wilhelmshaven Green Hydrogen Hub		Less-Adv.
HYD-N-1171	Nordic Hydrogen Route - Bothnian Bay- Swedish section	NORDION ENERGY	Less-Adv.
HYD-N-1176	Aukra Hydrogen Hub	AKER HORIZONS CAPE OMEGA	Less-Adv.
HYD-N-1205	Italian H2 Backbone		Less-Adv.
HYD-N-1206	HU hydrogen corridor IV-1, HU/SK		Less-Adv.
HYD-N-1236	DK Hydrogen Pipeline, West DK Hydrogen System	ENERGINET	Less-Adv.
HYD-N-1237	Croatia-Slovenia-Austria H2 corridor	Plininvest	Less-Adv.
HYD-N-1239	Nordic-Baltic Hydrogen Corridor - LT section	Amber Grid	Less-Adv.
HYD-N-1249	CHE Production Facility	Fluxys	Less-Adv.
HYD-N-1255	H2 repurposing interconnection HR-HU	punacro	Less-Adv.
HYD-N-1259	HU hydrogen corridor V-1, HU/RO		Less-Adv.
HYD-N-1264	Central European Hydrogen Corridor (SK part)	eustream	Less-Adv.
HYD-N-1272	Network related electrolyser in South of Italy (Sicily and Apulia)	Qipgaz	Less-Adv.
HYD-N-1273	Guitiriz - Zamora H2 Pipeline	reganosa	Less-Adv.
HYD-N-1274	H2 supply system Croatia - North	punacro	Less-Adv.
HYD-N-1280	Nordic-Baltic Hydrogen Corridor - LV section	CONEXUS	Less-Adv.
HYD-N-1281	HU hydrogen corridor III, Slovenian-Hungarian interconnector		Less-Adv.
HYD-N-1291	Hynframed	Qipgaz	Less-Adv.
HYD-N-1307	H2 supply system Croatia - South	punacro	Less-Adv.
HYD-N-1310	Nordic-Baltic Hydrogen Corridor - DE section	ONTRAS	Less-Adv.
HYD-N-1311	Belgian Hydrogen Backbone	fluxys	Less-Adv.
HYD-N-1324	H2Med-CelZa (Enagás)	enagas	Less-Adv.
HYD-N-1325	Zeebrugge New Molecules development	fluxys	Less-Adv.
HYD-N-1339	Aukra H2 Pipeline	AKER HORIZONS CAPE OMEGA	Less-Adv.
HYD-N-1352	HySoW (Hydrogen South West corridor of France)	teréga	Less-Adv.
HYD-N-1354	H2 Backbone Murfeld	GAS CONNECT AUSTRIA	Less-Adv.
HYD-N-1355	Baltic Sea Hydrogen Collector - Offshore Pipeline [BHC] - Finland	GASGRID	Less-Adv.
HYD-N-1356	Italy-Slovenia-Hungary H2 corridor	Plininvest	Less-Adv.

RETROFITTING INFRASTRUCTURE FOR HYDROGEN			
Retrofitting : infrastructure upgrades to allow hydrogen blends			
RET-A-425	UGS Lab - H2	nafta	Advanced
RET-A-1003	Power recovery with turboexpander in Kardoskut UGS	HGS	Advanced
RET-N-483	L2DG (LNG to Decarbonised Gas)	reganosa	Less-Adv.
RET-N-558	Retrofitting of the Bulgarian Gas Transmission System	BULGARTRANSAGAZ	Less-Adv.
RET-N-916	Blending readiness of the transmission system	eustream	Less-Adv.
RET-N-973	Retrofitting of existing Greek Transmission System		Less-Adv.
RET-N-1044	Upgrade compressor control system TH-W compressor units for H2		Less-Adv.
RET-N-1049	H2RENGRID - Transport Network	REN	Less-Adv.
RET-N-1050	H2RENGRID - Carriço UGS	REN	Less-Adv.
RET-N-1081	Cross border gas transmission system retrofitting for hydrogen	CONEXUS	Less-Adv.
RET-N-1113	Replacement of chromatographs		Less-Adv.
RET-N-1135	Retrofitting pipelines		Less-Adv.
RET-N-1155	Gas system retrofitting for 100% H2 future capability	punacro	Less-Adv.

Figure 33: Map for Hydrogen (HYD) and Retrofitted (RET) projects in TYNDP 2022

Download the map from ENTSGO website:

Just click on the icon.



MAP FOR HYDROGEN (HYD) AND RETROFITTED (RET) PROJECTS IN TYNDP 2022, CLEAN VERSION

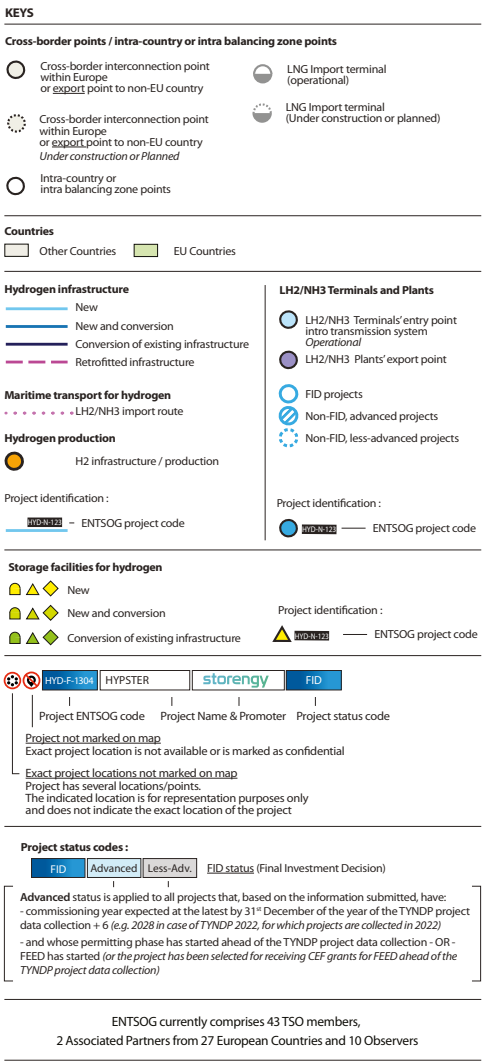
TRANSPORT BY PIPELINES (INCL. COMPRESSOR STATIONS)					TRANSPORT BY PIPELINES (INCL. COMPRESSOR STATIONS)					TRANSPORT BY PIPELINES (INCL. COMPRESSOR STATIONS)				
TRA-F-51	Trans Adriatic Pipeline		FID	PCI	TRA-A-10	Poseidon Pipeline		Advanced	PCI	TRA-N-7	Development for new import from the South (Adriatic Line)		Less-Adv	PCI
TRA-F-90	LNG evacuation pipeline Omilaj – Zlobin (Croatia)		FID	PCI	TRA-A-31	Melita TransGas Pipeline		Advanced	PCI	TRA-N-63	LNG terminal in northern Greece / Alexandroupolis – Pipeline Section		Less-Adv	PCI
TRA-F-190	Poland – Slovakia interconnection		FID	PCI	TRA-A-123	Väroslöf CS		Advanced	PCI	TRA-N-86	Interconnection Croatia/Slovenia (Lučko – Zabok – Jezerčica – Sella)		Less-Adv	PCI
TRA-F-212	Gas Interconnection Poland-Lithuania (GIPU) – PL section		FID	PCI	TRA-A-271	Poland – Denmark interconnection (Baltic Pipe) – offshore section		Advanced	PCI	TRA-N-92	CS Ajdovščina, 1 st phase of upgrade		Less-Adv	PCI
TRA-F-275	Poland – Slovakia Gas Interconnection (GPL section)		FID	PCI	TRA-A-330	EastMed Pipeline		Advanced	PCI	TRA-N-94	CS Kidričevo, 2 nd phase of upgrade		Less-Adv	PCI
TRA-F-298	Modernization and rehabilitation of the Bulgarian GTS		FID	PCI	TRA-A-339	Trans-Caspian		Advanced	PCI	TRA-N-108	M3 pipeline reconstruction from CS Ajdovščina to Sempeter/Gorizia		Less-Adv	PCI
TRA-F-334	Compressor station 1 at the Croatian gas transmission system		FID	PCI	TRA-A-342	Enhancement of Latvia-Lithuania interconnection (Lithuania's part)		Advanced	PCI	TRA-N-112	R15/1 Pince – Lendava – Kidričevo		Less-Adv	PCI
TRA-F-341	Gas Interconnection Poland-Lithuania (GIPU) (Lithuania's section)		FID	PCI	TRA-A-342	Enhancement of Latvia-Lithuania interconnection (Lithuania's part)		Advanced	PCI	TRA-N-128	Compressor Station Kipi		Less-Adv	PCI
TRA-F-358	Development on the Romanian territory of the NTS (B0-B0-HU-AT)-Phase I		FID	PCI	TRA-A-342	Enhancement of Latvia-Lithuania interconnection (Lithuania's part)		Advanced	PCI	TRA-N-137	Interconnection Bulgaria – Serbia		Less-Adv	PCI
TRA-F-378	Interconnector Greece-Bulgaria (IGB Project)		FID	PCI	TRA-A-377	Romanian-Hungarian reverse flow Hungarian section 2 nd stage		Advanced	PCI	TRA-N-245	North – South Gas Corridor in Eastern Poland		Less-Adv	PCI
TRA-F-500	L/H Conversion Belgium		FID	PCI	TRA-A-382	Development on the Romanian territory of the Southern Transmission Corridor		Advanced	PCI	TRA-N-325	Slovenian-Hungarian interconnector		Less-Adv	PCI
TRA-F-941	Metering and Regulating station at Nea Messimria		FID	PCI	TRA-A-429	Adaptation L-gas – H-gas		Advanced	PCI	TRA-N-361	GCA 2015/08, Entry/Exit Murfeld		Less-Adv	PCI
TRA-F-1193	TAP Interconnection		FID	PCI	TRA-A-780	Baltic Pipe project – onshore section in Denmark		Advanced	PCI	TRA-N-389	Upgrade of Murfeld/Ceršak interconnection (M3 Interconnection Central)		Less-Adv	PCI
TRA-F-139	Interconnection of the NTS with the DTS and reverse flow at Isaccoa		FID	Non-PCI	TRA-A-782	TANAP X – Expansion of Trans Anatolian Natural Gas Pipeline Project		Advanced	PCI	TRA-N-390	Upgrade of Rogatec interconnection (M4/I) Interconnection Rogatec		Less-Adv	PCI
TRA-F-208	Reverse Flow TENP Germany		FID	Non-PCI	TRA-A-1173	Poland – Denmark interconnection (Baltic Pipe) – onshore section in Poland		Advanced	PCI	TRA-N-934	Enhancement of Transmission Capacity of SK-HU interconnector		Less-Adv	PCI
TRA-F-247	North – South Gas Corridor in Western Poland		FID	Non-PCI	TRA-A-1322	Development on the Romanian territory of the NTS (B0-B0-HU-AT)-Phase II		Advanced	PCI	TRA-N-971	Compressor station at Nea Messimria		Less-Adv	PCI
TRA-F-284	Romanian-Hungarian reverse flow Hungarian section 1 st stage		FID	Non-PCI	TRA-A-12	GALSI Pipeline Project		Advanced	Non-PCI	TRA-N-1057	Compressor stations 2 & 3 / Croatian gas transmission system		Less-Adv	PCI
TRA-F-291	NOWAL – Nord West Anbindungsleitung		FID	Non-PCI	TRA-A-21	Bidirectional Austrian-Czech Interconnector (BACI) – AT section		Advanced	Non-PCI	TRA-N-1090	Metering and Regulating Station at Alexandroupoli		Less-Adv	PCI
TRA-F-307	H-gas exit OS2 GTD Nord		FID	Non-PCI	TRA-A-48	Ionian Adriatic Pipeline		Advanced	Non-PCI	TRA-N-1091	Metering and Regulating station at Megalopoli		Less-Adv	PCI
TRA-F-329	ZELINK		FID	Non-PCI	TRA-A-70	Interconnection Croatia/Serbia (Slobodica-Solin-Backo Novo Selo)		Advanced	Non-PCI	TRA-N-1092	Metering and Regulating Station at UGS South Kavala		Less-Adv	PCI
TRA-F-340	CS Werringen		FID	Non-PCI	TRA-A-133	Bidirectional Austrian Czech Interconnection (BACI) – CZ section		Advanced	Non-PCI	TRA-N-1138	South Caucasus Pipeline Future Expansion (SCPFX)		Less-Adv	PCI
TRA-F-357	NTS developments in North-East Romania		FID	Non-PCI	TRA-A-134	Czech-Polish Gas Interconnector (CPI)		Advanced	Non-PCI	TRA-N-1195	Matagola – Massafra pipeline		Less-Adv	PCI
TRA-F-409	Larino – Chieli		FID	Non-PCI	TRA-A-273	Poland – Czech Republic Gas Interconnection (PL section)		Advanced	Non-PCI	TRA-N-1227	Gorizia plant upgrade		Less-Adv	PCI
TRA-F-424	San Marco – Recanati		FID	Non-PCI	TRA-A-283	3 rd IP between Portugal and Spain (pipeline Celorico-Spanish border)		Advanced	Non-PCI	TRA-N-8	Import developments from North-East		Less-Adv	Non-PCI
TRA-F-592	Necessary expansion of the Bulgarian gas transmission system		FID	Non-PCI	TRA-A-302	Interconnection Croatia-Bosnia and Herzegovina (South)		Advanced	Non-PCI	TRA-N-9	Additional Southern developments		Less-Adv	Non-PCI
TRA-F-752	Capacity4Gas – DE/CZ		FID	Non-PCI	TRA-A-320	Carregado Compressor Station		Advanced	Non-PCI	TRA-N-14	Komotini-Thessalonika pipeline		Less-Adv	Non-PCI
TRA-F-755	CS Rimpur		FID	Non-PCI	TRA-A-394	Norwegian tie-in to Danish upstream system		Advanced	Non-PCI	TRA-N-27	Physical reverse flow from NI to GB and IE via SNIP pipeline		Less-Adv	Non-PCI
TRA-F-763	EUGAL Europäische Gasanbindungsleitung (European Gaslink)		FID	Non-PCI	TRA-A-408	Wilhelmshaven LNG-Terminal Anbindungsleitung		Advanced	Non-PCI	TRA-N-53	White Stream		Less-Adv	Non-PCI
TRA-F-814	Upgrade for IP Deutschneudorf et al. for More Capacity		FID	Non-PCI	TRA-A-496	Increase of Gas Transport to the Netherlands		Advanced	Non-PCI	TRA-N-66	Interconnection Croatia-Bosnia and Herzegovina (Slobodica – Bosanski Brod)		Less-Adv	Non-PCI
TRA-F-895	Balticconnector		FID	Non-PCI	TRA-A-561	Poland-Ukraine Interconnector (Ukrainian section)		Advanced	Non-PCI	TRA-N-75	LNG evacuation pipeline Zlobin-Bosiljevo-Sisak-Kozarac		Less-Adv	Non-PCI
TRA-F-902	Capacity increase at IP Lanzhot entry		FID	Non-PCI	TRA-A-621	Poland – Ukraine Gas Interconnection (PL section)		Advanced	Non-PCI	TRA-N-192	Entry capacity expansion GATE terminal		Less-Adv	Non-PCI
TRA-F-915	Enhancement of Estonia-Latvia interconnection		FID	Non-PCI	TRA-A-628	Eastring – Slovakia		Advanced	Non-PCI	TRA-N-224	Gas pipeline Brod – Zenica		Less-Adv	Non-PCI
TRA-F-916	Capacity4Gas – CZ/SK		FID	Non-PCI	TRA-A-654	Eastring – Bulgaria		Advanced	Non-PCI	TRA-N-258	Developments for Mentor LNG terminal 2.5 bcm expansion		Less-Adv	Non-PCI
TRA-F-928	Balticconnector Finnish part		FID	Non-PCI	TRA-A-655	Eastring – Romania		Advanced	Non-PCI	TRA-N-269	Developments for Fosmax (Cavaou) LNG 8.25 bcm expansion		Less-Adv	Non-PCI
TRA-F-937	Nord Stream 2		FID	Non-PCI	TRA-A-656	Eastring – Hungary		Advanced	Non-PCI	TRA-N-299	M3/I Sempeter – Vodic		Less-Adv	Non-PCI
TRA-F-949	Oude/NLJ-Bunde/DE) GTD H-Gas		FID	Non-PCI	TRA-A-808	Additional transport of gas volumes to the Netherlands		Advanced	Non-PCI	TRA-N-303	Interconnection Croatia-Bosnia and Herzegovina (west)		Less-Adv	Non-PCI
TRA-F-954	TAG Reverse Flow		FID	Non-PCI	TRA-A-829	Physical Reverse Flow at Moffat interconnection point (IE/UK)		Advanced	Non-PCI	TRA-N-334	Interconnection Croatia/Slovenia (Umag-Koper)		Less-Adv	Non-PCI
TRA-F-964	New NTS developments for Latvia and gas from the Black Sea shore		FID	Non-PCI	TRA-A-950	Gulitritz – Lugo – Zamora pipeline		Advanced	Non-PCI	TRA-N-354	Interconnection with Slovenia		Less-Adv	Non-PCI
TRA-F-1169	Trans-Balkan Bi-directional Flow		FID	Non-PCI	TRA-A-951	Embedding CS Fölnhusen in H-Gas		Advanced	Non-PCI	TRA-N-402	TENP Security of Supply		Less-Adv	Non-PCI
TRA-F-1241	Interconnection with production in Gela		FID	Non-PCI	TRA-A-967	Nea-Messimria to Evzon/Gevgelija pipeline (IGNM)		Advanced	Non-PCI	TRA-N-423	GCA Mosonmagyaróvár		Less-Adv	Non-PCI
TRA-F-1254	CS Elten		FID	Non-PCI	TRA-A-980	Interconnection North Macedonia-Greece (North Macedonian part)		Advanced	Non-PCI	TRA-N-439	Stazione di Spinta 'San Marco'		Less-Adv	Non-PCI
TRA-F-1267	Upgrade Sölustorf station		FID	Non-PCI	TRA-A-1199	LNG Terminal Brunsbüttel – Grid Integration		Advanced	Non-PCI	TRA-N-502	Interconnector Romania – Ukraine		Less-Adv	Non-PCI
TRA-F-1271	Compressor Station Krummhoern		FID	Non-PCI	TRA-A-1268	Romania-Serbia Interconnection		Advanced	Non-PCI	TRA-N-594	Interconnection between RD & UA gas transmission systems		Less-Adv	Non-PCI
TRA-F-1276	Compressor station at Nea Messimria (3 rd unit)		FID	Non-PCI	TRA-A-1303	IAEF – Viera ccgt		Advanced	Non-PCI	TRA-N-598	NTS developments in North-West Romania		Less-Adv	Non-PCI
TRA-F-1277	Upgrading GMS Isaccoa 1 and GMS Negro Voda 1		FID	Non-PCI						TRA-N-809	Reallocation H-Gas towards NL Bunde/Dude to Zone Dode StatenZijl H		Less-Adv	Non-PCI
										TRA-N-810	TAP Expansion		Less-Adv	Non-PCI
										TRA-N-851	Southern Interconnection pipeline BIH/CRO		Less-Adv	Non-PCI
										TRA-N-873	Additional import at Oude StatenZijl area		Less-Adv	Non-PCI
										TRA-N-882	Transferring L-gas infrastructure to H-gas		Less-Adv	Non-PCI
										TRA-N-910	West Interconnection BIH/CRO		Less-Adv	Non-PCI
										TRA-N-955	GDJ Complete conversion to H-gas		Less-Adv	Non-PCI
										TRA-N-959	Further enlargement of BG—RD—HU—AT transmission corridor (B0ISU phase 3)		Less-Adv	Non-PCI
										TRA-N-1058	LNG Evacuation Pipeline Kozarac-Slobodnica		Less-Adv	Non-PCI
										TRA-N-1043	Export to Malta		Less-Adv	Non-PCI
										TRA-N-1044	Moffat Physical Reverse Flow		Less-Adv	Non-PCI
										TRA-N-1123	Compressor Station Kipi Increment		Less-Adv	Non-PCI
										TRA-N-1181	Connecting pipe to LNG terminal in Latvia		Less-Adv	Non-PCI
										TRA-N-1194	Sardinia Methanization		Less-Adv	Non-PCI
										TRA-N-1202	GCP GAZ-SYSTEM/ONTRAS – incremental capacity project		Less-Adv	Non-PCI
										TRA-N-1235	Firm transmission capacity increase at the IP Velič Zlieve		Less-Adv	Non-PCI
										TRA-N-1244	Greece – Italy interconnection		Less-Adv	Non-PCI
										TRA-N-1265	Biometane productions interconnection		Less-Adv	Non-PCI
										TRA-N-1278	Compressor station at Ambelia		Less-Adv	Non-PCI

Figure 34: Map for Hydrogen (HYD) and Retrofitted (RET) projects in TYNDP 2022, clean version

Download the map from ENTSGO website:

Just click on the icon.





When the same point is affected by several projects, the point is shown with the highest project status (operational, FID, advanced, non-FID), the status from single projects can vary from that.

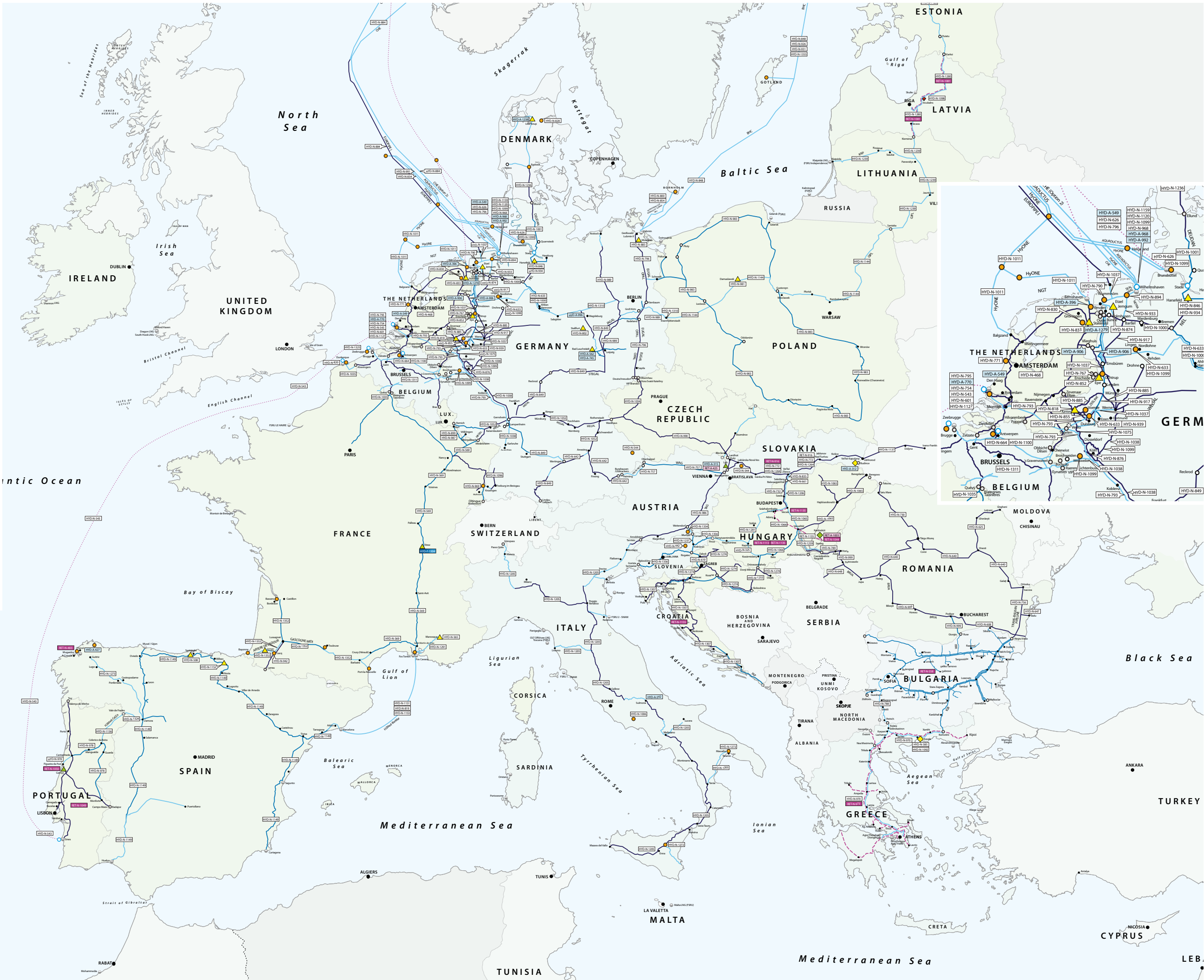
The projects are shown with the planning status reported in their TYNDP 2022 submission.

All data provided on this map is for information purposes and shall be treated as indicative and non-contractual in nature, without pre-empting different outcomes of any possible discussion held at regional level. Under no circumstances shall it be regarded as information intended for commercial use.

polaris Infrastructure

Version : March 2023

WGS 84 / Pseudo-Mercator projection



MAP FOR BIOMETHANE (BIO) AND OTHER INFRASTRUCTURE (OTH) PROJECTS IN TYNDP 2022

BIOMETHANE DEVELOPMENT PROJECTS				
BIO-F-437	Supercritical water gasification demonstration facility Alkmaar		FID	PROD-INJ
BIO-A-921	Circular economy: waste to biomethane		Advanced	PROD-INJ
BIO-A-1107	Energy conversion waste organic materials to biomethane in Zsana		Advanced	PROD-INJ
BIO-N-20	GNI Sustainable Renewable Gas Central Grid Injection Project		Less-Adv.	PROD-INJ
BIO-N-125	Implementation of smart solutions for injection of renewable gases		Less-Adv.	PROD-INJ
BIO-N-287	Production of biomethane as a fuel for compressors		Less-Adv.	PROD-INJ
BIO-N-497	Reverse flow biomethane Denmark vol. 2		Less-Adv.	REVERSE
BIO-N-547	Biomethane : Reverse flow Projects		Less-Adv.	REVERSE
BIO-N-624	Biomethane: Reverse flow projects		Less-Adv.	REVERSE
BIO-N-728	Biomethane: connection of production units		Less-Adv.	PROD-INJ
BIO-N-1265	Biomethane productions interconnection		Less-Adv.	PROD-INJ
OTHER INFRASTRUCTURE RELATED PROJECTS				
OTH-F-541	CORE LNGas hive and LNGHIVE2 Infrastructure & logistic solutions		FID	TRANSPORT
OTH-F-632	Railway Proj. roadmap. Transformation to LNG, Biogas, e-fuels & H2		FID	TRANSPORT
OTH-F-743	Impulse 2025		FID	ELECTRICITY
OTH-A-300	HyOffWind Zeebrugge		Advanced	HYD PROD
OTH-A-401	Antwerp@C		Advanced	CCS
OTH-A-430	Porthos		Advanced	CCS
OTH-A-898	CNG filling station system development (CroBlueCorr project)		Advanced	TRANSPORT
OTH-A-924	Power to Methanol Antwerp		Advanced	OTHER
OTH-A-1043	Power conversion with fuel cell in Kardoskút UGS		Advanced	HYDROGEN
OTH-A-1046	Replacement of boilers in Zsana and Hajduszoboszló UGS		Advanced	METHANE
OTH-A-1073	Sector-coupling with installing and relocating compressor units		Advanced	HYDROGEN
OTH-A-1104	Synthetic methane production in Zsana UGS w/ electricity balancing		Advanced	SYNT METH
OTH-A-1110	Reduction of methane emission with portable compressor		Advanced	METHANE
OTH-A-1269	CO2 Export & Transmission Facilities		Advanced	CCS
OTH-A-1337	Reduction of methane emissions in UGS Lab		Advanced	METHANE
OTH-N-305	PEGASUS		Less-Adv.	SYNT METH
OTH-N-306	Greening of Gas (GoG)		Less-Adv.	OTHER
OTH-N-322	North Sea Wind Power Hub		Less-Adv.	HYDROGEN
OTH-N-453	Hydrogen production for fuel gas at Városföld CS		Less-Adv.	HYD PROD
OTH-N-456	SAVA aquifer CO2 transmission cluster		Less-Adv.	CCS
OTH-N-551	DRAVA aquifer CO2 transmission cluster		Less-Adv.	CCS
OTH-N-554	Osijek aquifer CO2 transmission cluster		Less-Adv.	CCS
OTH-N-560	Establishing power plant cap. to use max. 25% H2 at Szőreg-1 UGS		Less-Adv.	ELECTRICITY
OTH-N-604	P2G4A		Less-Adv.	ELECTRICITY
OTH-N-920	Measures for the reduction of methane emissions		Less-Adv.	METHANE
OTH-N-929	Ghent Carbon Hub		Less-Adv.	CCS
OTH-N-972	Methane emission red. booster compressor Mosonmagyaróvár CS		Less-Adv.	METHANE
OTH-N-982	Portable compressor to reduce methane emission		Less-Adv.	METHANE
OTH-N-984	Pycasso		Less-Adv.	CCS
OTH-N-993	LNG Hub: 2nd jetty for maritime fuel		Less-Adv.	TRANSPORT
OTH-N-1069	Methane emission reduction booster compressor at Városföld CS		Less-Adv.	METHANE
OTH-N-1070	Methane emission reduction at 7 compressor station		Less-Adv.	METHANE
OTH-N-1071	Hydrogen production for fuelgas at Mosonmagyaróvár CS		Less-Adv.	HYD PROD
OTH-N-1133	CO2 network in Dunkirk		Less-Adv.	CCS
OTH-N-1157	CO2 Grid Italy		Less-Adv.	CCS
OTH-N-1201	Reduction of transmission system methane emissions		Less-Adv.	METHANE
OTH-N-1230	Green H2 at CS01		Less-Adv.	HYD PROD
OTH-N-1242	Modernisation of compressor units		Less-Adv.	ELECTRICITY
OTH-N-1338	Hydrogen production for fuelgas at Szőreg-1 UGS		Less-Adv.	HYD PROD

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Figure 35: Map for Biomethane (BIO) and Other Infrastructure (OTH) projects in TYNDP 2022

KEYS

Cross-border points / intra-country or intra balancing zone points

Cross-border interconnection point within Europe or export point to non-EU country

Cross-border interconnection point with third country (import)

Cross-border interconnection point (Virtual Point)

Intra-country or intra balancing zone points

LNG import terminal (operational)

LNG export terminal (operational)

Cross-border interconnection point within Europe or export point to non-EU country Under construction or Planned

Cross-border third country (import) Under construction or Planned

Third country cross-border (Virtual Point / import)

Third country cross-border interconnection point

LNG import terminal (Under construction or planned)

LNG Export terminal (Under construction or planned)

Gas Reserve areas

Gas field

Drilling platform

Countries

Other Countries

EU Countries

Transport by pipeline

Existing infrastructure for natural gas :

Diameter < 600 mm

Diameter 600 - 900 mm

Diameter > 900mm

Not operational

Biomethane / Other pipeline infrastructure

FID project

Non-FID, advanced project

Non-FID, less-advanced project

Biomethane projects

FID projects

Non-FID, advanced projects

Non-FID, less-advanced projects

Project identification :

ENTSO project code

PHOD-IN

Network development projects enabling biomethane production/injection into the gas grid

REVERSE

Projects enabling the reverse transportation between DSO and TSO of biomethane

Other infrastructure projects

FID projects

Non-FID, advanced projects

Non-FID, less-advanced projects

Project identification :

ENTSO project code

CCS

Converted Infrastructure for Carbon Capture & Storage

HYD PHOD

Hydrogen production facilities other than the ones included in category HYD

TRANSPORT

A project related to the transport sector (incl. road, railway, aviation and maritime transport)

ELECTRICITY

Projects enabling gas- electricity integration

HYDROGEN

Projects enabling the production, reception, injection, transportation or end-use supply of hydrogen

SYNT METH

Synthetic methane projects aiming at decarbonizing the gas grids

METHANE

Dedicated projects to reduce methane emission in existing infrastructure

OTHER

Any other infrastructure related projects

BIO-F-437

HYPSTER

storengy

FID

Project status codes :

FID

Advanced

Less-Adv.

FID status (Final Investment Decision)

Advanced status is applied to all projects that, based on the information submitted, have:

- commissioning year expected at the latest by 31st December of the year of the TYNDP project data collection + 6 (e.g. 2028 in case of TYNDP 2022, for which projects are collected in 2022)

- and whose permitting phase has started ahead of the TYNDP project data collection - OR -

FEED has started (or the project has been selected for receiving CEF grants for FEED ahead of the TYNDP project data collection)

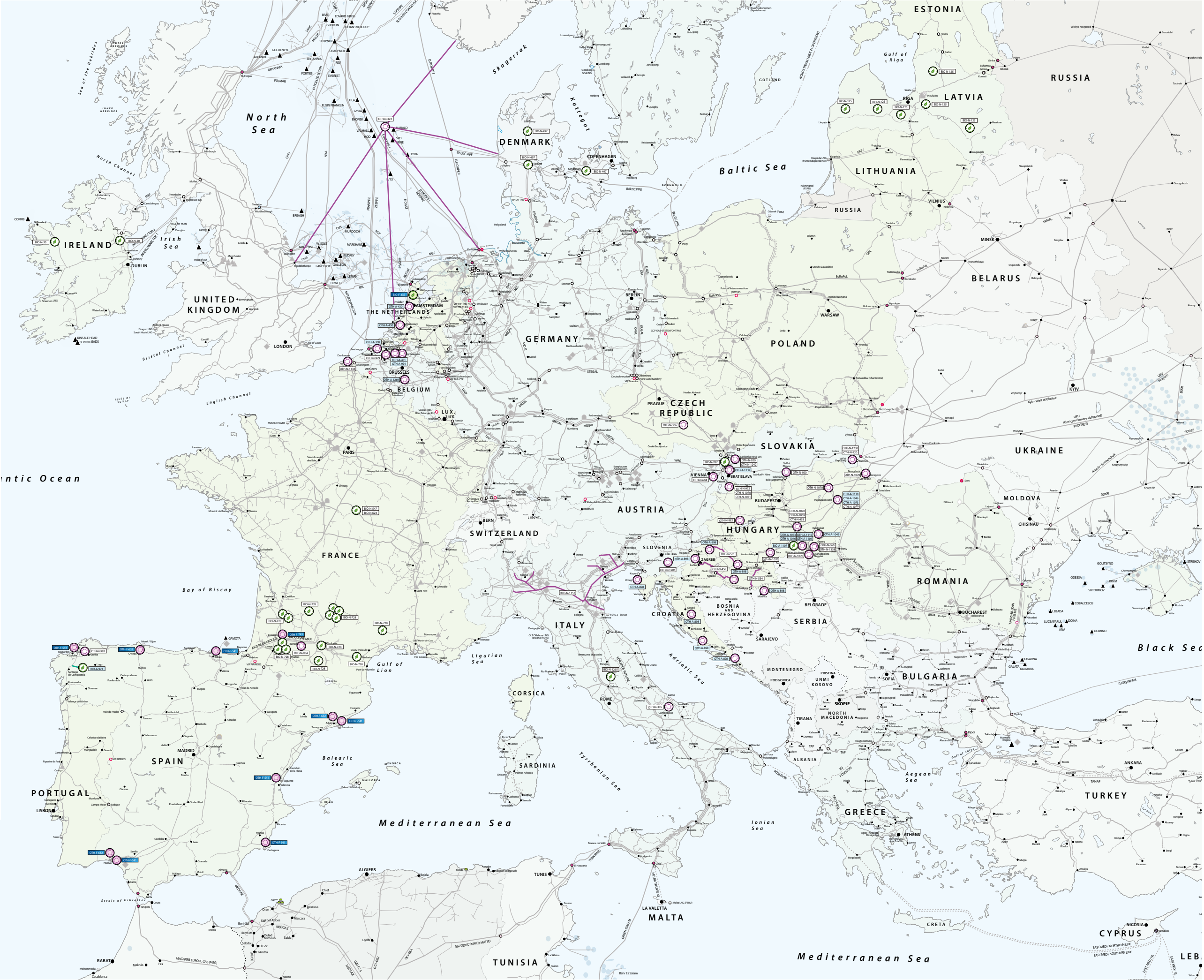
ENTSO currently comprises 43 TSO members,

2 Associated Partners from 27 European Countries and 10 Observers

When the same point is affected by several projects, the point is shown with the highest project status (operational, FID, advanced, non-FID), the status from single projects can vary from that.

The projects are shown with the planning status reported in their TYNDP 2022 submission.

All data provided on this map is for information purposes and shall be treated as indicative and non-contractual in nature, without pre-empting different outcomes of any possible discussion held at regional level. Under no circumstances shall it be regarded as information intended for commercial use.



7.5 FURTHER DETAILS ON THE TYNDP 2022 PROMOTERS' SUBMISSIONS FOR HYD, RET, BIO AND OTH

Similar to → [section 6.4.](#), this section provides more details on the investments under category HYD, RET, BIO and OTH submitted to TYNDP 2022. The high level of investments should be considered in the context of the background described in → [section 6.4.](#)

Overall, 358 investments have been submitted to TYNDP 2022 by more than 60 different project promoters including both TSOs and third-party promoters. From this number 215 investment included in TYNDP 2022 are falling under the categories HYD, RET, BIO and OTH (60 %)

The below graph provides the overview for this submission, compared to the previous TYNDP editions.

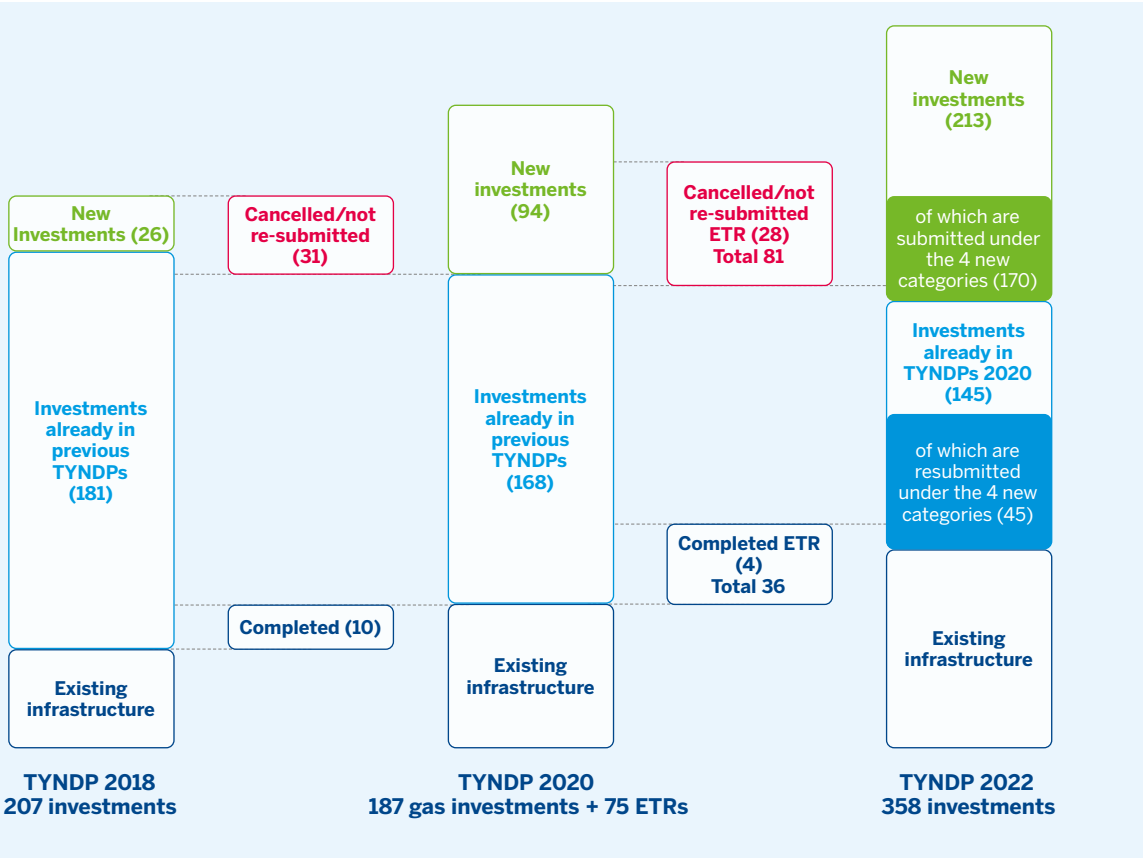


Figure 36: Comparison between TYNDP 2018, TYNDP 2020 and TYNDP 2022 – New categories

From the graph the following conclusions can be drawn:

- From 75 ETR investments in TYNDP 2020 to 215 investment (re-)submitted for the four new categories in TYNDP 2022 and thus we can detect a high increase investments;
- The high number of new investments shows the willingness of promoters to commit to the

EU decarbonisation targets through the submission of newly introduced TYNDP 2022 project categories.¹⁸ Here the highest share falls on the construction and conversion of existing infrastructure to carry or store 100 % hydrogen.

The following assessment chapters will elaborate the submissions in more detail.

18 From the 170 new submitted investments it is very likely that former ETRs submitted for TYNDP 2020 are included here. By introducing the new project categories and subcategories for TYNDP 2022, Promoters had the possibility to split projects to fully align with the new categories. E.g. 1 ETR Investment in TYNDP 2020 = 1 HYD Investment and 1 OTH Investment in TYNDP 2022.

7.5.1 OVERVIEW PER STATUS

Considering all submitted investments for HYD, RET, BIO and OTH, when compared to the 75 ETR submissions in TYNDP 2020 an important increase to 215 in the 2022 edition can be observed. This increase stems from:

- Need of industries and societies within the European countries to decarbonise and reduce greenhouse gas emissions in the near-, mid- and long term future;
- Enhancing deployment of renewable gases, boosted by REPowerEU and the inclusion of hydrogen infrastructure and Electrolyser in the revised TEN-E.

The following figures and tables provide a statistical overview of promoters' submissions (see TYNDP Annex A for further details) based on information such as the type of infrastructure or the FID/PCI status. Those reports reflect all the details entered as part of the data collection process by project promoters.

Figure 37 presents an overview of all the investments accepted for inclusion in TYNDP 2022 per type of infrastructure for Category HYD, RET, BIO and OTH.

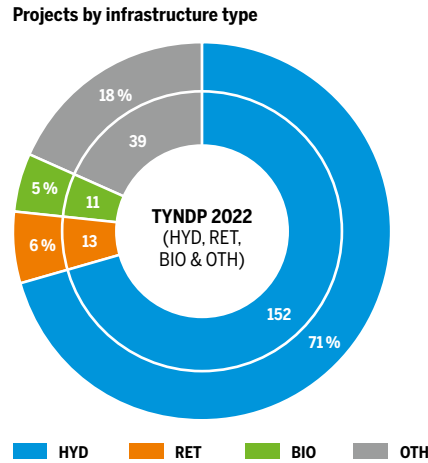


Figure 37: Investment inclusion in TYNDP 2022 per type of infrastructure. The inner circle represents absolute numbers of investments; the outer circle represents the share of each project type.

HYD, RET, Bio and OTH investments by status

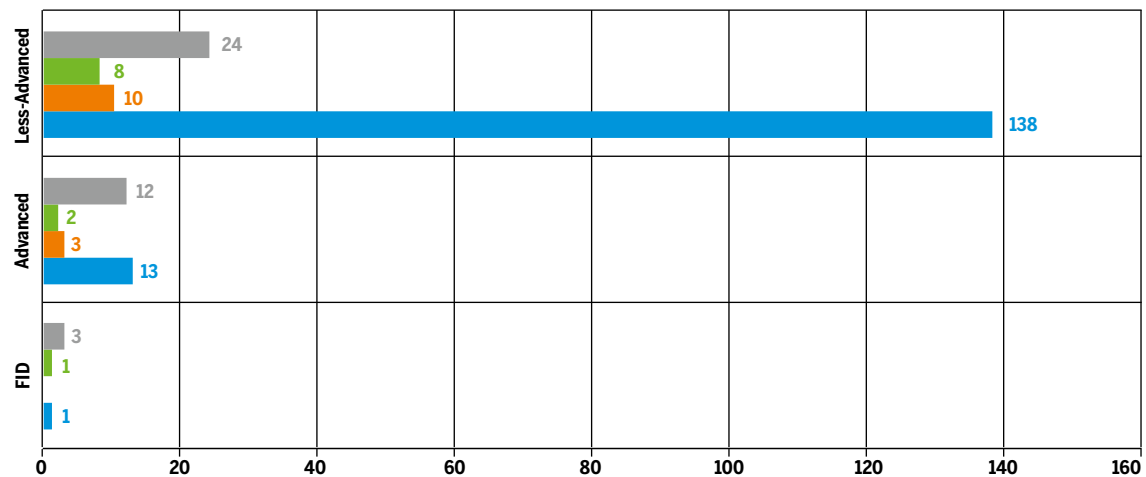


Figure 38: Promoters submissions by maturity status – HYD, RET, BIO & OTH

Figure 38 shows the breakdown of TYNDP 2022 HYD, RET, BIO and OTH investments by project maturity status.

As seen clearly in figure 38, the majority of these investment were recorded in status "less advanced". Only a very small share of hydrogen infrastructure investments (5 out of 215 investments) have reached the FID status.

7.5.2 OVERVIEW OF PROMOTERS' INVESTMENTS PER GEOGRAPHICAL LOCATION

The following charts provide an overview of promoters' submissions based on their geographical location, infrastructure type and maturity status for the four categories HYD, RET, Bio and OTH.

For TYNDP 2022, 215 investments relevant for the four above mentioned categories were included for 26 countries. Projects submitted for Ukraine and Norway are supply chain projects bringing hydrogen to the EU border.

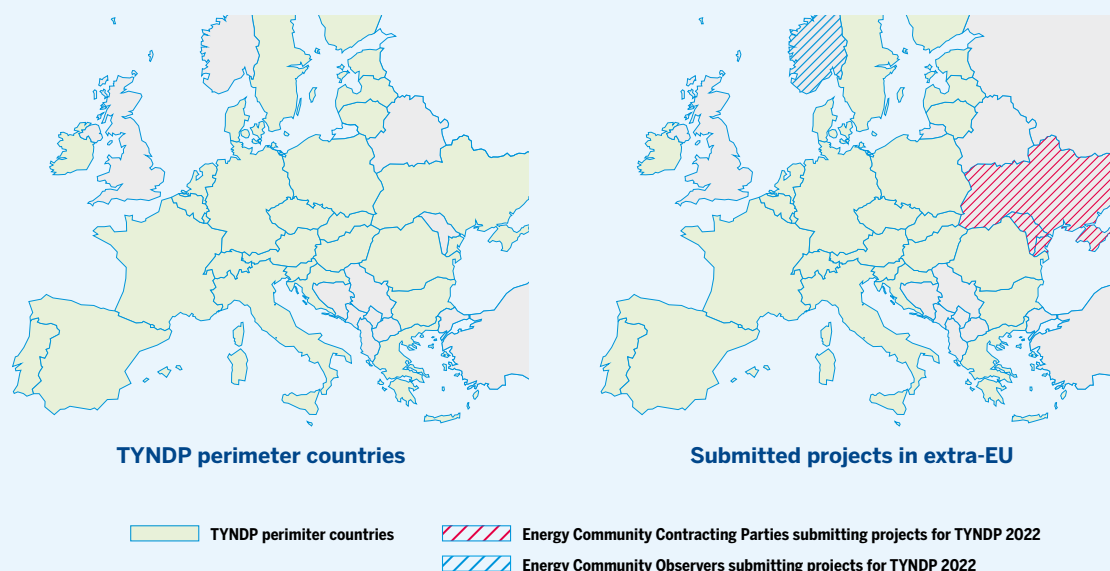


Figure 39: TYNDP perimeter countries and countries outside European Union for which HYD, RET, BIO & OTH initiatives were submitted in TYNDP 2022



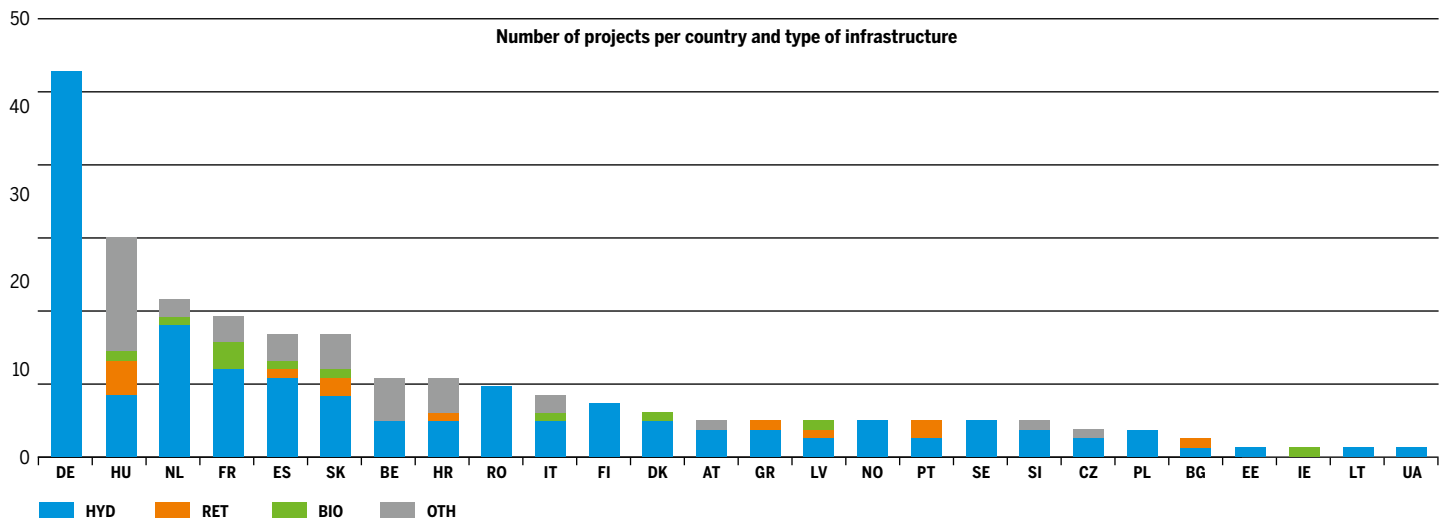


Figure 40: Number of investments per country and type of infrastructure

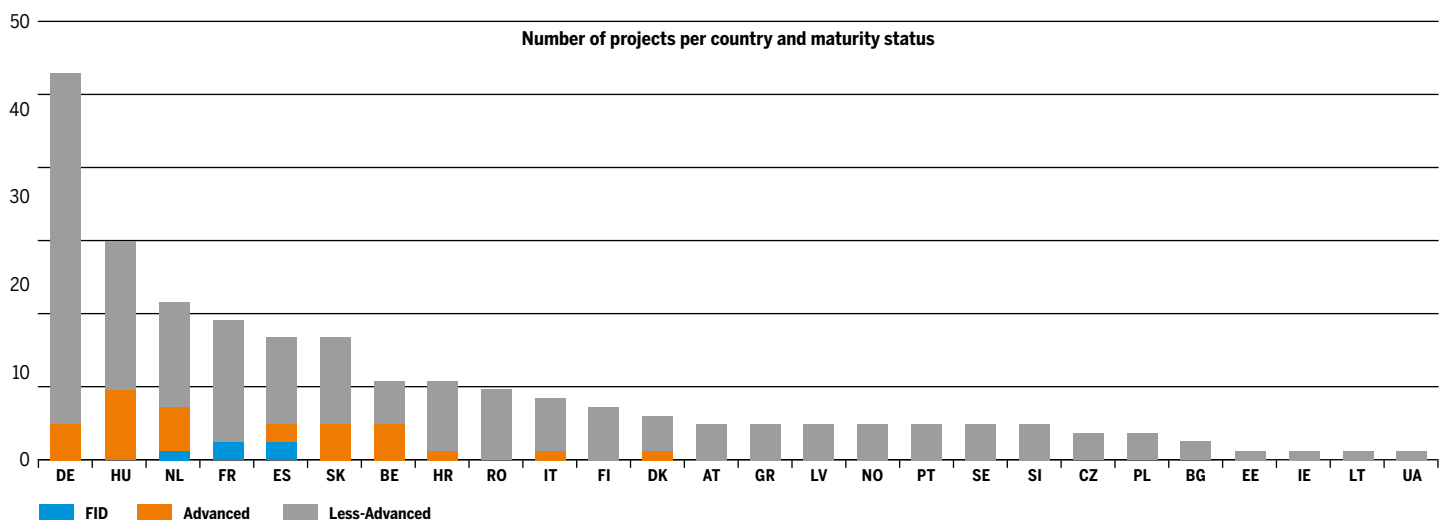


Figure 41: Number of investments per country and maturity status

7.5.3 ANALYSIS OF PROJECTS SCHEDULE

The majority of projects falling under the Category HYD, RET, BIO and OTH have the Less-Advanced Status (84 %) and have commission years in the

mid- and long future. 49 Investments indicated to start commissioning until the end of 2025 (23 %).

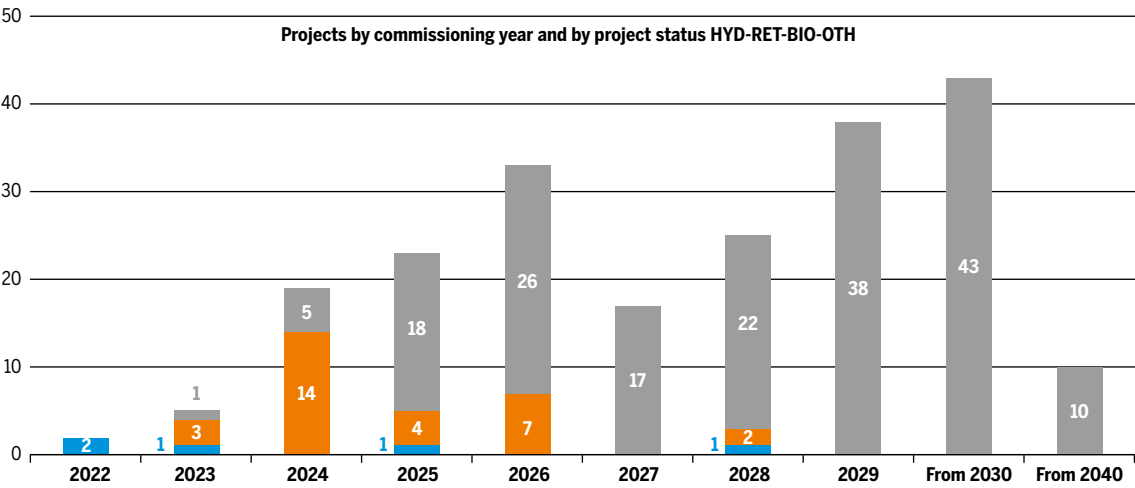


Figure 42: Investments by commissioning year and by project status HYD-RET-BIO-OTH

As part of the project collection, promoters have to provide information (except for some specific situations) about the projects' schedules of the main project phases and milestones (Feasibility, FEED, Permitting, FID, Construction and Commissioning). ENTSG analysed the provided data but it should be noted that the majority of projects are less advanced and several promoters for hydrogen infrastructure have reported that the development and time schedule of these projects is changing quite fast based on occurred rapid changes in the Euro-

pean gas market and increased hydrogen ambitions of many countries and commercial players.

In case of the **Feasibility Study phase**, the start and end dates, either past or expected, have been provided for 154 investments. The average duration of the Feasibility Study phase for these projects is 13.5 months with the highest average duration in case of BIO projects (26 months) and the lowers average duration for RET projects (11 months), see figure 43.

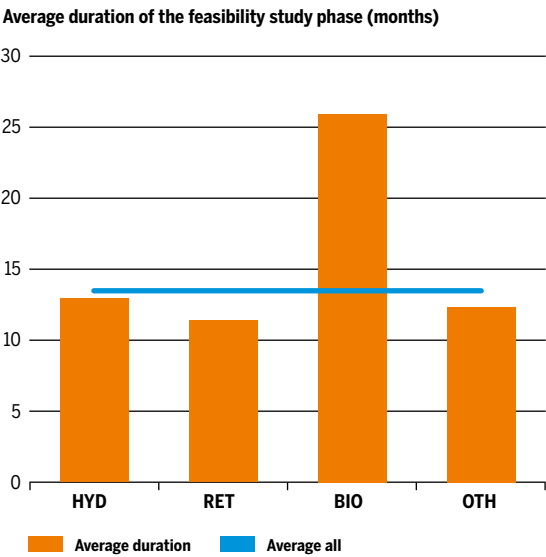


Figure 43: Average duration of the Feasibility Study phase per type of infrastructure

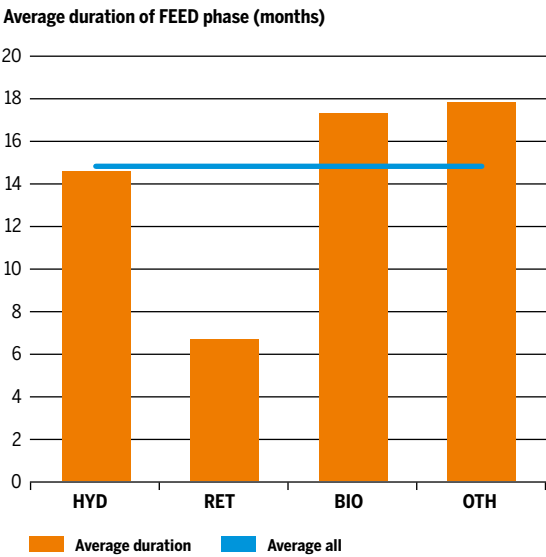


Figure 44: Average duration of the FEED phase per HYD, RET, BIO and OTH Investment

57 investments have indicated the completion of the feasibility study until 31.12.2022. 27 investments have started the feasibility before the 31.12.2022 but is still ongoing with the latest finalisation date in January 2030. The remaining 71 investments haven't started their feasibility study by the end of 2022.

Regarding the **FEED phase**, the start and end dates, either past or expected, have been provided for 122 investments. The average duration of the FEED phase for these projects is 15 months with the highest average duration in case of OTH projects (18 months) and BIO (17 months) and the lowest average duration in case of RET projects (7 months). HYD projects have an average duration of 14.5 months, see figure 42.

23 investments have indicated to complete the FEED phase until 31.12.2022. 14 investments have started FEED phase before the 31.12.2022 but are still ongoing with the latest finalisation date in December 2025. The remaining 85 investments haven't started the FEED phase by the end of 2022.

In case of the **Permitting phase**, the start and end dates, either past or expected, have been provided for 123 investments. The average duration of the Permitting phase for these projects is 23 months, with the highest average duration in case of HYD projects (25.5 months) and the lowest average duration in case of RET projects (12 months) and BIO projects (14 months). OTH projects have an average duration of 17 months, see figure 45.

Ten investments indicated the completion of the Permitting phase until 31.12.2022, of which are four HYD projects (HYD-A-396, HYD-A-549, HYD-A-562

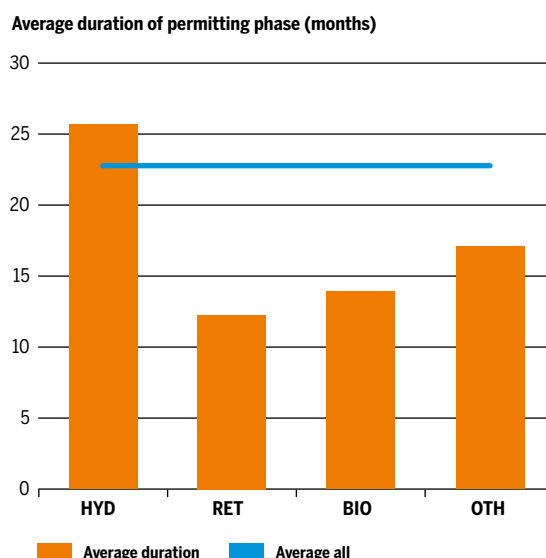


Figure 45 Average duration of the Permitting phase per HYD, RET, BIO and OTH Investment

and HYD-A-745). 17 investments indicated to start permitting until 31.12.2022 with latest expected end of permitting until December 2030. 89 Investment indicated to start permitting between 2023–32, which the highest concentration in the years 2024 and 2025.

135 Investments provided information regarding the (expected) FID Date, with only five investment actual reaching FID status until the end of the project collections (BIO-F-437, OTH-F-541, OTH-F-632, OTH-F-743, HYD-F-1304). Based on the lack of maturity and uncertainties on the time schedule, the FID Date as well as the construction period will be not further analysed but all information can be found in the respective → **Annex A** for TYNDP 2022.

Status	Completed in TYNDP 2022	FID in TYNDP 2022	Advanced in TYNDP 2022	Less-Advanced in TYNDP 2022	Cancelled/Not-resubmitted	Total
FID (TYNDP 2020)	2	3	0	1	3	9
Advanced (TYNDP 2020)	1	1	2	0	0	4
Less-Advanced (TYNDP 2020)	1	0	9	27	25	62
Total	4	4	11	28	28	75

Table 7: Evolution of projects from TYNDP 2020 to TYNDP 2022 (Energy Transition Projects TYNDP 2020 Category)

The project category ETR in TYNDP 2020 have been replaced by the new categories HYD, RET, BIO and OTH. Promoters were able to resubmit projects

using the project categories as defined in the PID for TYNDP 2022.

Of the nine investments submitted for ETR already having the FID status in TYNDP 2020:

- ▲ 2 were completed;
- ▲ 3 are still planned with FID status in TYNDP 2022 submitted under Category OTH (OTH-F-541, OTH-F-632 and OTH-F-743);
- ▲ 1 is still planned but no more FID:
 - BIO-N-728¹⁹ present in TYNDP 2022 has the Less-Advanced status while in TYNDP 2020 it was FID status. The Promoter confirmed that this project is still on time but haven't provided sufficient information regarding the time schedule to keep the FID Date.
- ▲ 3 projects have been cancelled (ETR-F-523, ETR-F-516 and ETR-F-599).

Of the four ETR investments having the Advanced status in TYNDP 2020:

- ▲ 1 were completed (ETR-A-64);
- ▲ 1 got the FID after TYNDP 2020 project collection (BIO-F-437);
- ▲ 2 still have the Advanced status (HYD-A-312 and OTH-A-430);

Of the 62 ETR TYNDP 2020 investments having Less-Advanced status:

- ▲ 1 were completed (ETR-N-938);
- ▲ 9 moved from Less-Advanced to Advanced status;
- ▲ 27 are still planned and present Less-Advanced status;
- ▲ 25 were cancelled/not-resubmitted.

7.5.4 INVESTMENT COSTS

Investment costs are for project promoters in many cases commercially sensitive information and might have the potential to negatively affect the competitive position of project promoters vis-à-vis contractors. This is in particular valid for Hydrogen Infrastructure Projects as currently not many reference values/indicators are available.

In total 115 Investments in the HYD, RET, BIO and OTH categories have provided Cost Information as non-confidential. Starting in 2029 the highest concentration of costs can be reported.

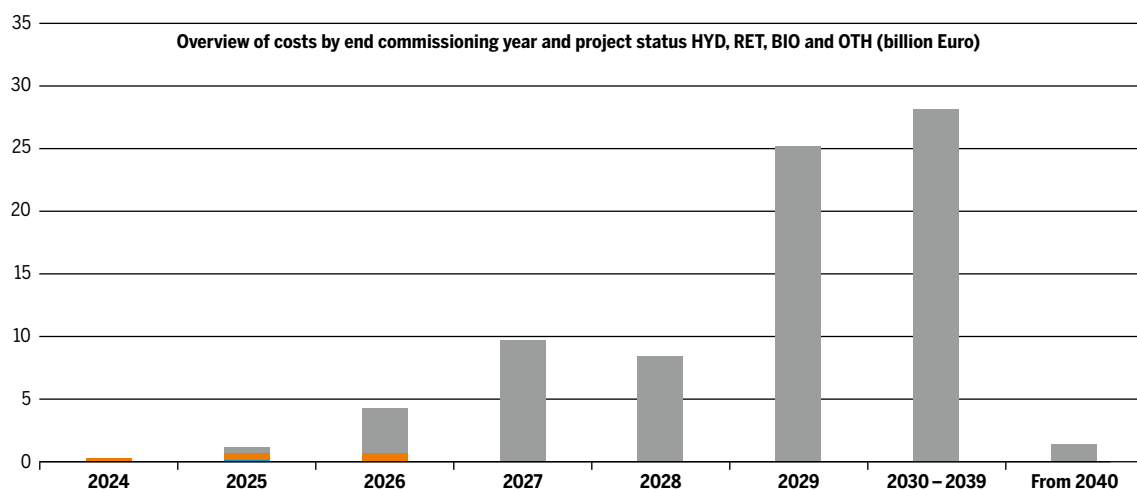


Figure 46: Overview of total cost by commissioning year and project status for HYD, RET, BIO and OTH (billion €)

Given that the maturity of projects has been submitted under HYD and most projects are having the

less advanced status the highest expected costs are concentrated here.

¹⁹ Biomethane: connection of production units

Besides the expected CAPEX, ENTSOG asked Promoters for this TYNDP edition to provide figures for the expected range in [in %] on how the CAPEX may differ. Analysing this CAPEX range is emphasising the less mature status of the investments in these four new project categories. Furthermore, promoters do not have comparison values based on the lack of commissioned projects in the past. The average range for TRA, UGS and LNG is only 21 %, while for HYD Investment it is the highest average range of 35 %. OTH Investments have an average range of 29 %, while RET and BIO show a average range of 25 % (see figure 47).

In line with the ENTSOG Practical Implementation Document, the cost data submitted by the project promoters for the projects to be included in the TYNDPs is made public by ENTSOG unless the data is deemed confidential by the respective project promoters.

While fully acknowledging the importance and the right of promoters to keep project cost information confidential, at the same time, it is important that projects for which promoters have applied for the PCI label during the 1st PCI/PMI call under the revised TEN-E ensure the highest possible level of transparency and there is a level-playing field for all projects.

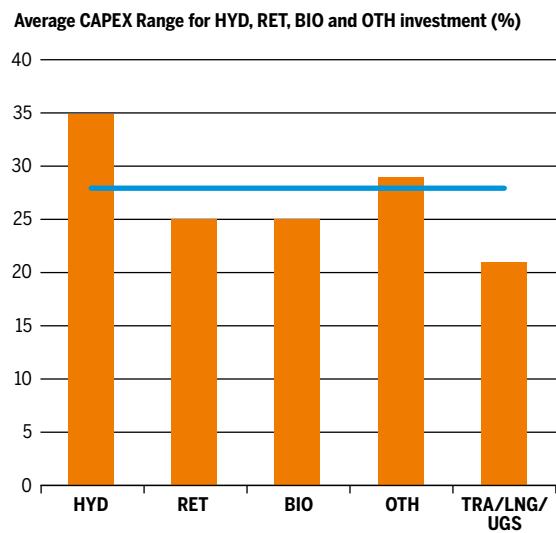


Figure 47: Average CAPEX Range per infrastructure category

On this basis, for PCI candidate projects that have marked their expected costs as confidential, alternative figures have been directly provided by the promoters based on reference costs. These figures, per project, will be later used only for public information sharing reasons in the Assessment phase, in order to ensure as much transparency as possible.



Picture courtesy of Plinacro

7.6 HYDROGEN INFRASTRUCTURE AND ITS 1ST PCI/PMI CALL UNDER THE REVISED TEN-E REGULATION

The revised TEN-E Regulation (EU) 2022/869 was published in May 2022 and according to Regulation (EU) 2022/869 Annex III.2 *“From 1 January 2024, the proposed hydrogen projects of common interest falling under the energy infrastructure categories set out in point (3) of Annex II to this Regulation are projects that are part of the latest available Community-wide ten-year network development plan for gas, developed by the ENTSO for Gas pursuant Article 8 of Regulation (EC) No 715/2009.”*

Following this, projects aiming to apply for the 1st PCI/PMI call were not prerequired to be included in this TYNDP edition and PCI project candidates were collected in a separate PCI call between 18 October and 15 December 2022. To allow a fair treatment of

all projects applying for PCI/PMI status, also project promoters for hydrogen infrastructure submitted during the TYNDP 2022 project collection phases could also update their submission providing the latest available data. After reviewing the PCI Collection, ENTSOG decided to include newly submitted initiatives, with relevance for the system assessment, also in TYNDP 2022.

Based on Hydrogen Infrastructure submissions received for the 1st PCI/PMI call and in line with the draft CBA Methodology, published by JRC, ENTSOG will run project-specific assessments (PS-CBA) for eligible PCI candidate Projects. The final list of groups and the assessment will be published together with the Final TYNDP 2022.

Picture courtesy of TAP



8 INCREMENTAL CAPACITY PROCESS

The incremental capacity process has been introduced by the EC Regulation (EU) 2017/459²⁰ as a streamlined and harmonised Union-wide process to react to possible market-based capacity requests for an increase in technical capacity or creation of new capacity.

The requested incremental capacity is offered based on a market demand. Technical capacity is increased at an existing IP or through establishing a new IP or creating a physical reverse flow capacity at an IP, which has not been offered before, only if there are binding market commitments and subject to the positive outcome of an economic test.

The aim of setting rules for incremental capacity is to identify the need for new/incremental capacity and to allocate both existing and incremental capacity in an integrated way.

The process lasts two years and is divided in two phases, a non-binding phase in which the demand for incremental capacity is assessed, and a binding phase where network users provide binding commitments for incremental capacity.

The non-binding phase

The non-binding phase starts after the annual yearly auction, at least in each odd-numbered year, with the assessment of demand indications for incremental capacity. The network users provide TSOs with their non-binding capacity demand. No later than eight weeks after the start of the annual yearly auction, TSOs are required to produce market demand assessment reports (DARs) to be published within 16 weeks after the start of the annual yearly auction. The DARs should consider, among other things, whether the TYNDP identifies a physical capacity gap whereby a specific region is undersupplied in a reasonable peak scenario and where offering incremental capacity at the interconnection point in question could close the gap; or a national network development plan identifies a concrete and sustained physical transport requirement. If the DAR identifies demand for incremental

capacity that cannot be satisfied by existing available capacity, the concerned TSOs will follow the incremental capacity process further. If no demand has been identified, the process stops at that point.

The design phase

In the next phase, the design phase, TSOs conduct technical studies for incremental capacity projects and coordinated offer levels based on technical feasibility and the DARs. A public consultation on the key parts of the draft project proposal is conducted and stakeholders have an opportunity to provide feedback on the TSOs' proposals. A key milestone after the design phase and public consultation is to submit a comprehensive incremental capacity project proposal to the relevant National Regulatory Authorities (NRAs). The NRAs will then have six months to issue coordinated decisions on the project proposal.

The allocation phase

After the NRAs' decisions, the binding allocation phase will start and binding commitments for incremental capacity from network users will be collected during the annual yearly auction. As a default, auctions are used. However, an alternative capacity allocation mechanism can be employed, subject to NRA's approval.

After receiving binding commitments for the incremental capacity offered in the annual yearly auction, the economic viability of the incremental capacity project will be assessed through the economic test. If the outcome of the economic test is positive on both sides of an interconnection point for at least one offer level that includes incremental capacity, an incremental capacity project will be initiated.

20 COMMISSION REGULATION (EU) 2017/459 of 16 March 2017 establishing a network code on capacity allocation mechanisms in gas transmission systems and repealing Regulation (EU) No 984/2013

8.1 INCREMENTAL CAPACITY PROCESS INITIATED IN 2021

Immediately after the start of the annual yearly capacity auctions in July 2021, a new cycle of the

incremental capacity process was initiated. Figure 48 illustrates the timeline for this process.

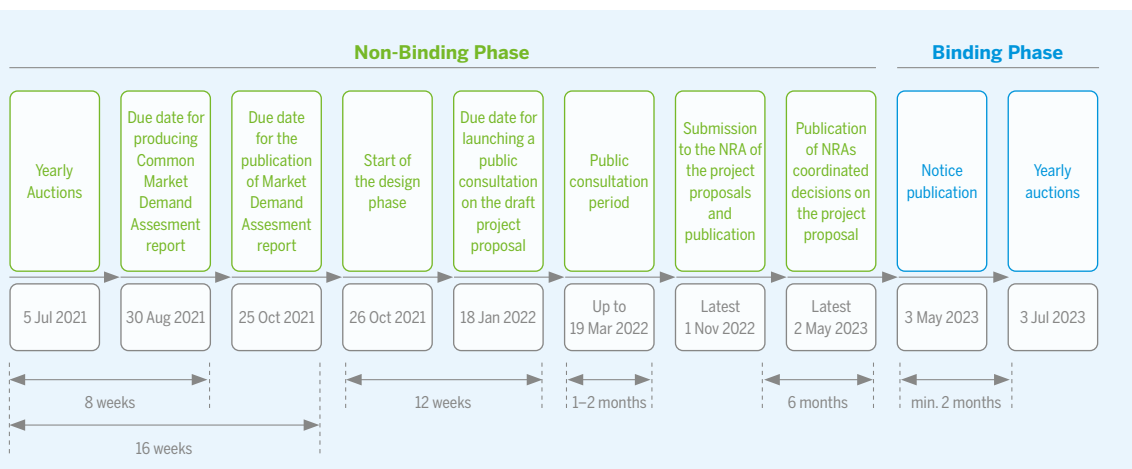


Figure 48: Timeline for the incremental capacity process initiated in 2021

The beginning of the process for 2021 has been marked by the development and publication of the DARs. Start of the design phase, due to received

market interest, has been triggered on six borders which is shown in table 8.

TYNDP 2022 Project Code	Description	Entry-exit border	TSO(s) involved in DAR	Gas flow direction covered by Demand Indications
		BELUX-DE	Fluxys Belgium, Fluxys TENP, GASCADE, Open Grid Europe, Thyssengas, Creos Luxembourg	only entry DE
	Polish-Czech Interconnection DAR 2021 (not submitted into TYNDP 2022) ¹	CZ-PL	NET4GAS, GAZ-SYSTEM ²	Exit PL/entry CZ
TRA-F-378 TRA-N-1112	Interconnector Greece-Bulgaria (IGB Project) Upgrade of Compressor Station at Komotini	GR-ICGB (GR)	DESFA, ICGB	exit GR/ entry ICGB (GR)
TRA-A-971 TRA-A-810 TRA-N-1195	Booster Compressor Station for TAP in Nea Messimvria TAP Expansion Matagiola-Massafra pipeline	GR-TAP-IT	DESFA, TAP, Snam Rete Gas S.p.A. ³	exit GR/entry TAP exit TAP/entry IT
		PL - UA	GAZ-SYSTEM, LLC Gas TSO of Ukraine ⁴	exit PL/entry UA
		UA - RO	LLC Gas TSO of Ukraine, Transgaz	entry UA/exit RO, "Bidirectional" for IP Tekove/Medieșu Aurit

¹ Incremental project Polish-Czech Interconnection DAR 2021 has not been submitted due to its initiation after the completion of the TYNDP 2022 projects data collection first phase. During the second extraordinary phase of projects data collection the PL-CZ incremental project was not submitted due to not finished discussion related to its final parameters.

² The project initiated by MDAR conducted by respective TSOs in 2021 was designed as one-directional (from PL to CZ) incremental capacity at the existing IP Cieszyn. (The capacity in the reverse direction – from CZ to PL – is already on the place.) This project was consulted with the market in January-March 2022. Both TSOs are still discussing the final parameters of the project. It has not been yet submitted for approval and for the moment concrete submission date is not known.

³ "The three Transmission System Operators, Trans Adriatic Pipeline AG (TAP), SNAM Rete Gas (SRG) and DESFA, submit to the National Regulatory Authorities of Greece, Italy and Albania, a Project Proposal for an incremental capacity project, in accordance with Regulation (EU) 2017/459. The Project Proposal for the incremental capacity project was approved by the relevant NRAs."

⁴ PL-UA INC project was submitted in November to both NRAs.

Table 8: Projects for which a demand for incremental capacity was identified in the DARs



In two cases, where there was no interest received during the 2021 incremental process, the process commenced in 2019²¹ will continue.

For TYNDP 2022 ENTSG collected information regarding projects triggered by the Incremental Capacity process. For natural gas projects the provision of such information was mandatory.

It should be noted that project data collection for TYNDP 2022 took place in two stages: first stage of project collection was in November 2021 and the extraordinary additional second phase was in June 2022 due to EC's REPowerEU Communication. At that time, the process reached a stage at which most TSOs receiving non-binding interest at the demand assessment phase, have submitted project proposals to their NRAs.

The General Court of the European Union ruling on the incremental capacity process

On 16 March 2022, the General Court of the European Union ("the Court") issued a ruling²² involving FGSZ, MEKH, E-Control, ACER and the EC. In its ruling, the Court declares Chapter V of Regulation 2017/459 (CAM NC) inapplicable under Article 277 TFEU, as the EC was not legally entitled to adopt rules on incremental capacity.

According to the Court, the Gas Regulation did not empower the EC to adopt the provisions governing the incremental capacity process of chapter V of the CAM NC. While the judgement does not have *erga omnes* effect²³, it will be up to the EC, to eventually develop new harmonised rules for the incremental capacity (Art 266 TFEU).

21 For the HU-SI border – involved TSOs FGSZ and Plinovodi, provided the terms currently disagreed could be mutually agreed by all concerned TSOs and NRAs, and IT-SI border – involved TSOs SNAM and Plinovodi;

22 <https://curia.europa.eu/juris/document/document.jsf?docid=256001&mode=lst&pageIndex=1&dir=&occ=first&part=1&text=&doclang=EN&cid=7186955>

23 Latin: "towards all" or "towards everyone". In legal terminology, erga omnes rights or obligations are owed toward all.

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LIST OF ABBREVIATIONS

ACER	Agency for the Cooperation of Energy Regulators
Bcm/Bcma	Billion cubic meters/Billion cubic meters per annum
BIO	Biomethane Development Projects
CAPEX	Capital expenditure
CBA	Cost-Benefit Analysis
DAR	Demand Assessment Report
EC	European Commission
ENTSO-E	European Network of Transmission System Operators for Electricity
ENTSO-G	European Network of Transmission System Operators for Gas
ETR	Energy Transition Projects
EU	European Union
FEED	Front End Engineering Design
FID	Final Investment Decision
GCV	Gross Calorific Value
GIE	Gas Infrastructure Europe
GHG	Greenhouse Gases
GRIP	Gas Regional Investment Plan
GWh	Gigawatt hour
e-GWh	Gigawatt hour electrical
GQO	Gas Quality Outlook
H-gas	High calorific gas
HYD	Hydrogen
IP	Interconnection Point
ktoe	A thousand tonnes of oil equivalent. Where gas demand figures have been calculated in TWh (based on GCV) from gas data expressed in ktoe, this was done on the basis of NCV and it was assumed that the NCV is 10 % less than GCV.
L-gas	Low calorific gas
LNG	Liquefied Natural Gas
mcm	Million cubic meters
MS	Member State

mtoe	A million tonnes of oil equivalents. Where gas demand figures have been calculated in TWh (based on GCV) from gas data expressed in mtoe, this was done on the basis of NCV and it was assumed that the NCV is 10 % less than GCV.
MWh	Megawatt hour
e-MWh	Megawatt hour electrical
NCV	Net Calorific Value
NDP	National Development Plan
NG	Natural Gas
NRA	National Regulatory Authority
OTH	Other Infrastructure-Related Projects
P2G	Power-to-Gas
PCI	Project of Common Interest
PID	Practical Implementation Document
REG-347	Regulation (EU) No 347/2013 of the European Parliament and of the council of 17 April 2013 on guidelines for trans-European energy infrastructure and repealing Decision No 1364/2006/EC and amending Regulations (EC) No 713/2009, (EC) No 714/2009 and (EC) No 715/2009
RES	Renewable Energy Sources
RET	Projects for Retrofitting Infrastructure to further integrate Hydrogen
SMR	Steam Methane Reforming
SoS	Security of Supply
Tcm	Tera cubic meter
TEN-E	Trans-European Networks for Energy
TSO	Transmission System Operator
TWh	Terawatt hour
e-TWh	Terawatt hour electrical
TYNDP	Ten-Year Network Development Plan
UGS	Underground Gas Storage (facility)
WI	Wobbe Index

COUNTRY CODES (ISO)

AL	Albania	LU	Luxembourg
AT	Austria	LV	Latvia
AZ	Azerbaijan	LY	Libya
BA	Bosnia and Herzegovina	MA	Morocco
BE	Belgium	ME	Montenegro
BG	Bulgaria	MK	North Macedonia
BY	Belarus	MT	Malta
CH	Switzerland	NL	Netherlands, the
CY	Cyprus	NO	Norway
CZ	Czech Republic	PL	Poland
DE	Germany	PT	Portugal
DK	Denmark	RO	Romania
DZ	Algeria	RS	Serbia
EE	Estonia	RU	Russia
ES	Spain	SE	Sweden
FI	Finland	SI	Slovenia
FR	France	SK	Slovakia
GR	Greece	TM	Turkmenistan
HR	Croatia	TN	Tunisia
HU	Hungary	TR	Turkey
IE	Ireland	UA	Ukraine
IT	Italy	UK	United Kingdom
LT	Lithuania		

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ENTSOG AISBL
Avenue de Cortenbergh 100
1000 Brussels, Belgium

Co-Authors

Mads Boesen, Hubert Bolesta, Maria Castro, Arturo de Onis Romero-Requejo, Mareike Dollinger, Diana Fathelbajanova, Joan Frezouls, Alexander Kättlitz, Pierre Marani, Dante Powell, Thilo von der Grün, Arnaud Weissrock, Kacper Żeromski, Nemo KG, INV WG, SCN WG, WGSB, Stefano Astorri, Jacques Rebérol, Louis Watine

Design

DreiDreizehn GmbH, Berlin | www.313.de



ENTSOG AISBL
Avenue de Cortenbergh 100 | 1000 Brussels, Belgium
Tel. +32 2 894 51 00

info@entsog.eu | www.entsog.eu