TYNDP 2024

DRAFT REPORTS: Natural Gas System Assessment Report and Infrastructure Report

23 June 2025

ENTSOG - System Development team

Simona Marcu, TYNDP project manager

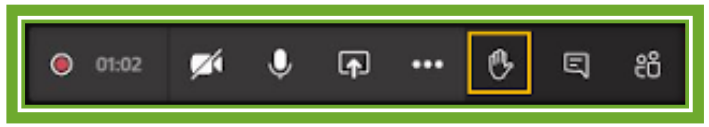
Online

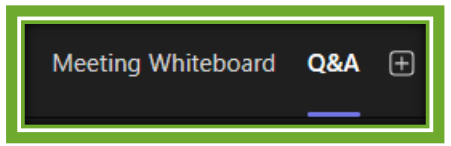
Introduction & TYNDP 2024 remaining timeline

Webinar rules & Agenda

Webinar rules

For **questions**, please **ask by raising a virtual hand** or write it in the Ms. Teams **Q&A section**.





The **recording** of this session, as well as the **slides** will be made available.

Microphones are muted by default. Please unmute to intervene.

Thank you!

TYNDP abbreviations


Picture courtesy of Gaz System

ATR – Autothermal Reforming
CBAM – Cost-Benefit Analysis Methodology
CD – Curtailed Demand
CDF –2 Week Cold Dunkelflaute
DC – Disruption Case
DGM – Dual Gas Model (H_2-NG)
DHEM – Dual Hydrogen Electricity Model
HDC – Hydrogen Disruption Case
IG – Implementation Guidelines
IGI – Infrastructure Gaps Identification
IL – Infrastructure Level
NG – Natural Gas
PCI – Project of Common Interest
PMI – Project of Mutual Interest
PS-CBA – Project-Specific Cost-Benefit Analysis
SA – System Assessment
SCN – Scenario(s)
SMR – Steam Methane Reformer
SLID – Single Largest Infrastructure Disruption


Picture courtesy of Gaz System

Agenda

Topic	Presenter	Time
Introduction & TYNDP 2024 remaining timeline	Kacper Żeromski Deputy Director System Development Simona Marcu TYNDP Project Manager	10:05 – 10:15
Scenarios assumptions refresher	Aisling Wall Scenarios Adviser	10:15 – 10:25
Draft Infrastructure report	Rafail Tsalikoglou Investment Adviser	10:25 – 10:45
Draft Natural Gas System Assessment report	Diana Fathelbajanova Modelling Subject Manager Development	10:45 – 11:20
Summary of discussions & closing remarks	Simona Marcu TYNDP Project Manager	11:20 – 11:30

Each session includes Q&A → please use the **Ms. Teams Q&A section**

Context

Introduction

Recent **TYNDP 2024** stakeholder consultations:

19 June – 9 July 2024

Draft Guidance Documents (Annex D1, D2, D3) and Gas Quality

18 December 2024 – 22 January 2025

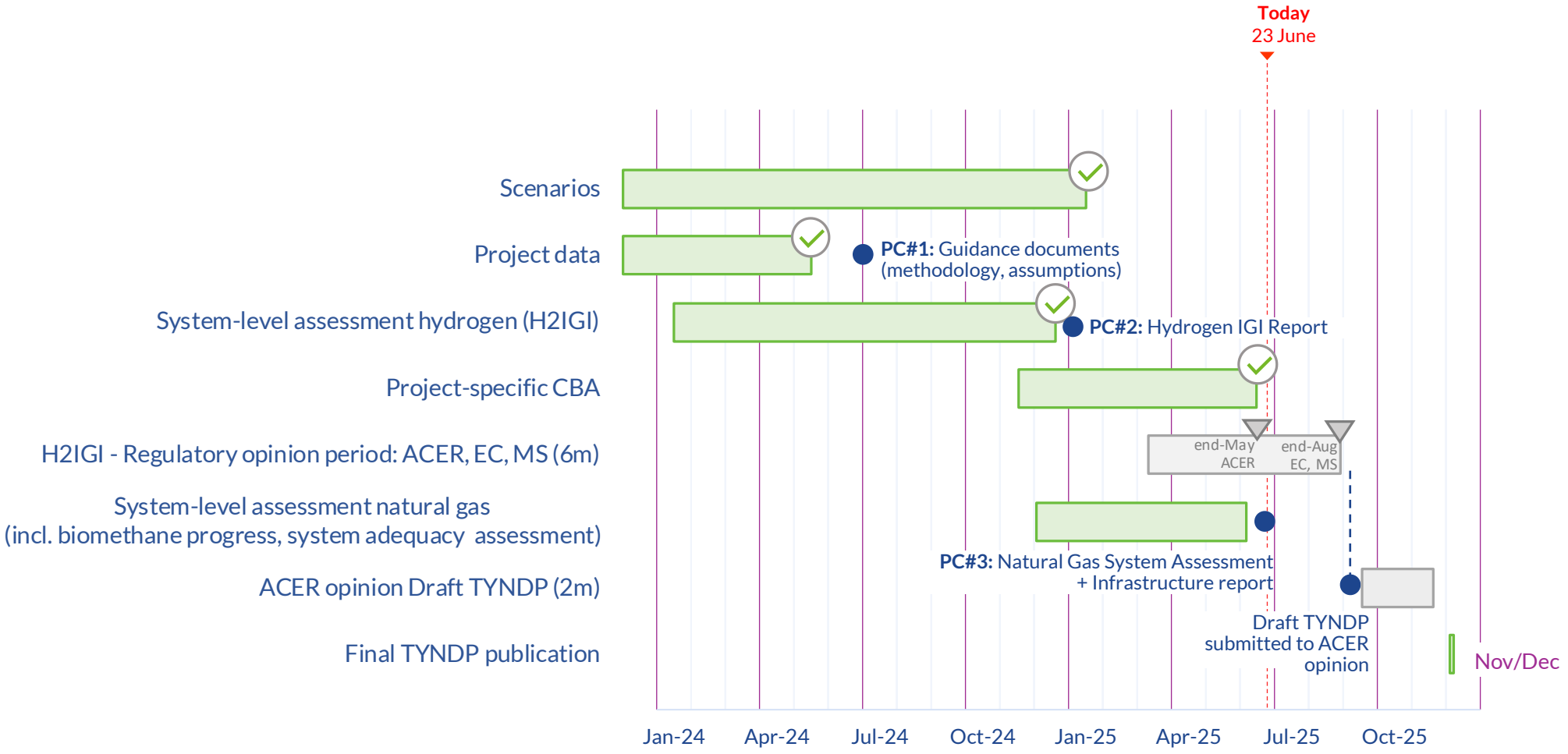
Draft Hydrogen Infrastructure Gaps Identification (IGI) Report

11-30 June 2025

Draft Natural Gas System Assessment Report and Draft Infrastructure Report

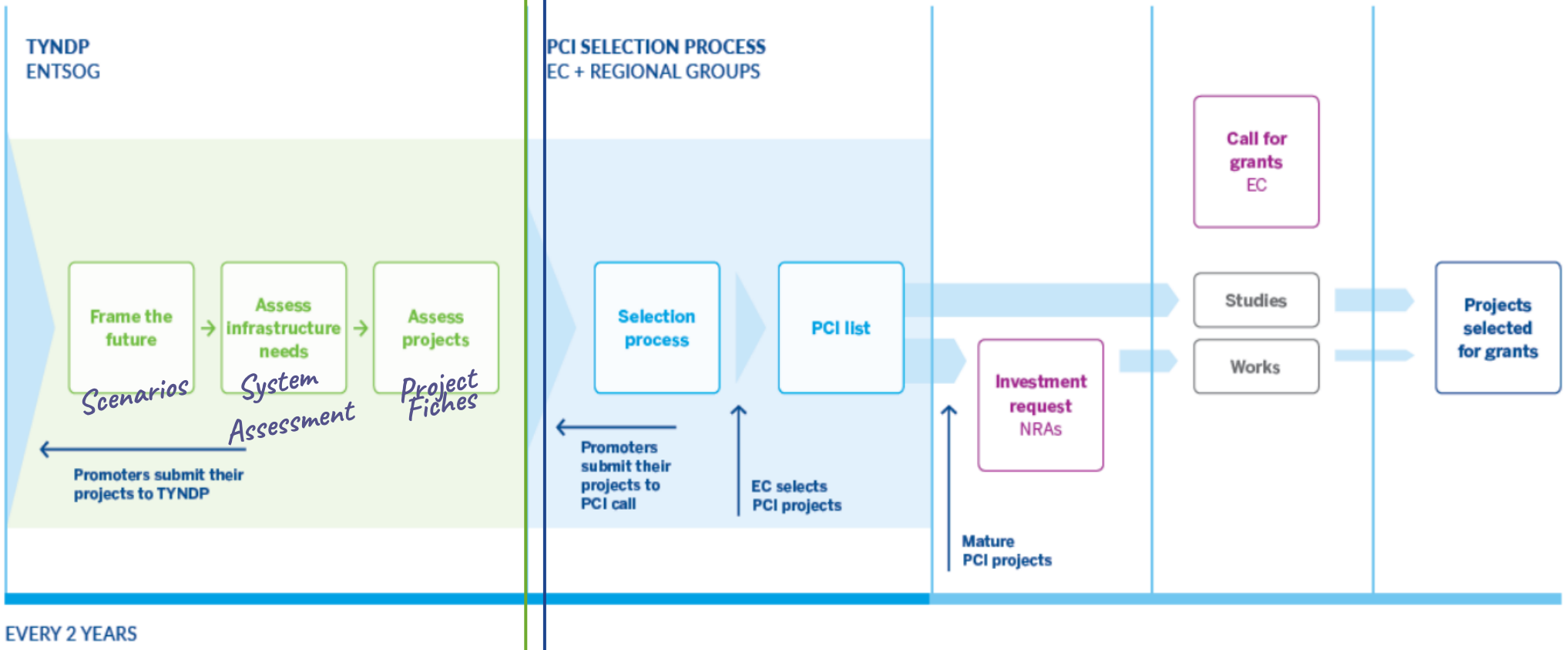
Access the questionnaire here:
https://forms.office.com/e/jpTLTKc8sL

Timeline to Final TYNDP 2024



Acronyms:
H2IGI - Hydrogen Infrastructure Gaps Identification
PC – Public consultation

The TYNDP process in the wider TEN-E framework



Every two years ENTSOG & ENTSO-E **plan, assess and test** the infrastructure against **possible futures**

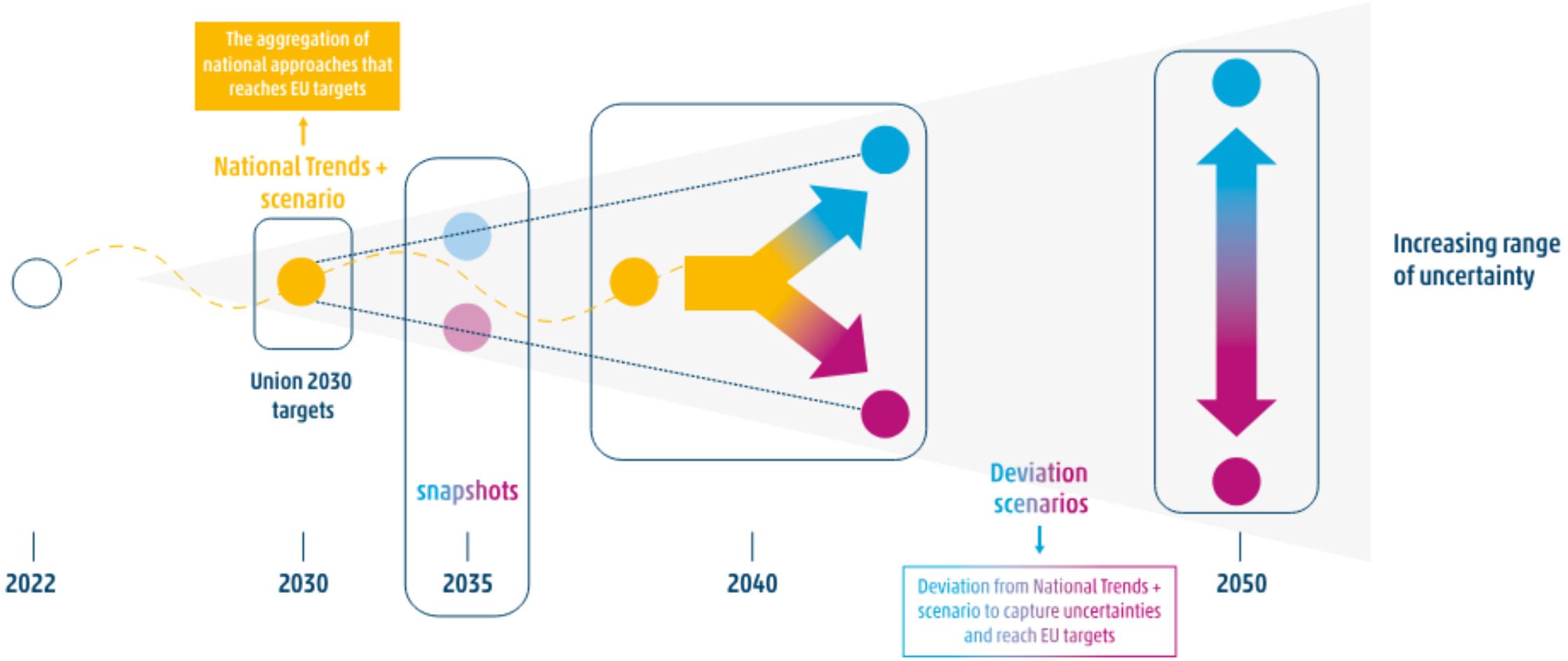
The **EC and regional groups attribute PCI or PMI status** to a list of candidate projects, considering their **contributions to covering the system needs** identified in the TYNDP.

Scenarios refresher

Scenarios 2024 refresher

- The development of the scenarios is the first step in the TYNDP process
- For the first time, the TYNDP 2024 Scenarios were jointly developed with ENTSO-E, requiring close alignment for the future energy system in the context of their respective TYNDPs
- The scenarios are intended to project the long-term energy supply and demand considering the ongoing energy transition
- Scenarios are built in line with policy targets
- Scenarios take into account the latest available data at the time and aligns with the ACER Scenarios Guidelines to the extent possible
- TYNDP 2024 scenarios were labelled National Trends+ (‘NT+’) scenarios or Deviation Scenarios (Distributed Energy ‘DE’ and Global Ambition ‘GA’).

TYNDP 2024 scenario Horizon and Framework



The TYNDP 2024 scenarios align with the energy efficiency first principle, the EU's 2030 energy and climate targets, its 2050 climate neutrality objective

Scenarios captures NECPs and latest national policies *(Q1 2023, for offshore August 2023)*
Take into account the latest Commission Scenarios *(Fit for 55 & REPowerEU)*
Extensive stakeholder engagement on the inputs and methodologies & enhanced transparency

Energy Efficiency First and Union's 2030 targets for energy

- ✓ EE1st 11.7% reduction (compared to 1990),
  - ✓ FEC – 763 Mtoe (aligns with binding target)
  - ❖ PEC – 101.9 Mtoe (indicative target 992.5 Mtoe)
- ✓ Up to 45.4% RES share in GFEC
- ✓ 55% GHG reduction (compared to 1990)
- ✓ Offshore targets (Latest MS non-binding agreements – August 2023)

Climate and its 2050 climate neutrality objective

- ✓ Net-zero emissions in 2050
- ✓ Offshore Targets (Latest MS non-binding agreements as (Aug 23)

Scenarios 2024 refresher

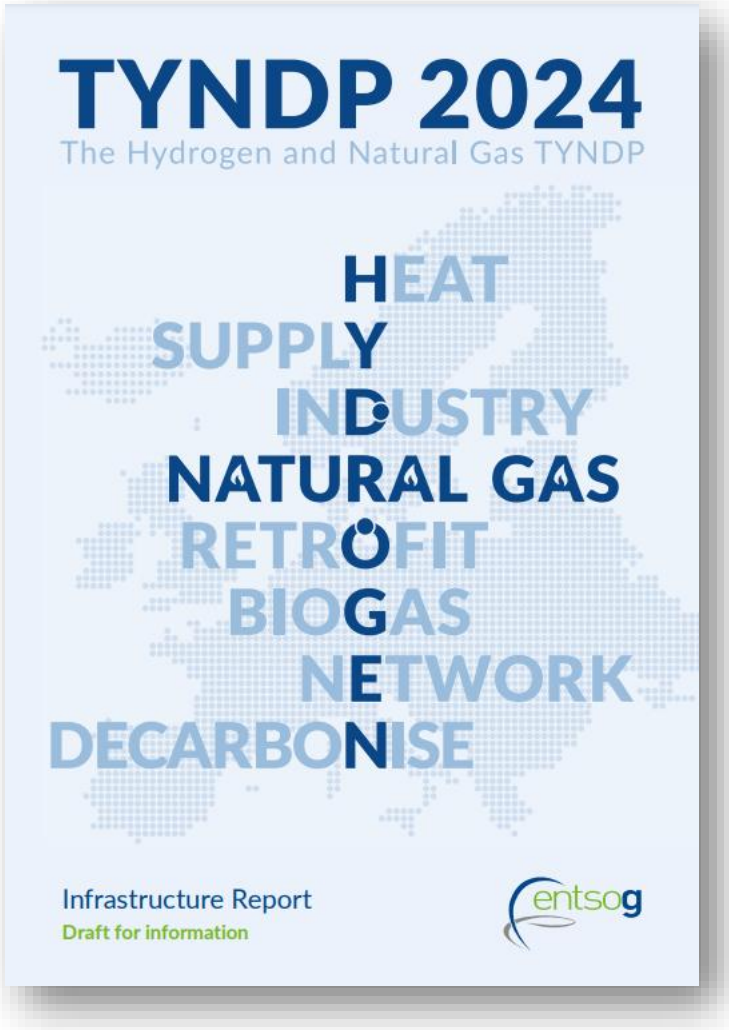
The 2024 Scenario Package is available here : https://2024.entsos-tyndp-scenarios.eu/

Draft Infrastructure report

Introduction

"As one of the main ENTSOG TYNDP documents, the Infrastructure Report presents investment projects that aim to bring the European energy system in line with the Union's energy and climate goals."

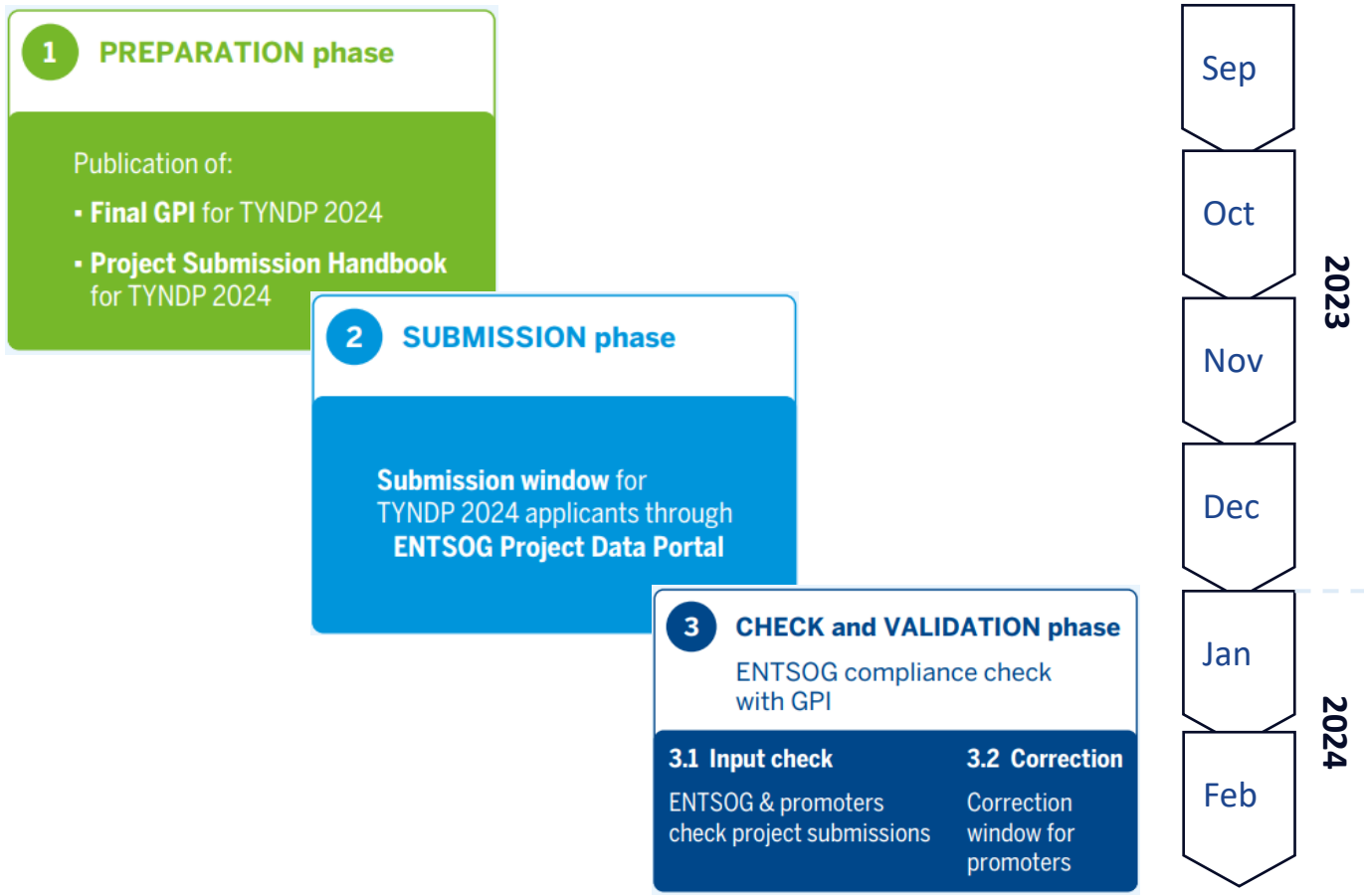
- Apart from the natural gas categories, **this Infrastructure report focus on hydrogen projects** that are now presented under more granular subcategories, as hydrogen transmission, reception facilities, storage, electrolysers and mobility projects, but also other categories, such as biomethane and CO2 infrastructure.



Phases and timeline of the TYNDP 2024 Project collection

- Projects were submitted through the ENTSOG Project Data Portal, to ensure transparency and equal treatment to project promoters by adherence to specific administrative and technical criteria defined in ENTSOG's TYNDP 2024 Guidelines for Project Inclusion (GPI).

- ENTSOG provided comprehensive guidelines, informative workshop and support to project promoters, facilitating a smooth submission process.



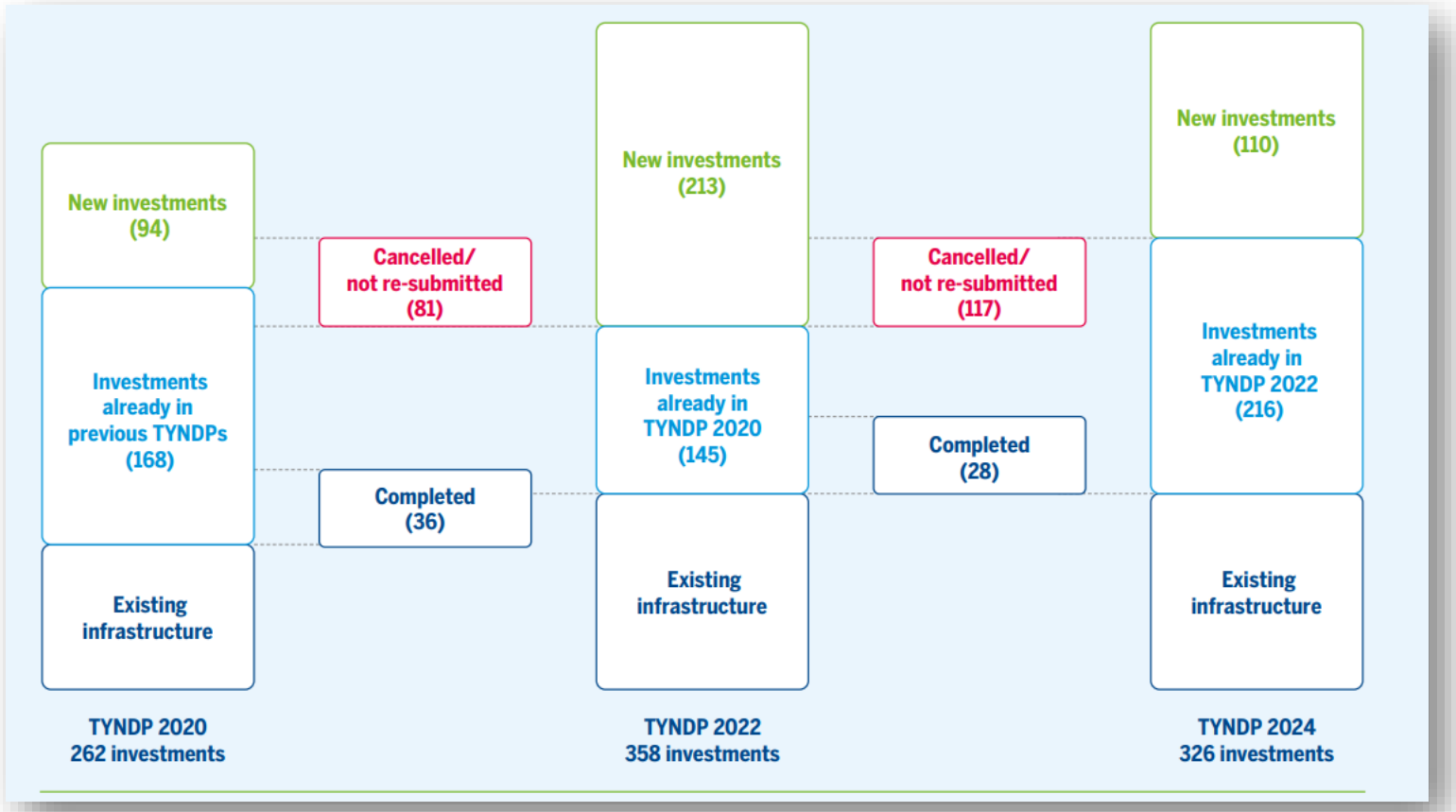
Infrastructure Report key numbers

326 investments in total:
- 110 new
- 216 from TYNDP 2022

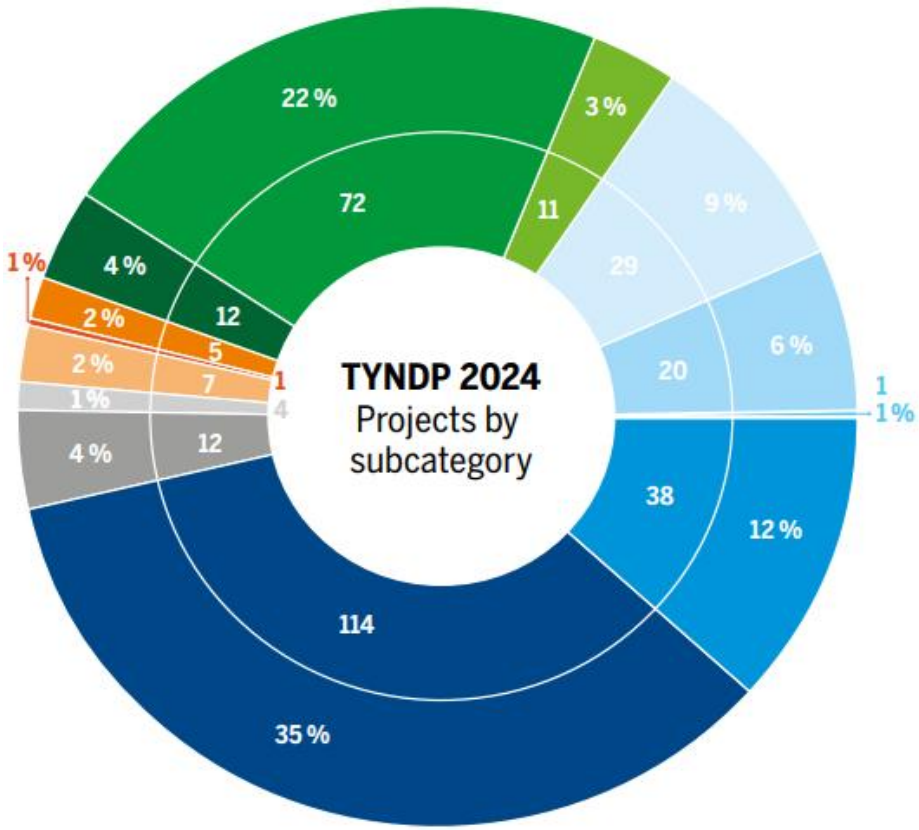
Over 90 promoters, including TSOs and third-party promoters, contributed.

23 projects that are expected to be commissioned by 2025 were submitted.

Comparison between TYNDP 2020, TYNDP 2022 and TYNDP 2024



Total number of investments by subcategory in TYNDP 2024



Hydrogen
H2E H2L H2M H2S H2T

Natural Gas
UGS TRA LNG

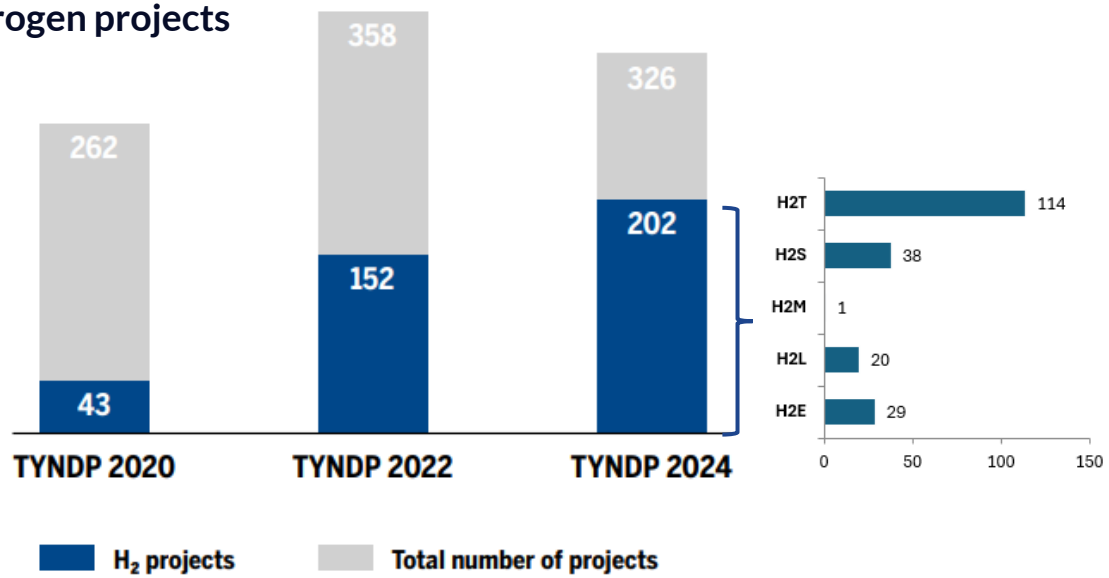
Smart Gas Grid
RET BIO SYN

Other
CO_2 OTH

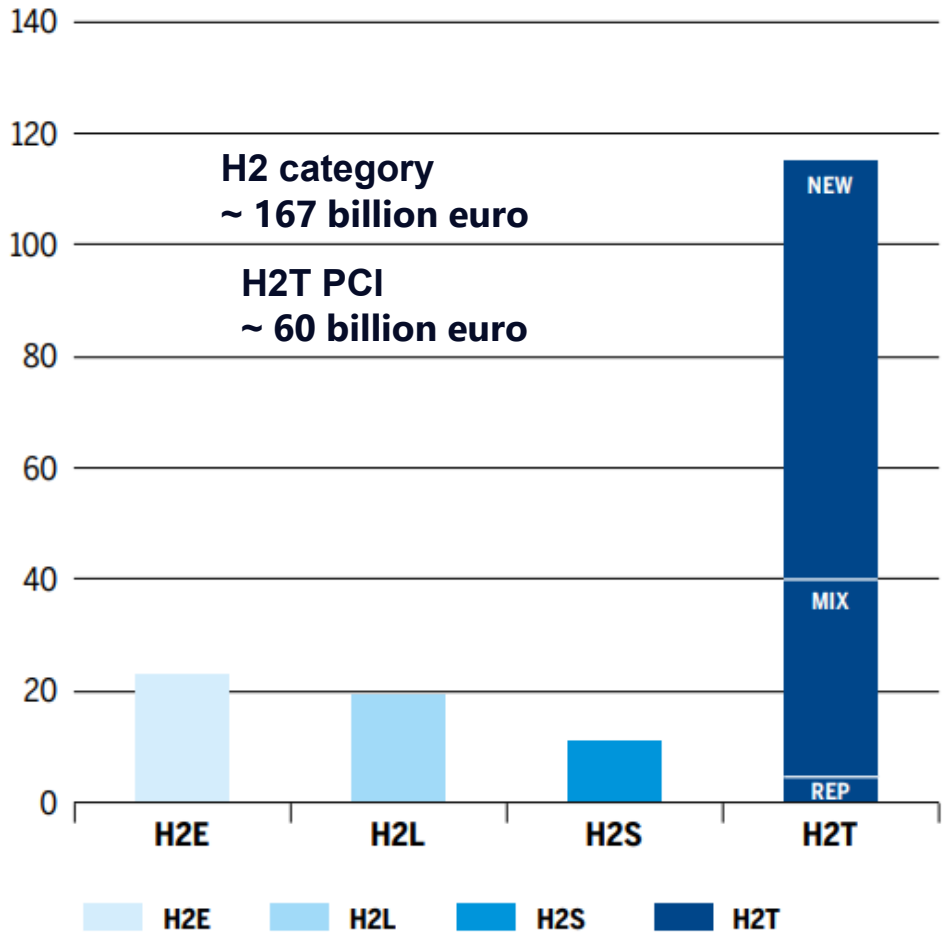
- **202 Hydrogen investments**
- **95 Natural gas investments**
- **29 SGG and Other investments**

Promoters' submissions for Hydrogen to TYNDP 2024

Evolution of total amount of projects and hydrogen projects



Overview of total capital expenditures by hydrogen subcategory (billion Euro)



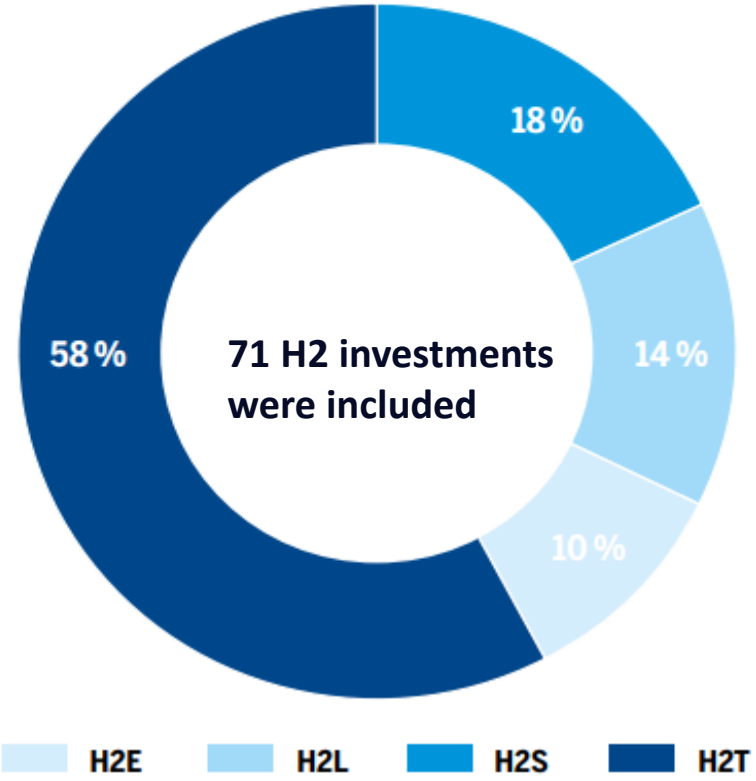
- **62% of the total investments in TYNDP 2024** are listed under the Hydrogen subcategories, compared to 40% in the previous TYNDP.
- **Maturity status**: 4 FID, 88 Advanced, 110 Less-Advanced.
- 74% of Hydrogen projects **are expected to be commissioned by 2029.**

Hydrogen NDP inclusion and PCI/PMI status

- 67 (33 %) Hydrogen investments were included in the NDPs. The subcategory with the highest number of included projects was H2T (49), followed by H2S (11), H2E (4) and H2L (3).
- Germany included 24 Hydrogen investments in the respective NDP, followed by Italy with 6.

"In TYNDP 2022, the inclusion rate of hydrogen TYNDP projects in the NDPs was 17 % compared to 33% from the current version. An indication that the level of consistency between TYNDP and NDPs increased between the two TYNDP cycles."

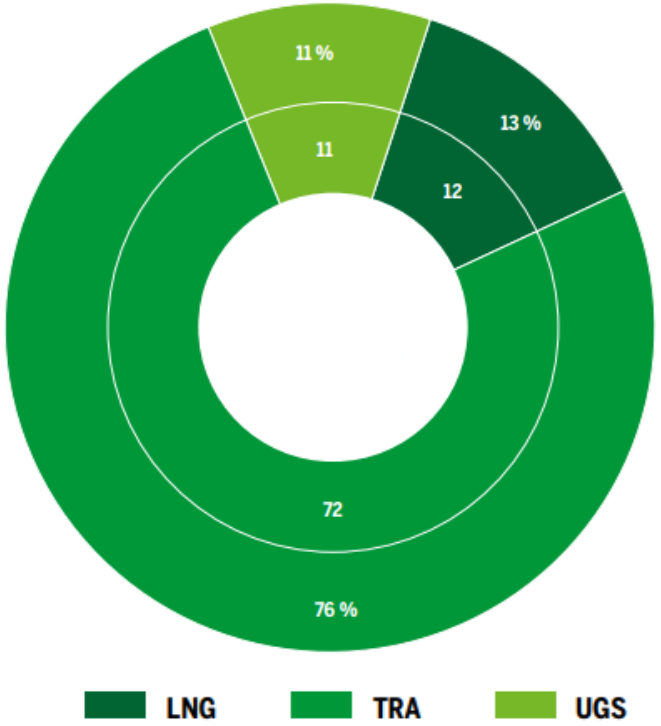
Projects with PCI/PMI status in the 1st Union list by hydrogen subcategory

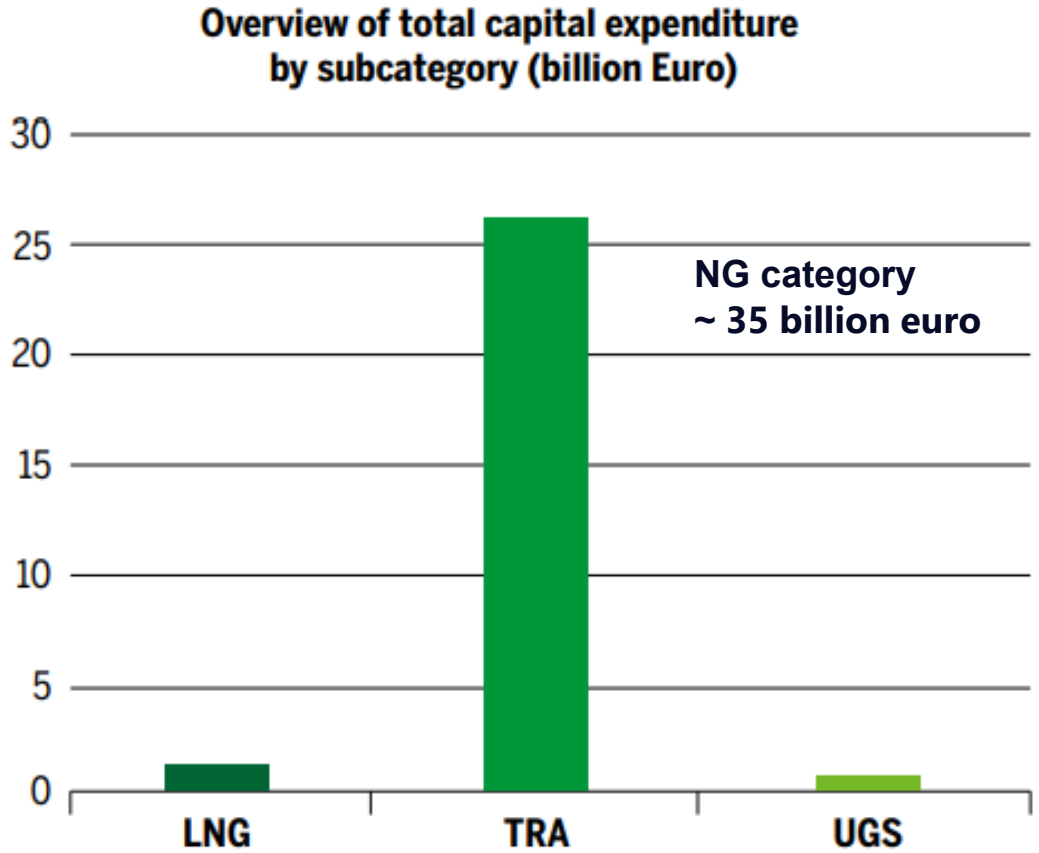


Around 20802,4 km of PCI H2T

Promoters' submissions for Natural Gas to TYNDP 2024

TYNDP 2024 NG investments





- **17 new and 78 existing projects** were submitted under the Natural Gas category.
- **Maturity status:** 29 FID, 23 Advanced and 43 Less-Advanced.
- ~ 80 % of Natural Gas projects **will be commissioned in the next five years.**

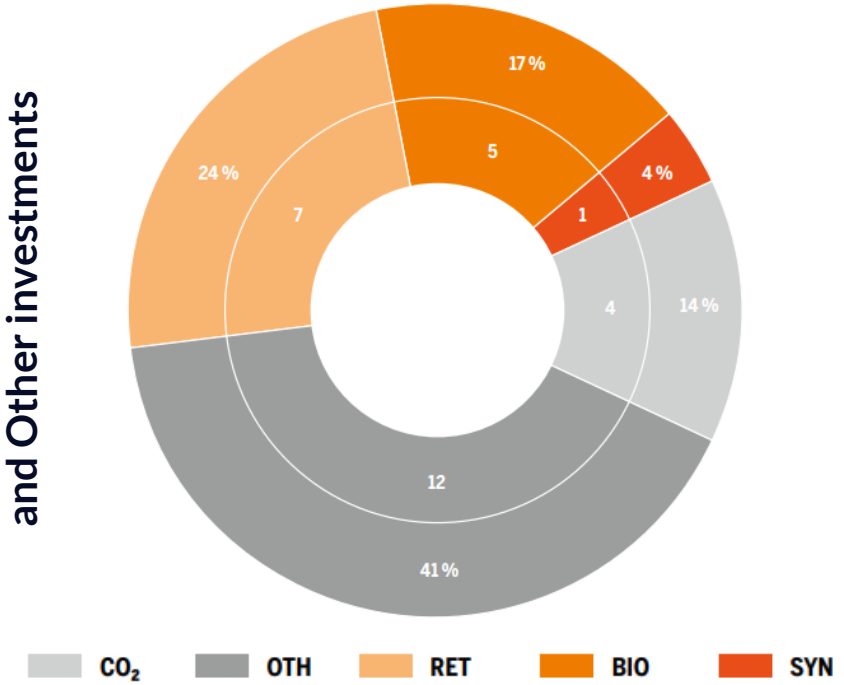
Natural Gas NDP inclusion and PCI/PMI status

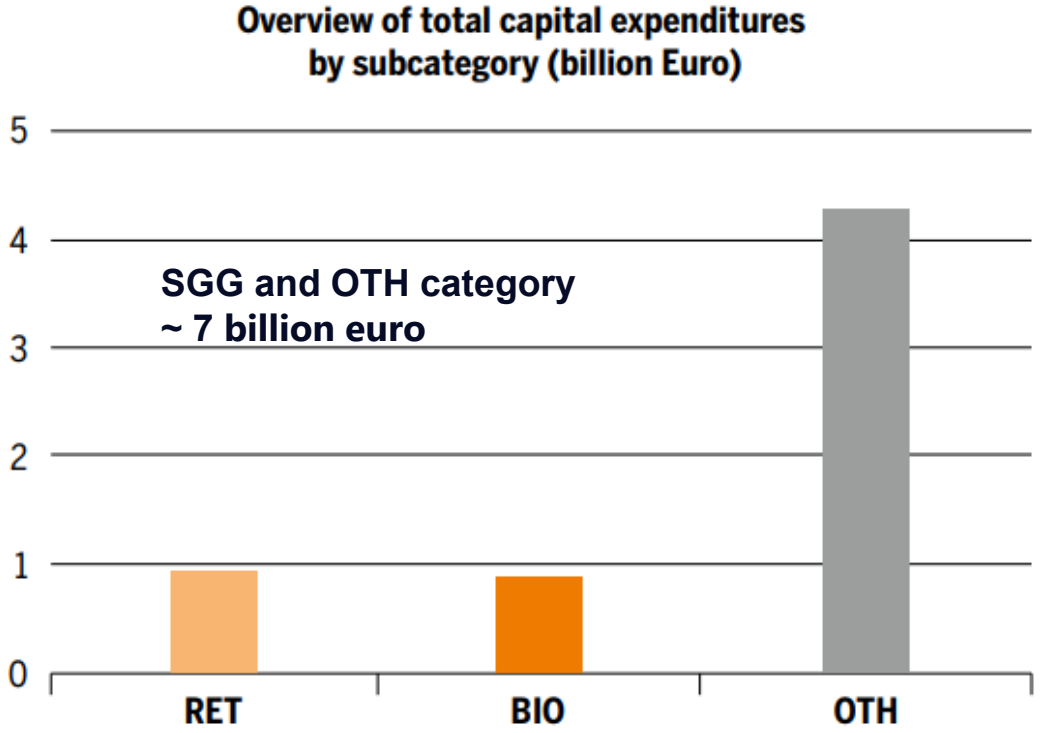
- 84 (88 %) Natural gas investments were included in the NDPs. The subcategory with the highest number of included projects was TRA (66), followed by UGS (10) and LNG (8).
- Italy included 16 Natural Gas investments in the respective NDP, followed by Romania with 13.

"Although, as a general rule, natural gas projects are ineligible for PCI and PMI status, the EastMed Pipeline (TRA-A-330) retained its PCI status as a unique exception, alongside the project connecting Malta to the European gas network (TRA-N-31)."

Promoters' submissions for Smart Gas Grid and Other to TYNDP 2024

TYNDP 2024 Smart gas grid and Other investments





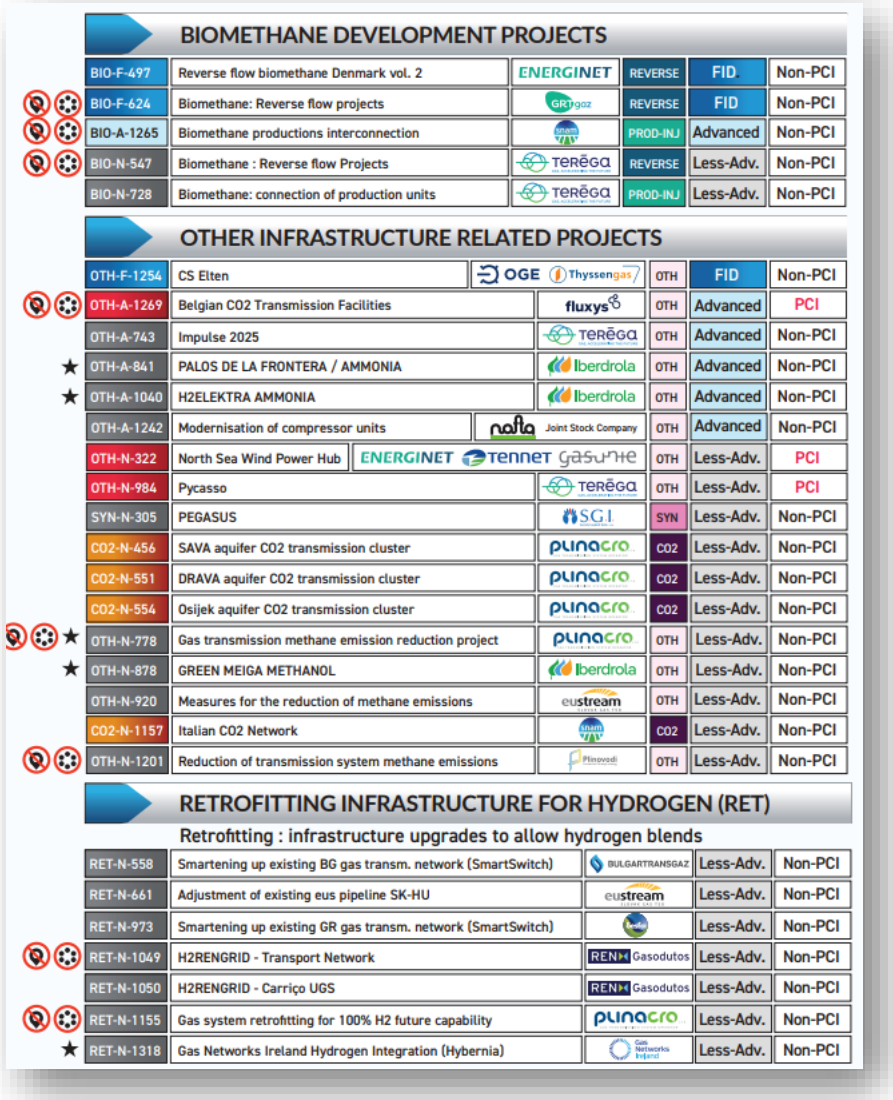
- **5 new and 24 existing projects** were submitted under the Smart Gas Grid and Other categories.
- **Maturity status:** 3 FID, 6 Advanced and 20 Less-Advanced.
- ~ 72 % of Smart Gas Grid and Other projects **will be commissioned in the next six years.**

Text here

Smart Gas Grid and Other NDP inclusion

– 15 (51 %) Smart Gas Grid and Other investments were included in the NDPs. The subcategory with the highest number of included projects was OTH (6), followed by RET (5), BIO (3) and CO2 (1).

– Slovakia included 3 Smart Gas Grid and Other investments in the respective NDP, while the rest of the countries between 1 and 2.



BIOMETHANE DEVELOPMENT PROJECTS

BIO-F-497	Reverse flow biomethane Denmark vol. 2	ENERGINET	REVERSE	FID	Non-PCI
BIO-F-624	Biomethane: Reverse flow projects	GRTgaz	REVERSE	FID	Non-PCI
BIO-A-1265	Biomethane productions interconnection		PROD-INJ	Advanced	Non-PCI
BIO-N-547	Biomethane : Reverse flow Projects	TEREGA	REVERSE	Less-Adv.	Non-PCI
BIO-N-728	Biomethane: connection of production units	TEREGA	PROD-INJ	Less-Adv.	Non-PCI

OTHER INFRASTRUCTURE RELATED PROJECTS

OTH-F-1254	CS Elten	OGE Thyssengas	OTH	FID	Non-PCI
OTH-A-1269	Belgian CO2 Transmission Facilities	fluxys	OTH	Advanced	PCI
OTH-A-743	Impulse 2025	TEREGA	OTH	Advanced	Non-PCI
★ OTH-A-841	PALOS DE LA FRONTERA / AMMONIA	Iberdrola	OTH	Advanced	Non-PCI
★ OTH-A-1040	H2ELEKTRA AMMONIA	Iberdrola	OTH	Advanced	Non-PCI
OTH-A-1242	Modernisation of compressor units	nafta Joint Stock Company	OTH	Advanced	Non-PCI
OTH-N-322	North Sea Wind Power Hub	ENERGINET TenneT gasunie	OTH	Less-Adv.	PCI
OTH-N-984	Pycasso	TEREGA	OTH	Less-Adv.	PCI
SYN-N-305	PEGASUS	SGI	SYN	Less-Adv.	Non-PCI
CO2-N-456	SAVA aquifer CO2 transmission cluster	plinacro	CO2	Less-Adv.	Non-PCI
CO2-N-551	DRAVA aquifer CO2 transmission cluster	plinacro	CO2	Less-Adv.	Non-PCI
CO2-N-554	Osijek aquifer CO2 transmission cluster	plinacro	CO2	Less-Adv.	Non-PCI
★ OTH-N-778	Gas transmission methane emission reduction project	plinacro	OTH	Less-Adv.	Non-PCI
★ OTH-N-878	GREEN MEIGA METHANOL	Iberdrola	OTH	Less-Adv.	Non-PCI
OTH-N-920	Measures for the reduction of methane emissions	eustream	OTH	Less-Adv.	Non-PCI
CO2-N-1157	Italian CO2 Network		CO2	Less-Adv.	Non-PCI
OTH-N-1201	Reduction of transmission system methane emissions	Plinovodi	OTH	Less-Adv.	Non-PCI

RETROFITTING INFRASTRUCTURE FOR HYDROGEN (RET)

Retrofitting : infrastructure upgrades to allow hydrogen blends

RET-N-558	Smartening up existing BG gas transm. network (SmartSwitch)	BULGARTRANSGAZ	Less-Adv.	Non-PCI
RET-N-661	Adjustment of existing eus pipeline SK-HU	eustream	Less-Adv.	Non-PCI
RET-N-973	Smartening up existing GR gas transm. network (SmartSwitch)		Less-Adv.	Non-PCI
RET-N-1049	H2RENGRID - Transport Network	REN Gasodutos	Less-Adv.	Non-PCI
RET-N-1050	H2RENGRID - Carriço UGS	REN Gasodutos	Less-Adv.	Non-PCI
RET-N-1155	Gas system retrofitting for 100% H2 future capability	plinacro	Less-Adv.	Non-PCI
★ RET-N-1318	Gas Networks Ireland Hydrogen Integration (Hybernia)	Gas Networks Ireland	Less-Adv.	Non-PCI

TYNDP 2024 Annex B maps

All
2024
2023
2022
2021
2020
2019
2018
2017
2016
2015
2014
2013
2012
2011
2010

ENTSOG TEN-YEAR NETWORK DEVELOPMENT PLAN 2024

– TYNDP 2024 website	18 Dec 2024
– Public consultation on draft Hydrogen Infrastructure Gaps Identification (H2 IGI) report	18 Dec 2024
↳ Draft Hydrogen Infrastructure Gaps Identification report	18 Dec 2024
↳ Support materials	18 Dec 2024
– TYNDP 2024 H2 IGI map – PCI (no H2E)	18 Dec 2024
– TYNDP 2024 H2 IGI map – PCI, ADV (no H2E)	18 Dec 2024
– TYNDP 2024 Infrastructure report	18 Dec 2024
– TYNDP 2024 Annex A - Projects	18 Dec 2024
– TYNDP 2024 Annex B - Map: H2 transmission (H2T)	18 Dec 2024
– TYNDP 2024 Annex B - Map: storage (H2S), terminals (H2L), electrolysers (H2E), mobility (H2M)	18 Dec 2024
– TYNDP 2024 Annex B - Map: natural gas transmission (TRA), storage (UGS), terminals (LNG)	18 Dec 2024
– TYNDP 2024 Annex B - Map: Other (BIO, RET, OTH, CO2, SYN)	18 Dec 2024
– TYNDP 2024 Annex C1 - Capacities CH4	18 Dec 2024
– TYNDP 2024 Annex C2 - Capacities H2	18 Dec 2024
– TYNDP 2024 Annex D1 - Implementation Guidelines	18 Dec 2024
– TYNDP 2024 Annex D2 - Infrastructure Gaps Identification methodology	18 Dec 2024
– TYNDP 2024 Annex D3 - System Assessment methodology	18 Dec 2024
– Public consultation report - Annex D	18 Dec 2024

https://www.entsog.eu/tyndp#entsog-ten-year-network-development-plan-2024

Public consultation questions Infrastructure report

14. Is the structure of the draft Infrastructure report clear and logical? Are the sections and subsections well-organized and easy to follow? Please answer "Yes/No" and justify briefly. *

Enter your answer

15. Are the analyses provided in the draft TYNDP 2024 Infrastructure report clear and exhaustive? Please answer "Yes/No" and justify briefly. *

Enter your answer

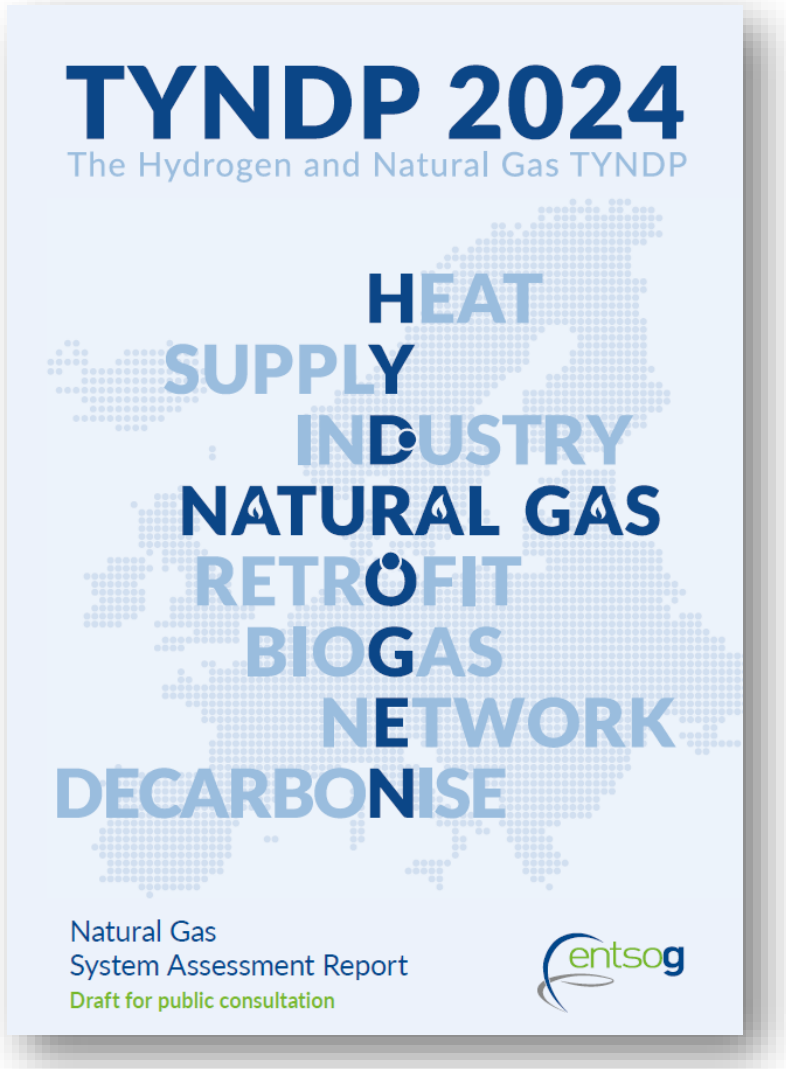
16. Are there any other sections or topics regarding projects that you feel are missing or should be expanded upon? Do you have any suggestion on how to improve the presentation of the results? Please answer "Yes/No" and justify briefly. *

Enter your answer

Access the questionnaire here: https://forms.office.com/e/jpTLTKc8sL

Draft Natural Gas System Assessment report

Natural Gas System Assessment



In TYNDP 2024, the main goal of the natural gas system-wide assessment* is to measure the network's resilience and security of supply under a series of stress cases.

The report additionally contains a yearly supply adequacy outlook, including a biomethane progress report.

*The assessment of H2 infrastructure in the draft Hydrogen Infrastructure Gaps Identification Report

Natural Gas System Assessment

The results presented in the Natural Gas System Assessment Report are solely based on the **Dual Hydrogen/Natural Gas Model** (Dual Gas Model, DGM) and assess the resilience of the European natural gas system to cope with various stressful events.

✓ The system assessment approach for the natural gas sector is defined in the TYNDP 2024 System Assessment Methodology (Annex D3)	✓ Natural Gas demand and supply input is defined in the TYNDP 2024 Implementation Guidelines (Annex D1)
▪ **Scenario**: National Trends+ (NT+) ▪ **Simulation Years**: 2030 and 2040 ▪ **Weather Conditions**: Reference weather Year (1995); Stressful weather Year (2009) ▪ **Simulation Duration**: Yearly, 2-Week cold spell with DF (CDF); Peak Demand (PD) ▪ **Storage usage**: for yearly – storage level is the same at the beginning and at the end of the simulation period; for CDF and PD - UGS filling level 35% and LNG tanks flexibility ▪ **Supply Disruption (S-1)**: RU pipeline supply ▪ **SLID (N-1):** PD	▪ **Natural gas demand**: - final demand is sourced from NT+ - power demand is sourced from DHEM* outputs (1 day for PD and 2 weeks for CDF when the EU had the highest sum of natural gas usage for power generation) ▪ **Production:** (i. e., biomethane production, synthetic methane production, and natural gas production) is derived from the NT+ **Dual Hydrogen/Electricity Model (DHEM)*

! The results are shaped by the model's behaviour, which does not account for commercial supply agreements and relies on assumptions regarding infrastructure developments

Infrastructure levels in TYNDP 2024

- Natural gas infrastructure levels:
  - **Low natural gas infrastructure level**
  - **Advanced natural gas infrastructure level**

- Natural gas infrastructure is affected by H2 infrastructure (through repurposing). The assessed natural gas system is a combination of both – CH4 and H2 infrastructures.

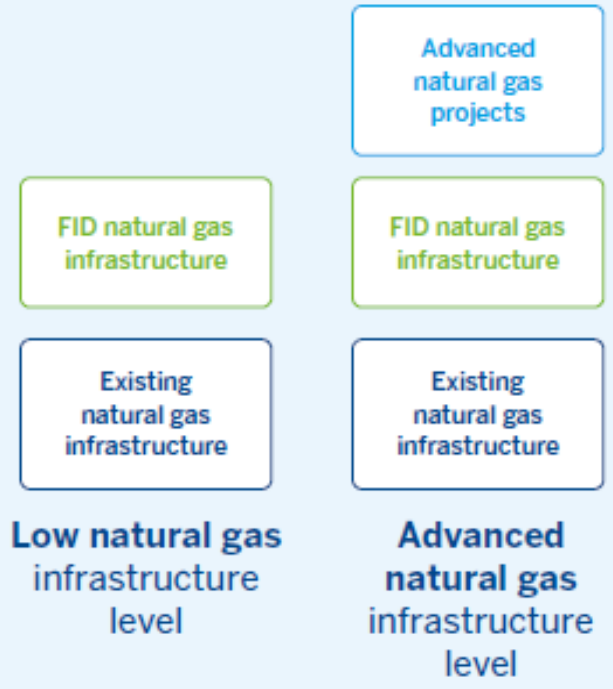


Figure 1: Natural gas infrastructure levels in TYNDP 2024

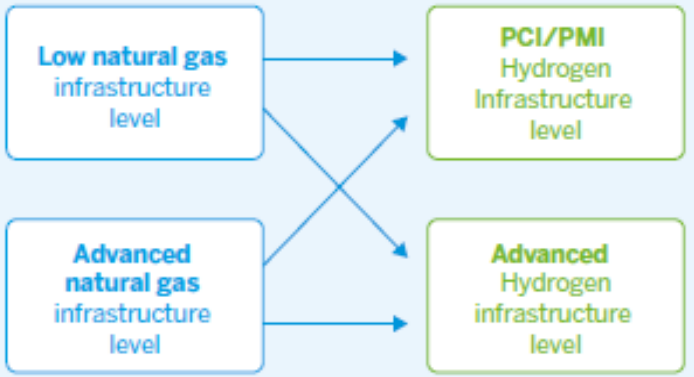


Figure 2: Natural gas and Hydrogen infrastructure levels in the System Assessment

Detailed information about the project collection and infrastructure levels is provided in the TYNDP 2024 Draft Infrastructure Report

Supply adequacy outlook

The supply adequacy outlook compares the full range of natural gas supply potentials with demand projections under the National Trends+ scenario. Extra-EU supply needs—the gap between EU demand and indigenous production (including biomethane, conventional gas, and synthetic methane)—are expected to be met through LNG and pipeline imports.

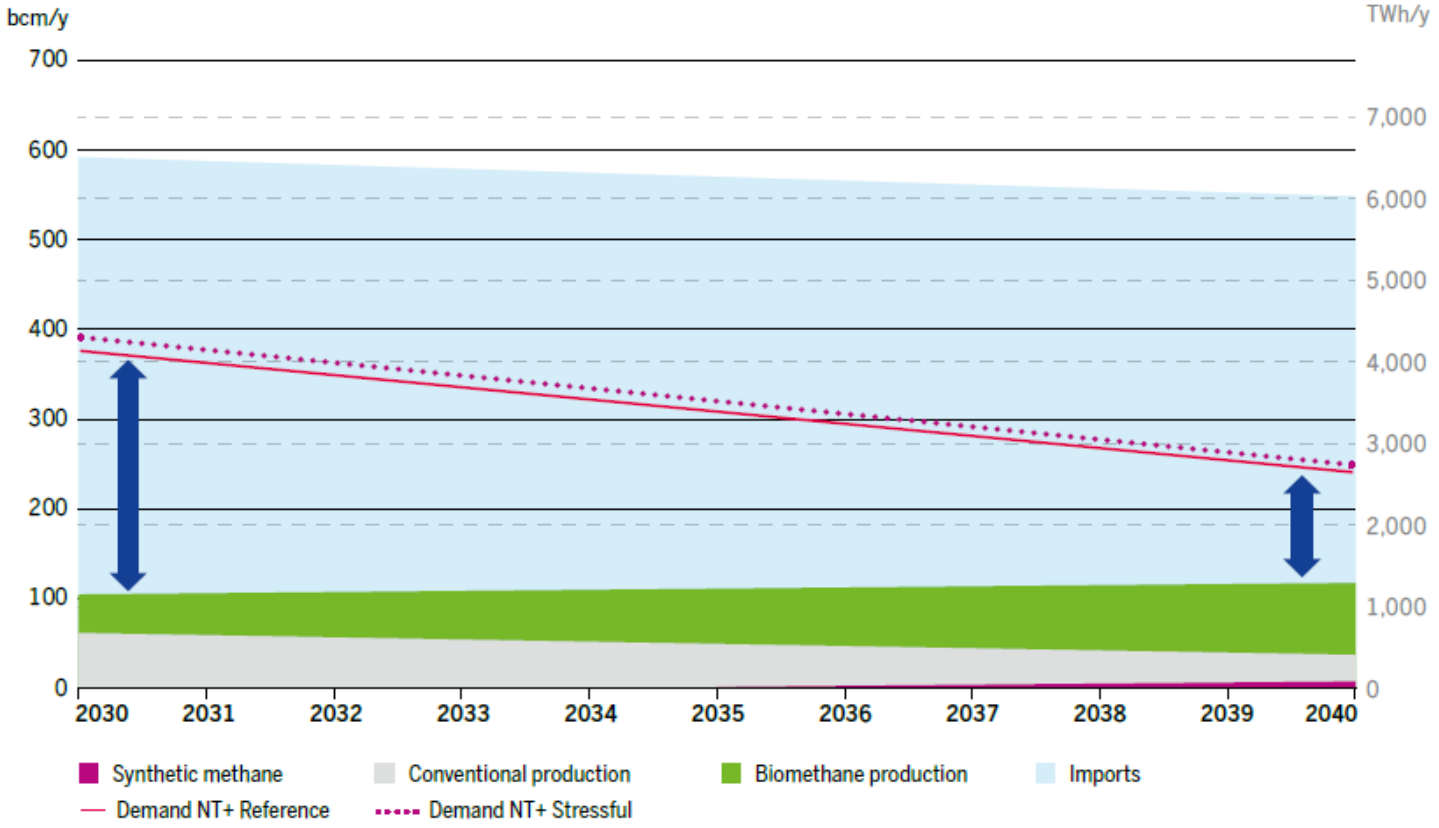


Figure 3: Supply Adequacy Outlook

- Extra-EU supply needs decline under the NT+ scenario due to lower demand and higher biomethane production by 2040.
- Deviations from the NT+ scenario assumptions (biomethane production, domestic natural gas output, or overall gas demand) would directly affect extra-EU supply needs.

Biomethane production progress

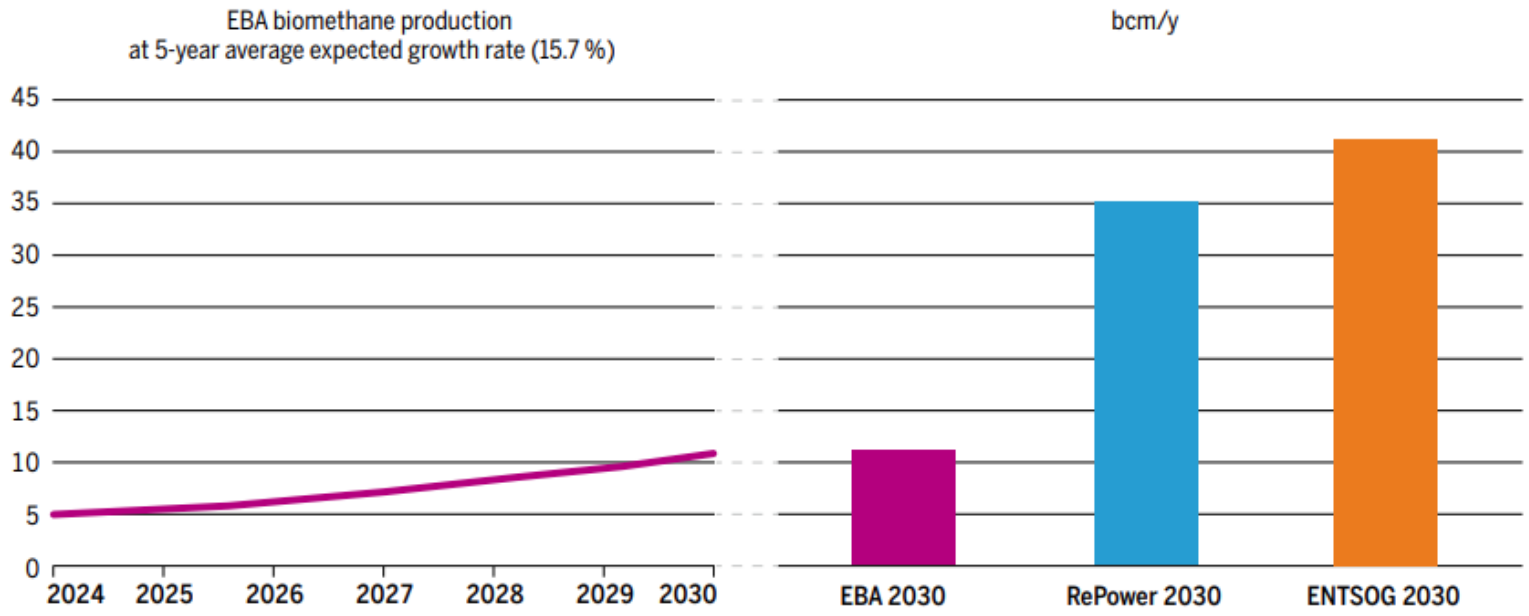


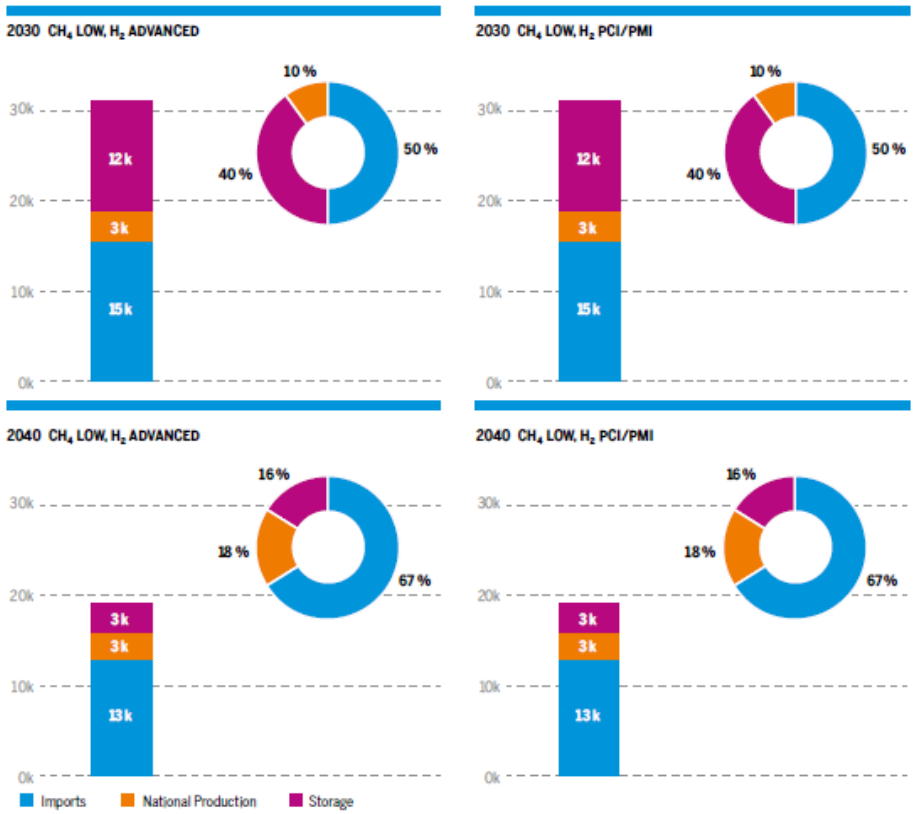
Figure 10: Biomethane production progress comparison

- According to the 2nd EBA Investment Outlook, biomethane production investments will yield a total added capacity of 6.3 bcm within Europe to reach approximately 11 bcm by 2030.

- Biomethane production is not currently on track to meet the REPowerEU target of 35 bcm by 2030. However, the same figure also presents data from the ENTSOG and ENTSO-E TYNDP 2024 Scenarios Report, which offers a more optimistic outlook.
- The natural gas infrastructure with methane supply is expected to play a critical role for a longer transition period than initially foreseen, ensuring system flexibility and supply security as renewable gas volumes continue to scale up.

Supply mix

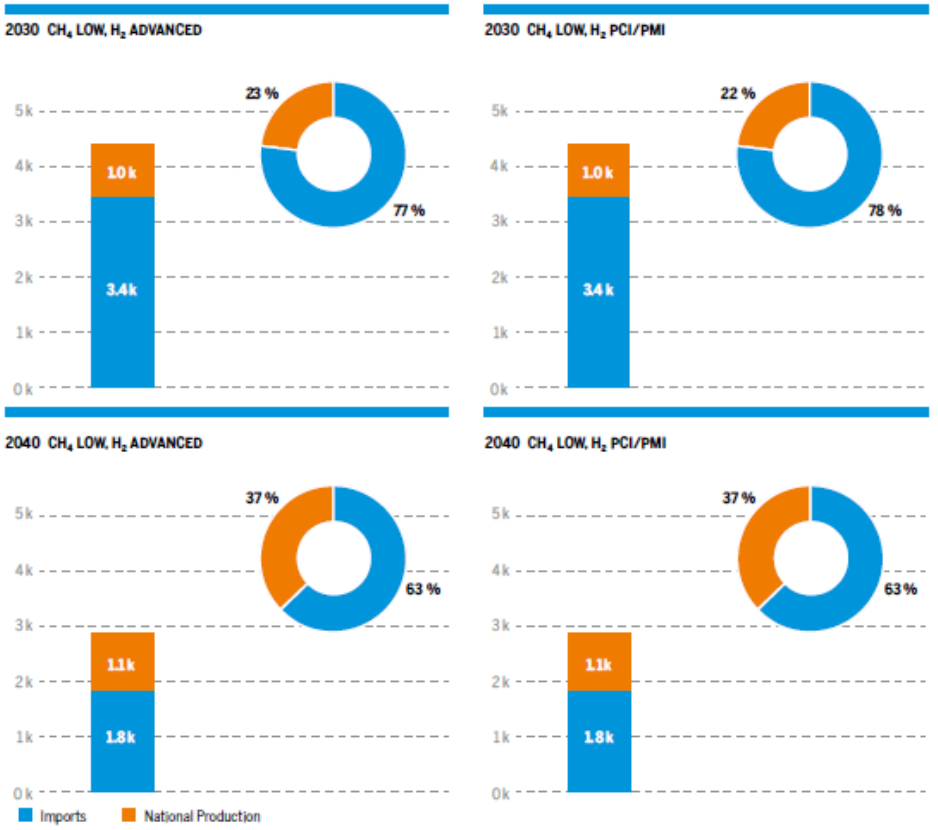
Peak demand, GWh/d



- Natural gas infrastructure, including underground storage, is vital for Europe's gas supply security—balancing supply and demand during peak demand, import disruptions, and amid a decrease in gas imports over time.

- Conventional gas production is declining and gradually replaced by the expected ramp-up biomethane, while national production increasingly substitutes imports amid falling methane demand.

Yearly demand, TWh/y



The model is designed to min the use of RU natural gas. The simulation results show no contribution from Russian pipeline supply in the overall supply mix

Reference case: Yearly, 2-week DF, PD

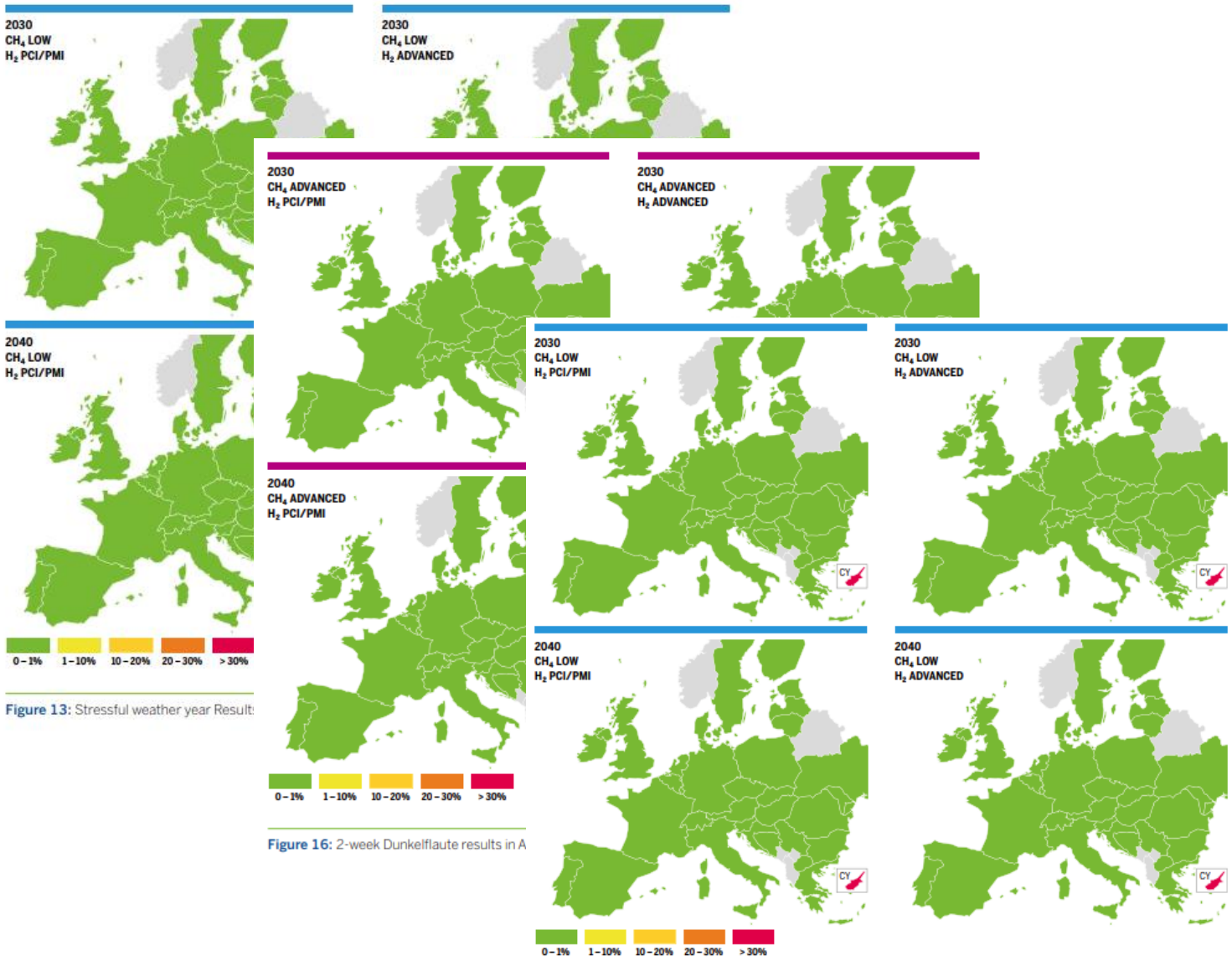


Figure 13: Stressful weather year Result

Figure 16: 2-week Dunkelflaute results in A

Figure 17: Peak Demand results in Low natural gas infrastructure level

- ENTSOG's simulations focus on transmission-level demand and supply, based on available data. For the Dual Gas Model, country-specific gas demand and supply come from the TYNDP 2024 Scenarios Report. Gas demand for power generation is taken from the Dual Hydrogen/Electricity Model (DHEM) results.
- The analyses show that there is no risk of methane demand curtailment in any scenario across EU countries.

SLID (N-1)

Low natural gas infrastructure level

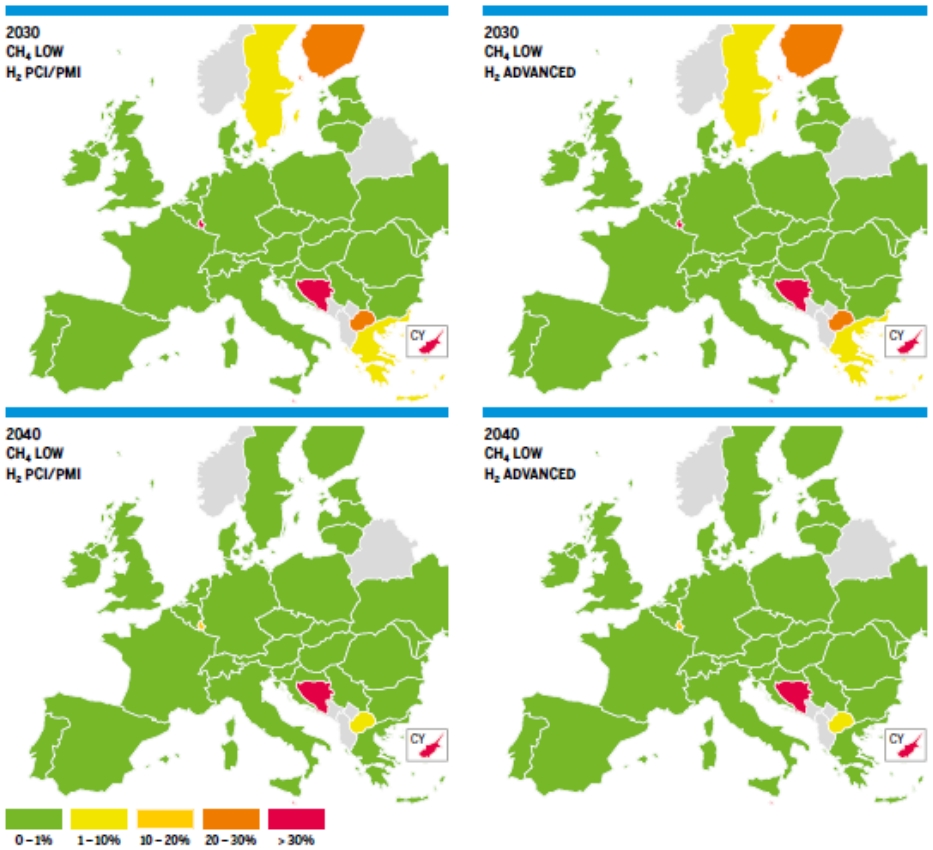


Figure 19: SLID Peak Demand results in Low natural gas infrastructure level

Advanced natural gas infrastructure level

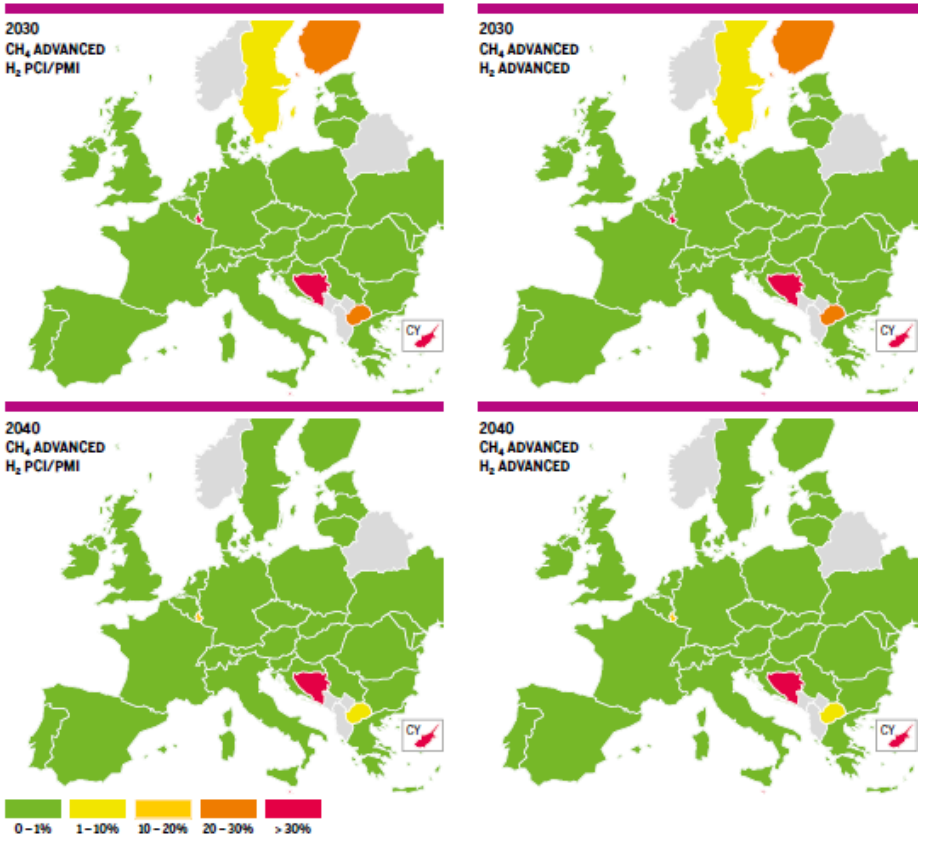


Figure 20: SLID Peak Demand results in Advanced natural gas infrastructure level

This section investigates the impact of a disruption to the single largest infrastructure in each country during Peak Demand (PD). The Single Largest Infrastructure Disruption (SLID) scenario evaluates the curtailed demand following the disruption of the single largest interconnection infrastructure for a given country, excluding domestic production and storage facilities.

Resilient, flexible, and future-ready energy system

Role of natural gas infrastructure in the EU's energy system

- Supports EU Green Deal and Clean Industrial Deal goals
- Backs up variable RES and mitigates electricity price spikes
- Cross-sector integration (Grids Package 2026)
- Enables hydrogen transport via repurposed infrastructure*

Supply adequacy and sustainability

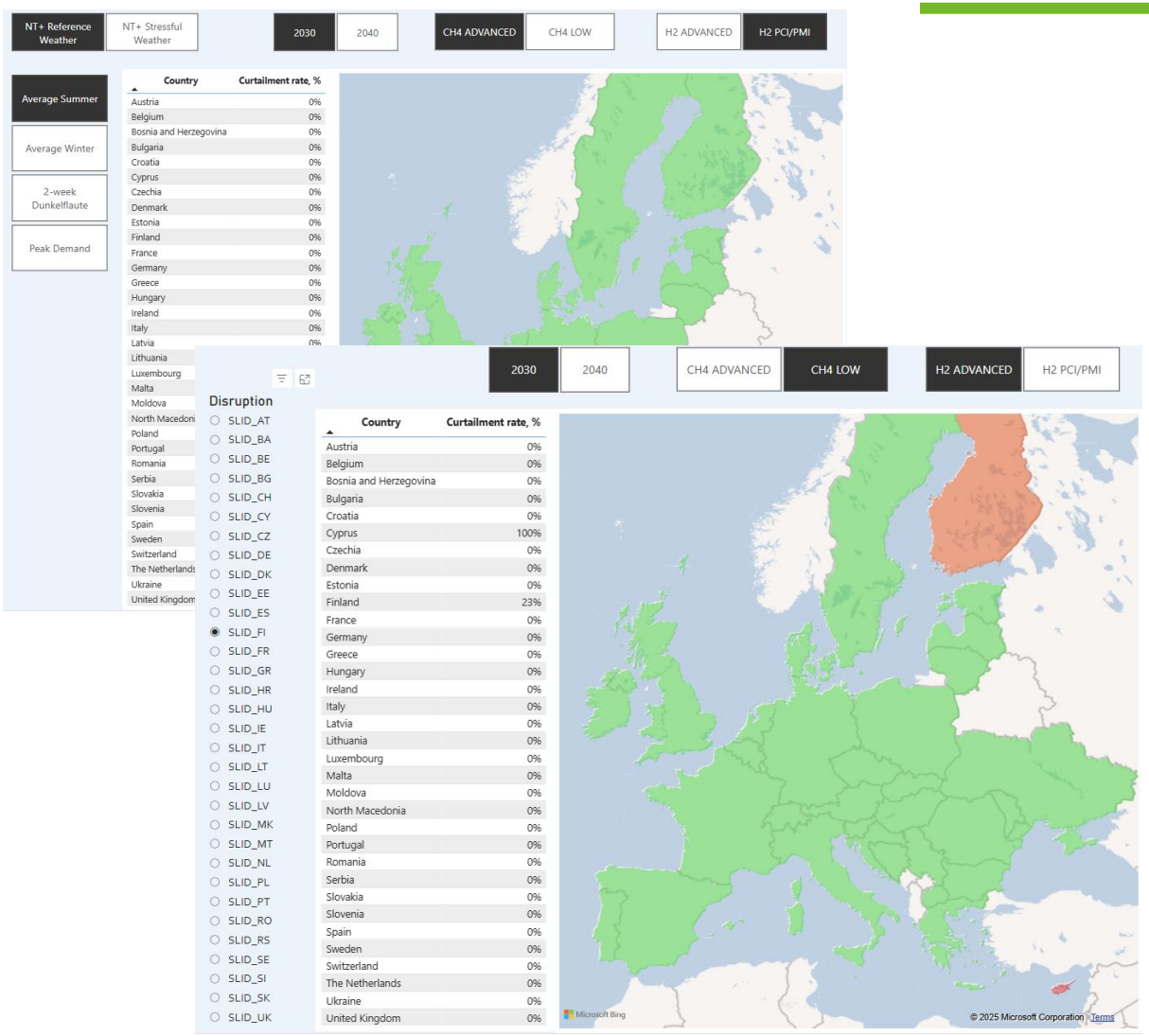
- Biomethane offsets declining conventional gas
- Ensures system flexibility and supply security
- Underground storage balances demand and strengthens resilience

Independence from Russia

- Infrastructure aligned with EU plan to phase out Russian gas by 2027
- Based on EC roadmap and upcoming legislation (June 2025)

*At the Copenhagen Forum, ENTSOG and ENNOH presented draft criteria for repurposing gas infrastructure for hydrogen and will consult stakeholders before finalising principles by November 2025 for application in TYNDP 2026

Visualisation platform



The results of the natural gas system assessment are also presented though an interactive visualisation platform, available HERE

Public consultation questions Natural Gas System Assessment Report (1/3)

5. Is the structure of the report clear and logical? Are the sections and subsections well-organized and easy to follow? Please answer "Yes/No" and justify briefly. *

Yes

6. Are the explanations provided in the draft TYNDP 2024 Natural Gas System Assessment report clear and exhaustive? Please answer "Yes/No" and justify briefly. *

Yes

7. Is the data visualisation platform valuable to you? Is it easy to navigate and interpret? Please answer "Yes/No" and justify briefly. *

Yes

Access the questionnaire here: https://forms.office.com/e/jpTLTKc8sL

Public consultation questions Natural Gas System Assessment Report (2/3)

8. In TYNDP 2024, building on feedback from TYNDP 2022 and taking into account the updated TEN-E regulation, ENTSOG separated the System Assessment and Infrastructure Gaps Identification exercises, using adapted modelling for each purpose. For the Natural Gas System Assessment report, the scope and assumptions can be found in Annex D3. Do you think assumptions can be further improved? Please answer "Yes/No" and justify briefly. *

Yes

9. Do you consider the draft TYNDP 2024 Natural Gas System Assessment report provides sufficient insight regarding the question of natural gas security of supply? Please answer "Yes/No" and justify briefly. *

Yes

10. The draft TYNDP 2024 Natural Gas System Assessment report assessed the supply source dependence of Russian gas as S-1 case. Should other S-1 scenarios be analysed in the Natural Gas System Assessment report? Please answer "Yes/No" and justify briefly. *

Yes

Access the questionnaire here: https://forms.office.com/e/jpTLTKc8sL

Public consultation questions Natural Gas System Assessment Report (3/3)

11. The draft TYNDP 2024 Natural Gas System Assessment report indicates that EU-wide security of supply assessment should consider the impact of infrastructure repurposing to hydrogen. Do you have suggestions on what could be implemented in the assessment for the purpose of such evaluation? Please answer "Yes/No" and justify briefly. *

Yes

12. Would a similar security of supply (SoS) assessment of hydrogen infrastructure be of value to your organisation in the next TYNDP edition? What is your expectation? Please answer "Yes/No" and justify briefly. *

Yes

13. Are there any other sections or topics that you feel are missing or should be expanded upon? Do you have any suggestion on how to improve the presentation of the results? Please answer "Yes/No" and justify briefly. *

No

Access the questionnaire here: https://forms.office.com/e/jpTLTKc8sL

Summary of discussions & closing remarks

Thank you for your attention