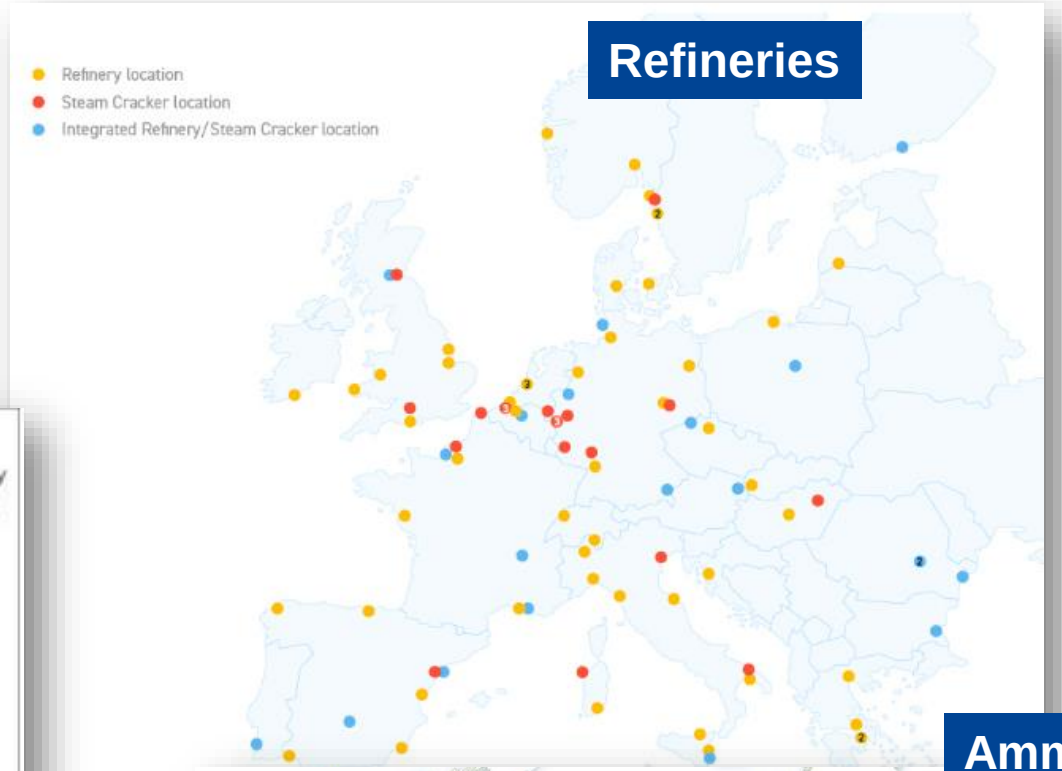
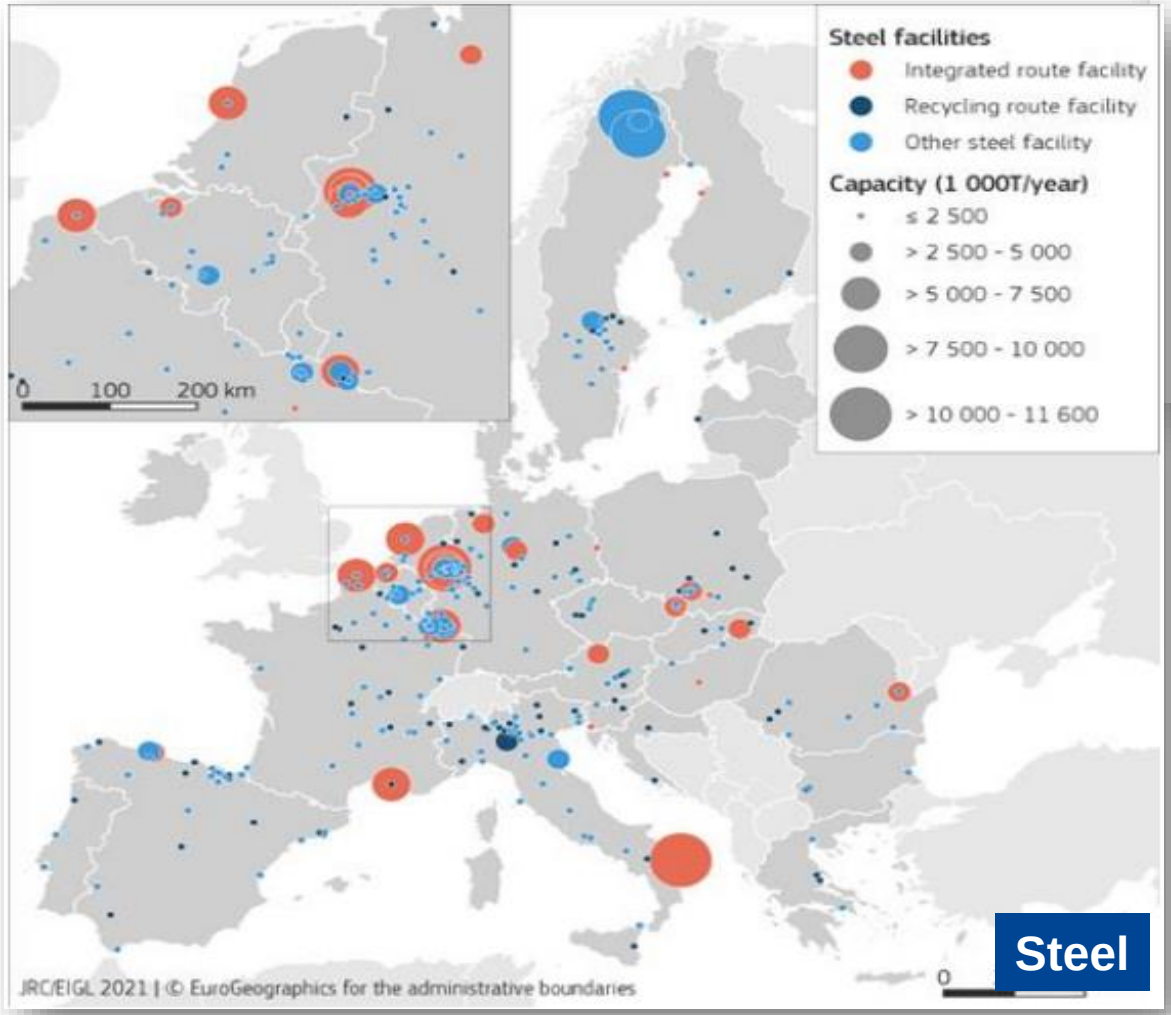
The role of Renewable Hydrogen for Decarbonizing Hard-to-abate Sectors

28 May 2025

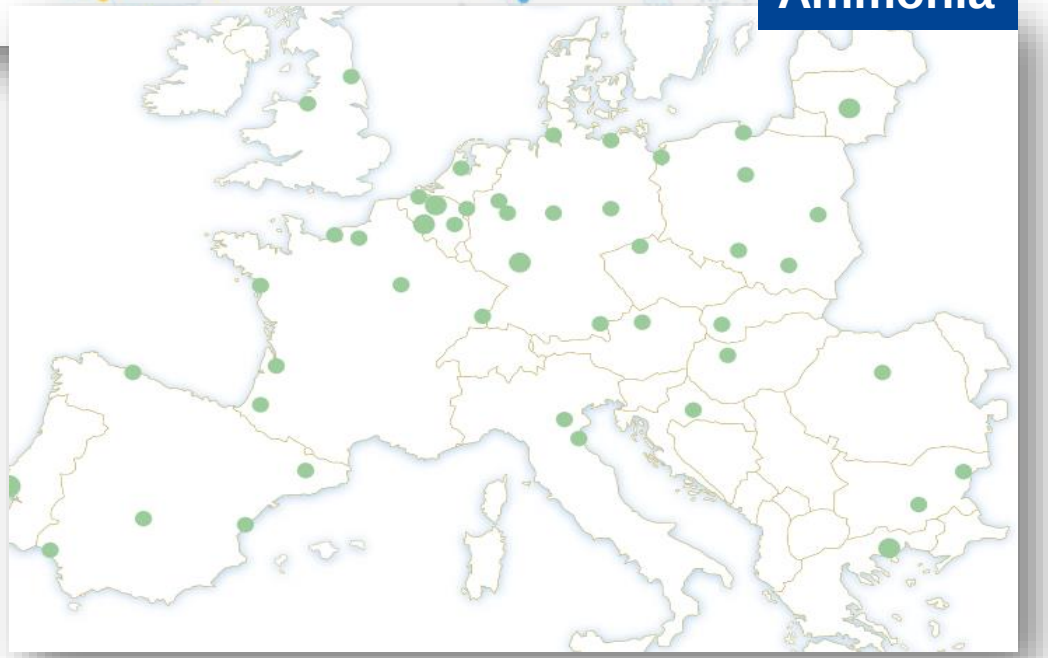
H2 demand under 2% of Europe's energy consumption



Refineries

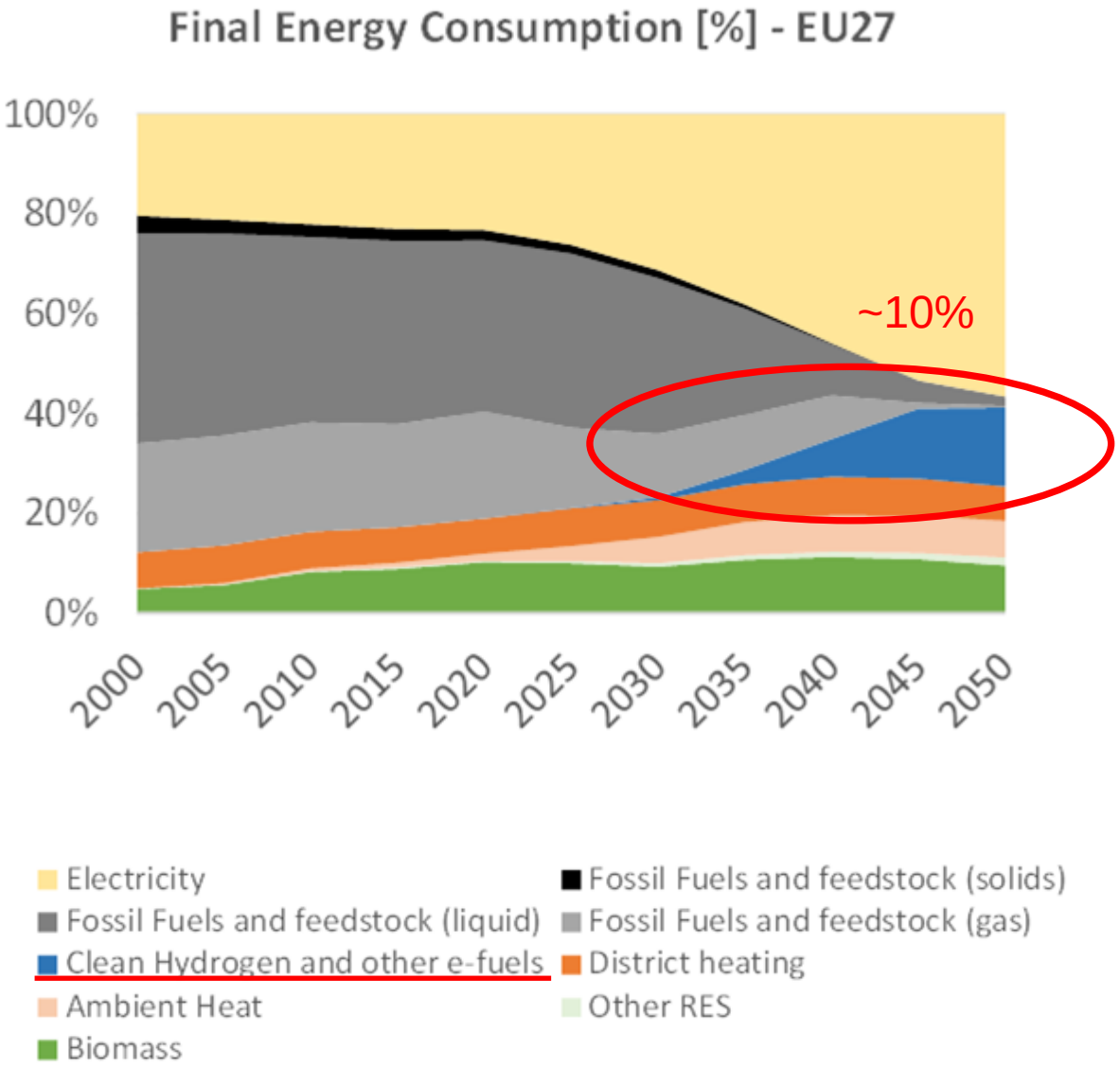


Steel



Ammonia

Future role of renewable and low-carbon hydrogen in the EU



H2 quantities?

- 3-4 Mt RFNBO /year for 2030 industry and transport targets
- 60-70 Mt/year in 2050

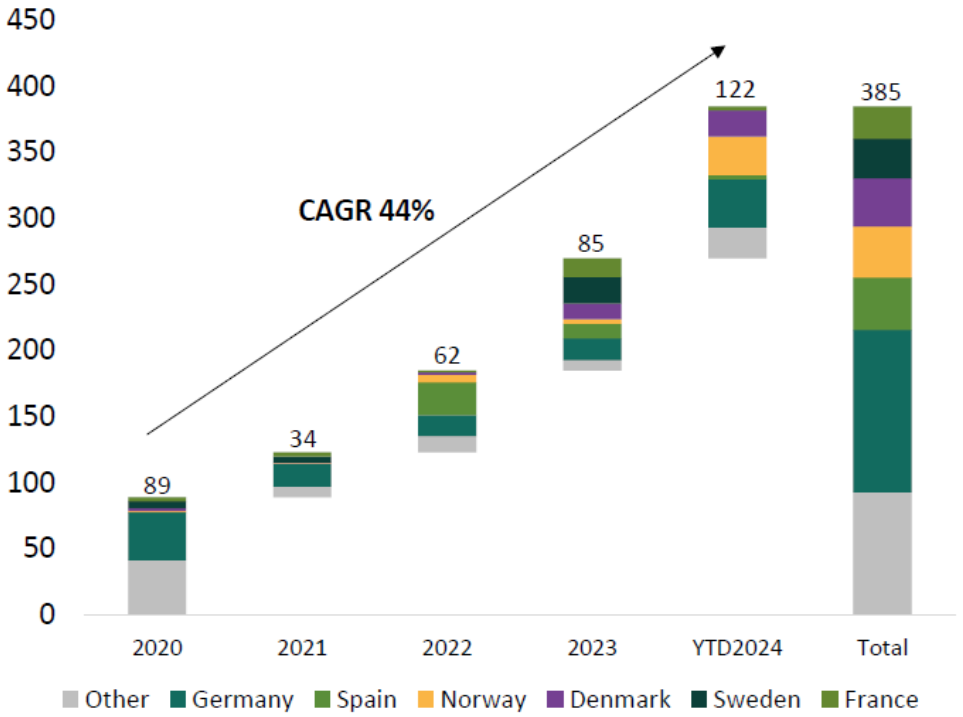
Production for 2030

- Necessary electrolyser capacity: 30-60 GW
- end 2024: 0.7 GW

European Commission

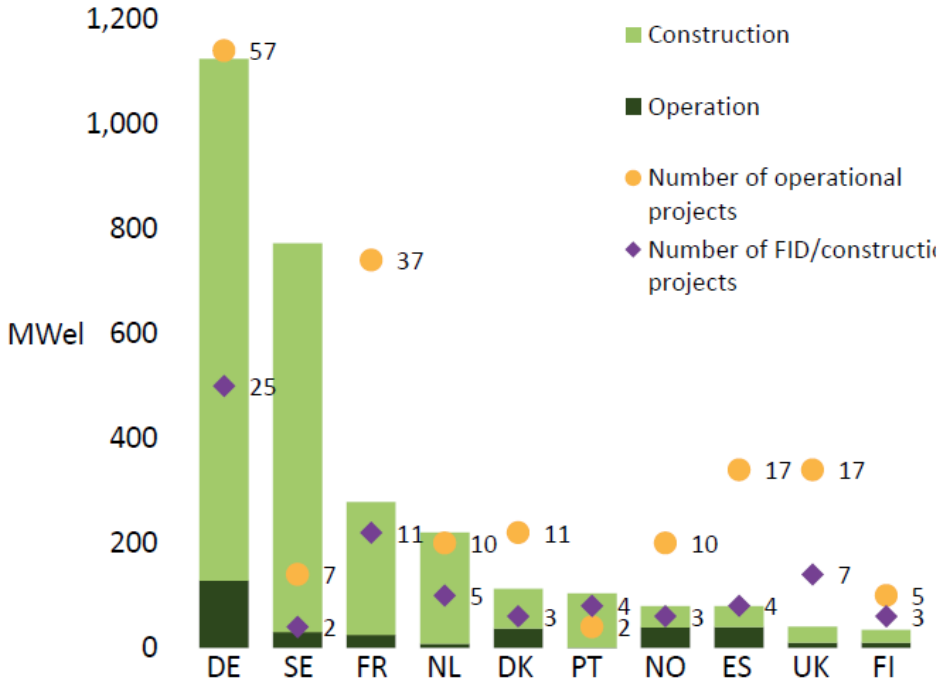
Electolysers

Installed and operational water electrolysis capacity installed in (MW_{el})



Notes: Actual capacity is slightly higher due to untracked small-scale electrolysers of less than 0.3 MW.

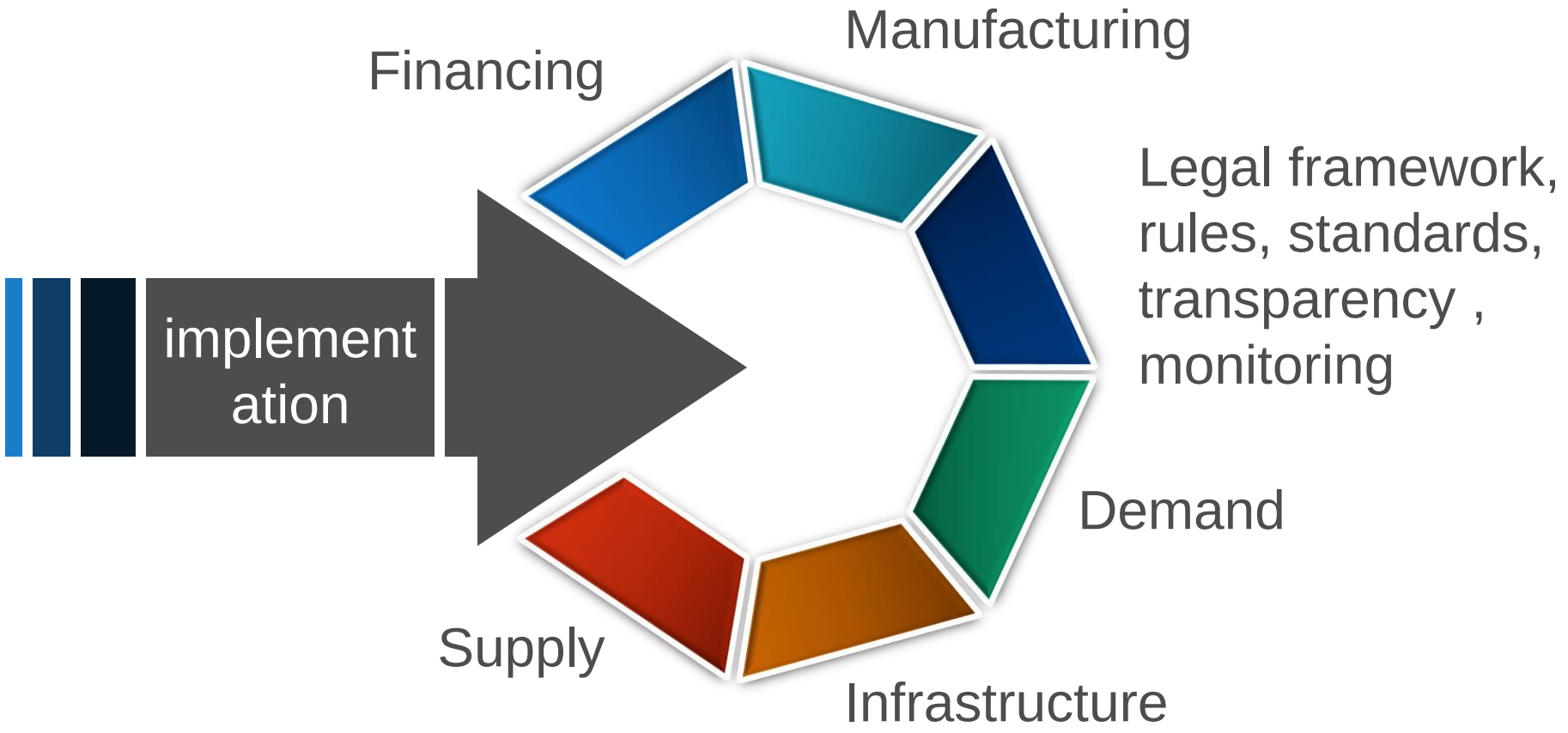
Top 10 countries in Europe with largest operational and under construction water electrolysis capacity and number of projects by September 2024 (MW_{el})



Source: Hydrogen Europe, figures 2024

European Commission

Hydrogen ecosystem

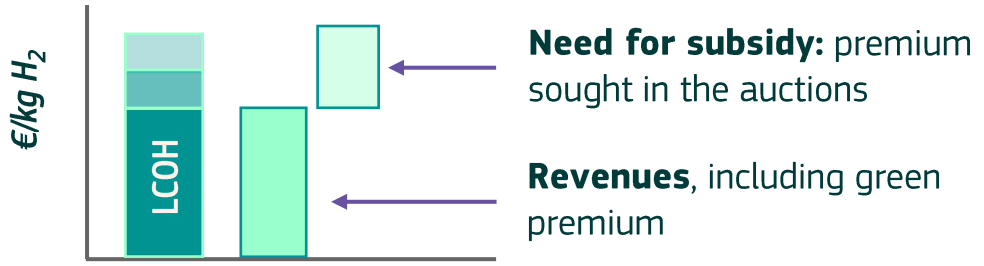


Hydrogen Bank - The Auction design I

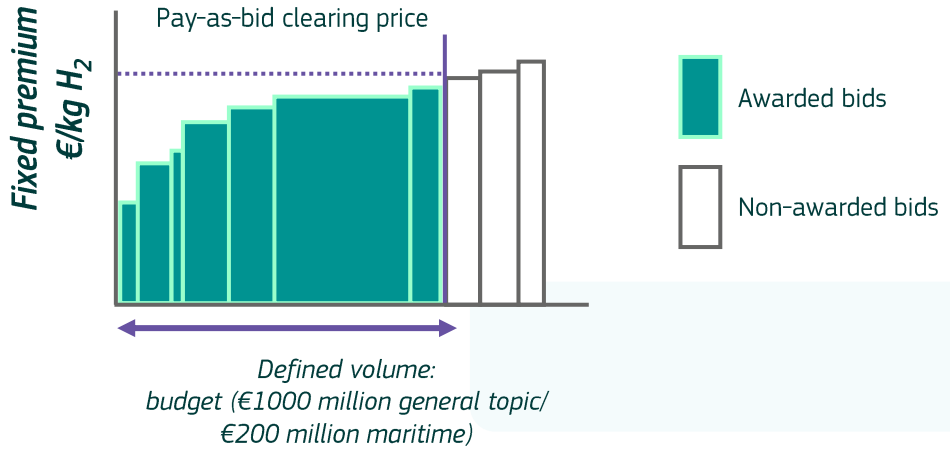
- Budget: **EUR 1,200 million:**
  - *Topic general : EUR 1,000 million*
  - *Topic maritime: EUR 200 million*
- Support in form of a **fixed premium** in €/kg of renewable hydrogen **produced** over **10 years**
- **15 out of 61 renewable H2 production projects to receive a total of €992 million in EU support**, with **individual subsidies ranging from €8 million and €246 million**
- .Bids **ranked on price** – budget allocated to projects with the lowest specific support requirements -> **support ranging from €0.20 and €0.60 per kg of RFNBO H2.**.
- **Auction–as-a-service**: IF**24 Auction: Spain and Austria** with EUR 400 million each and Lithuania with EUR 36 million
- 3rd round due in 2025, as announced in the Clean Industrial Deal (budget of 1bn €)

- IF24 Auction - European Commission

Fixed-premium auction



Bids ranked on price only



Hydrogen Bank - Auction requirements

Minimum electrolyser capacity

5MWe per bid

- one location in EEA, no virtual capacity pooling
- new capacity only (no “start of works” prior to application)

Maximum requested grant per project (=price*volume) capped

1/4 of total auction budget general topic (€250 million) to avoid “winner takes all”

EUR 200 million for maritime topic

Maximum bid price (“ceiling price”)

4.00 €/kg of RFNBO hydrogen produced

Planned financial close & entry into operation

Financial close in less than **2.5 years** and **entry into operation** in less than **5 years from grant signature**

Limited sourcing of electrolyser stack

Limit the sourcing of electrolyser stacks with surface treatment or cell unit production or stack assembly carried out **in China to no more than 25% (in MWe)** of the total electrolyser capacity as expressed in the bid

Termination for severe under-production over 3 consecutive years

Below 30% on average of planned yearly average volume

Completion guarantee (“deposit”)

8% of maximum grant amount

- To enter the auction, you need to provide an LoI for the guarantee from a financial institution
- To sign GA, you need the financial institution to issue the guarantee

Reporting at the end of the support period

Certification of 70% GHG savings on overall production

- Independent third-party certificate or audited report

European Commission

Hydrogen Bank - Supporting imports

- EHB international leg remains a priority activity under the overall European Hydrogen Bank despite lack of EU funding. Efforts ongoing to 1) secure funding under TeamEurope approach and 2) design the import auction

- The Commission contracted Guidehouse and Franhofer ISI to carry out a study on **auction design and necessary pre-conditions for a European import auction for renewable hydrogen under the European Hydrogen Bank** (expected July 2025) that will:

    - Provide a high-level assessment of the EU and international H2 market (expected development and dynamics, market shares of derivatives (etc)

    - Analyse a selected set of auctions and relevant EU and international schemes (EHB domestic leg, H2Global and other EU MSs schemes, UK, Japan, South Korea, India, Chile) and evaluate replicability of different elements to a joint European import auction

    - Develop recommendations for the T&Cs of an import auction under the EHB

Hydrogen Mechanism under the European Hydrogen Bank - Accelerating market creation

1 **Connect demand and supply**
of existing and future H2

2 **Inform** H2 infrastructure development
Support infrastructure development (e.g. “open seasons”)

3 **Link with financial support**
Display and match with relevant products

Renewable and low-carbon
Hydrogen derivatives

European offtakers
All suppliers

European Commission

Main milestones and next steps for the Hydrogen Mechanism

2024 | **2025** | **2029**

Design

Delivery

January 2025:
Development started

Operations and improvements

June 2025: Opening of registrations
- Creation of accounts and project libraries
- Granting access to individual users

September 2025: Start of operations (first “round”)
- Collection of **Demand request** and **Supply offers**
- Organisation of **Calls for interest, Aggregation** and **Matching**

Building the needed infrastructure

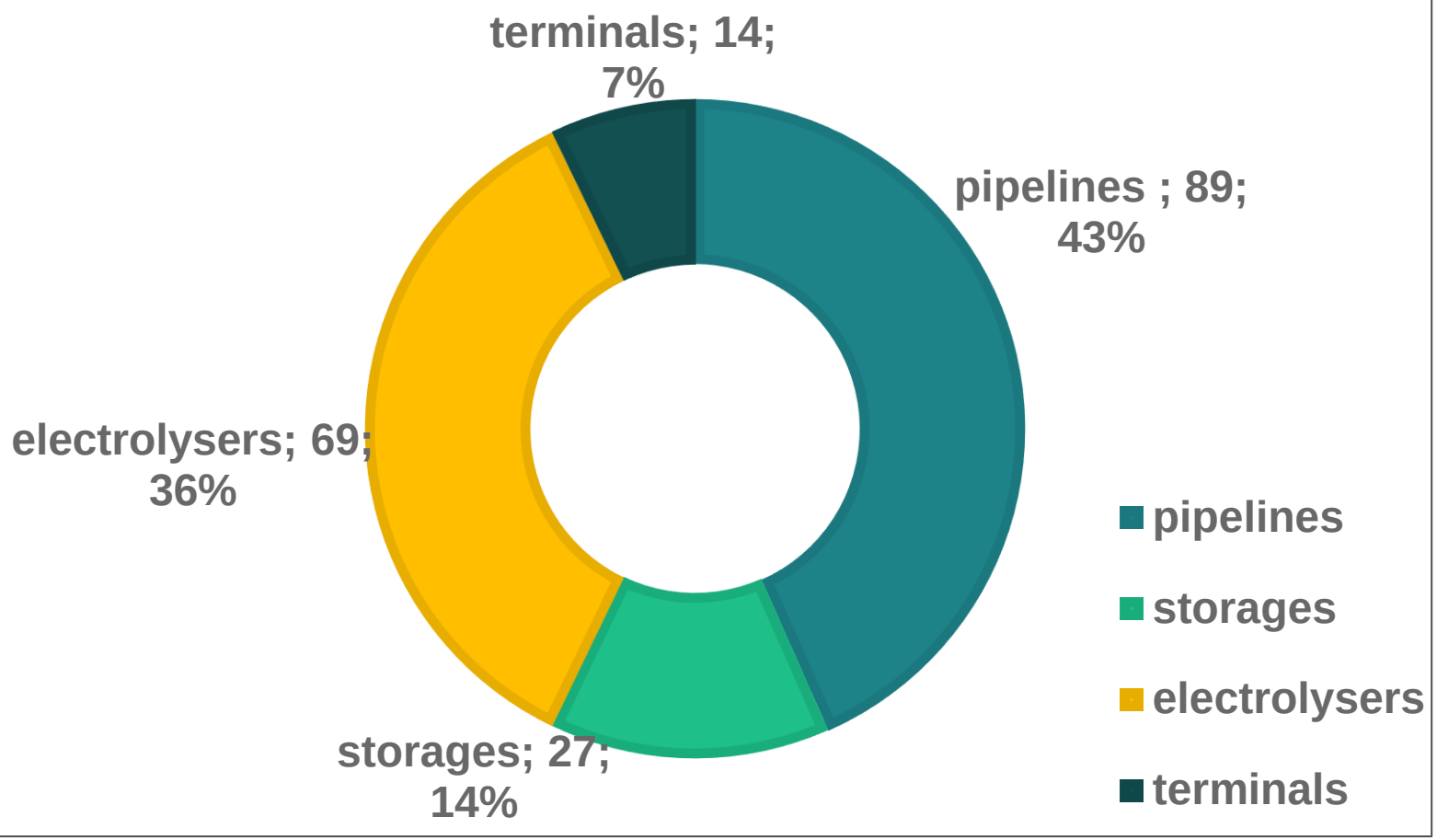
1st PCI/PMI list – 65 hydrogen and electrolyser projects:

- **31 pipelines, 17 electrolysers, 10 import terminals and 7 storages.**

- 21 out of which received, this year, CEF support for studies in the amount of well €250 million.

European Commission

Projects in the 2nd PCI/PMI process



- **199 candidate projects** submitted, only **35% are currently** included **on the PCI/PMI** list.
- From the 89 pipelines around 50% are expected to be repurposed.
- The **new list** is expected to be published **in November 2025.**

European Commission

Infrastructure needs – 2024-2040

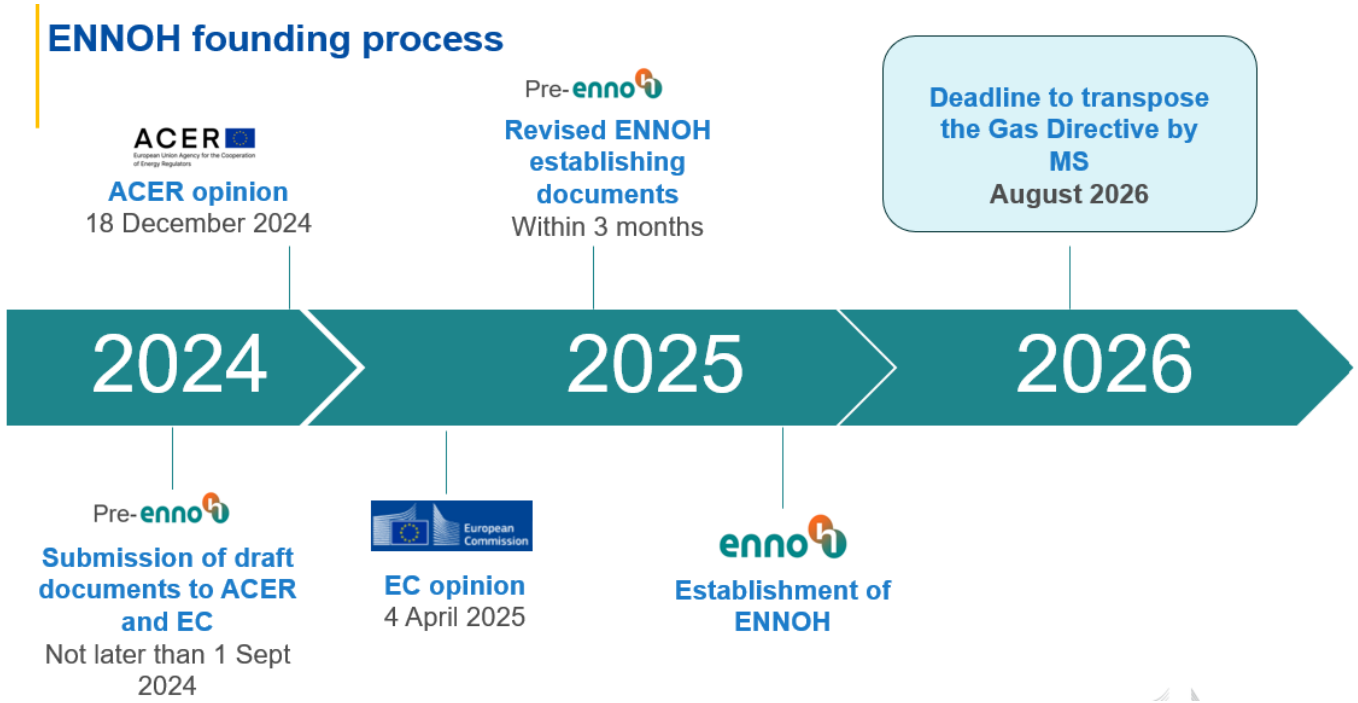
Energy infrastructure category		2024 - 2040 Total Investment needs (€ billion)
H2	Hydrogen pipelines	117,68
	Hydrogen storage	51,00
	Import terminals	20,00
	Electrolysers	48,14
	Installations for hydrogen use in transport sector	1,06

Source: European Commission study " Investment needs of European energy infrastructure to enable a decarbonised economy" (2025).

European Network of Network Operators for Hydrogen (ENNOH)

Association for the EU-level cooperation of HTNOs

- Main areas of competences:
- Develop hydrogen ten-year network development plans
    - in cooperation with ENTSO-E and ENTSOG in the framework of the EU-level integrated network planning
    - Until ENNOH is established, ENTSOG is developing the H2 TYNDP
- Provide technical expertise in the development of hydrogen network codes for the optimal management of the Union hydrogen network;



European Commission

Grids update: European Grids Package

- Building on the **Grid Action Plan** (2023), the Commission will publish a **European Grids Package** by end of this year.
- Announced under of the **Competitiveness compass** and the **Clean Industrial Deal**.
- The package will propose measures to accelerate the upgrade, digitalisation and expansion of the European grid infrastructure removing bottlenecks and increasing overall efficiency for a **well interconnected and resilient energy system**.
- With a **focus on electricity**, it will also cover **hydrogen** and **other infrastructure categories** included under TEN-E.
- **Public consultation** and **call for evidence** run are published – please contribute!

European Commission

irina-mihaela.minciuna@ec.europa.eu
Infrastructure and Regional Cooperation Unit
Directorate-General for Energy
Green Transition and Energy System Integration
European Commission

DG ENER
2025