

# Renewable hydrogen, a key energy carrier for Spain and Europe

DÍA DEL  
**HIDRÓGENO**  
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# Europe paves the way in H<sub>2</sub>

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## Green Deal

Roadmap to a climate-neutral EU by 2050.

## Fit for 55

Package of measures to reduce emissions by at least 55% by 2030.

Europe continues to move forward on H<sub>2</sub> regulatory frameworks

Decarbonisation goals in the EU

Carbon neutrality  
by 2050

## REPowerEU

European plan to reduce dependence on Russia and accelerate the energy transition.

The focus of H<sub>2</sub> demand is on sectors that are difficult to decarbonise, such as industry and heavy transport

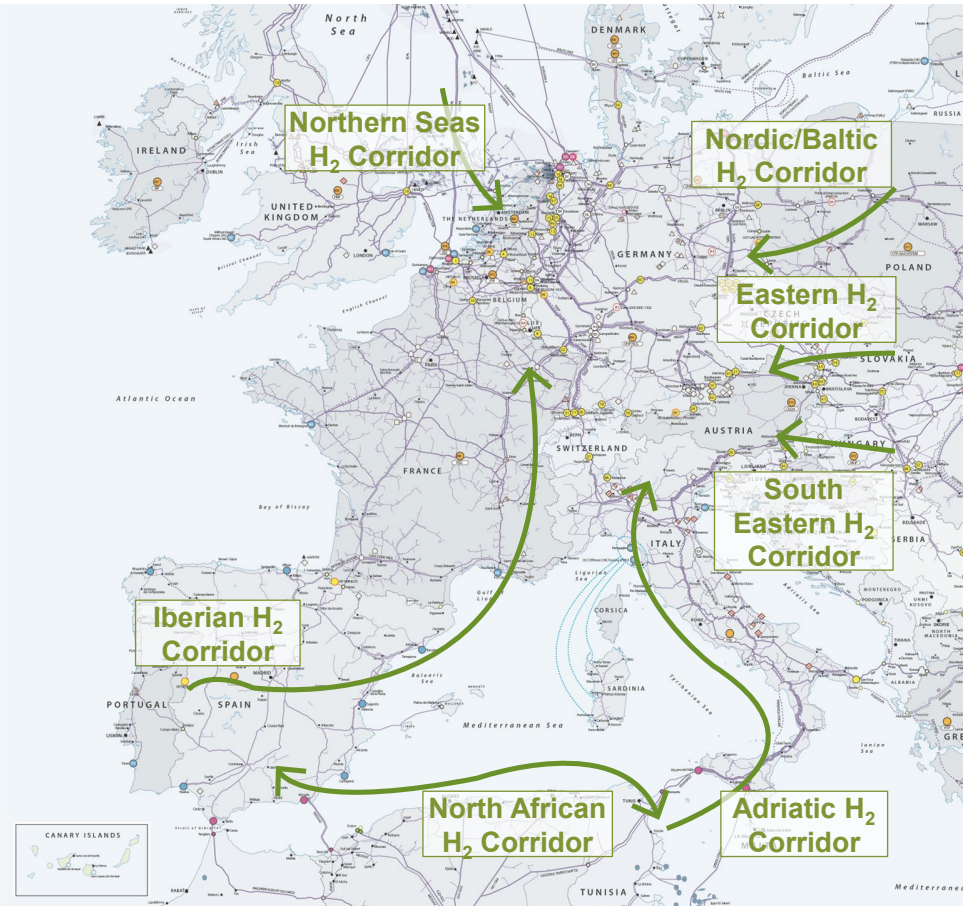
Hydrogen as an energy carrier

2030 target: 20Mt of hydrogen consumption in Europe

# Europe paves the way in H<sub>2</sub>

## REPowerEU Corridors

- Lever for the integration of European markets, to connect producer countries with centres of demand.
- Keys to European energy independence and security of supply.
- The cost of H<sub>2</sub> transmission by pipeline over long distances is 2 to 4 times lower than transmitting electricity over high-voltage lines to produce hydrogen at destination, according to a study by European Hydrogen Backbone.
- The transmission of hydrogen by pipeline reduces energy losses and avoids over-sizing the electricity infrastructure to get the same amount of hydrogen to the destination.



# Enagás, catalyst for an H<sub>2</sub> market

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## Enagás

**Pioneers and leaders in the development of renewable gases** (biomethane and green hydrogen) as new energy solutions for decarbonisation

With **technical know-how** and appropriate **societal instruments** for the development of a renewable hydrogen market

Incorporation of **Enagás Hydrogen Infrastructures**, in line with its purpose as TSO and HNO

**60% stake in Enagás Renewable\*** with the aim of contributing to the creation of the renewable gas market in Europe

**Role of Enagás GTS** for the implementation of the Guarantees of Origin System

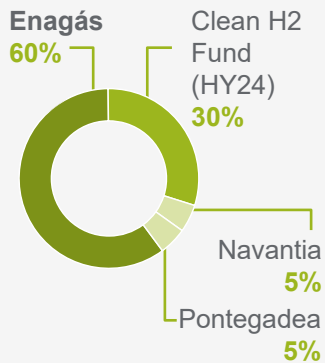
\*Enagás' participation is in line with the framework established by the CNMC and will be adapted to EU regulatory developments in this area

# Enagás, catalyst for an H<sub>2</sub> market

**~25**  
projects in Spain

**~50**  
partners

**~200**  
€M<sup>1,2</sup>  
Investment up to 2030

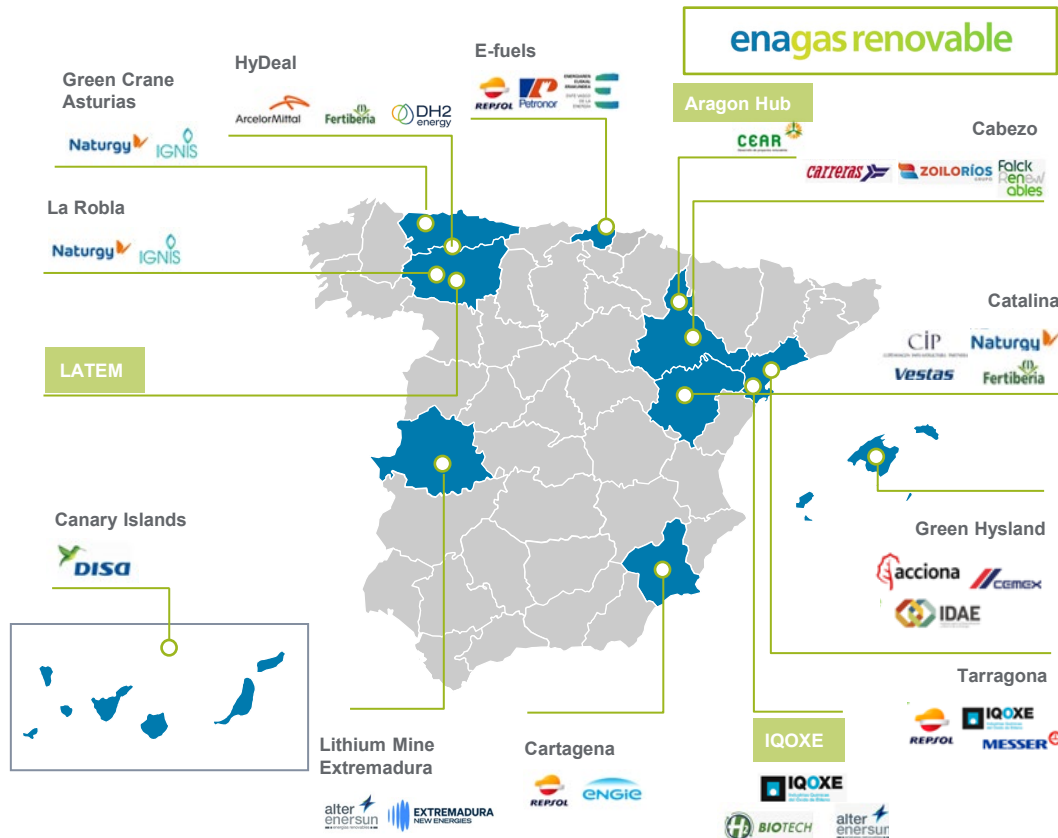


Enagás Renewable is one of the main players in the PERTE EHRA award, with 3 pre-selected projects

The CNMC has defined a **operating framework** for the definition of **Enagás Renewable activities**

1. Includes investments in renewable generation assets.  
2. Relating to Enagás, S.A.'s % stake in Enagás Renewable.

## H<sub>2</sub>'s main projects and partners



Projects in green have been pre-awarded under the H2 Pioneros programme of PERTE ERHA

# Enagás, catalyst for an H<sub>2</sub> market

## Enagás Hydrogen Infrastructures: HNO

- As a European TSO, Enagás is ready to be **operator of the future hydrogen network**
- More than **50 years' experience** as a developer, owner and operator of the natural gas network
- A **network of infrastructures** that should be the starting point for the development of the future **Spanish H<sub>2</sub> Backbone Network**
- The **proposed European legislation** confirms that TSO status is compatible with HNO status

**H2MED, the first axes and the storage facilities of the future Spanish H<sub>2</sub> Backbone Network were submitted by Enagás to the EU call for Projects of Common Interest on 15 December 2022, according to the announcement made by the Spanish Government**



# Spain, first hub in Europe

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## Capacities of Spain



**Renewable  
generation  
potential**



**Robust  
infrastructure  
network**



**Industrial  
capabilities**



**Geographical  
position**



**Collaboration with  
public  
administrations**

**H2MED presentation at the Euro-Mediterranean Summit as the first European Green Corridor**

# Spain, first hub in Europe

## Renewable H<sub>2</sub> production potential

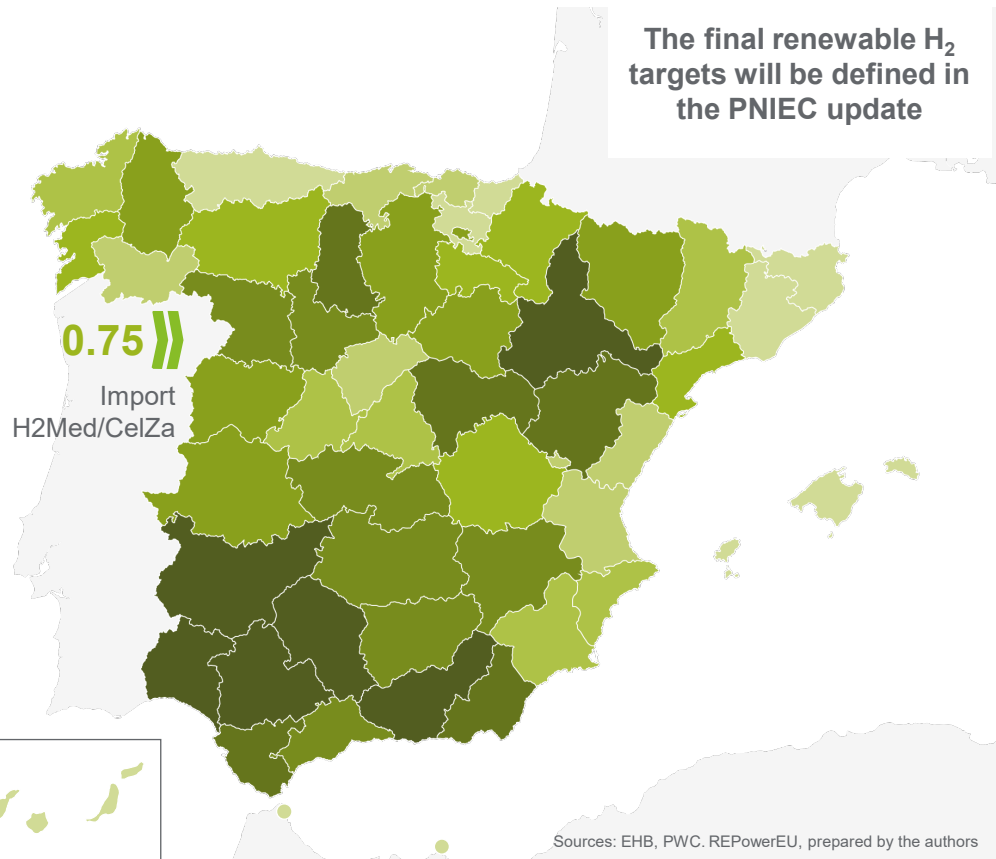
The estimated renewable H<sub>2</sub> production potential in Spain in 2030 is between 2 and 3 Mt and in 2040, between 3 and 4 Mt

2-3 Mt  
in 2030

3-4 Mt  
in 2040

Import from  
Portugal

0.75 Mt



# Spain, first hub in Europe

## Potential renewable H<sub>2</sub> demand in 2030

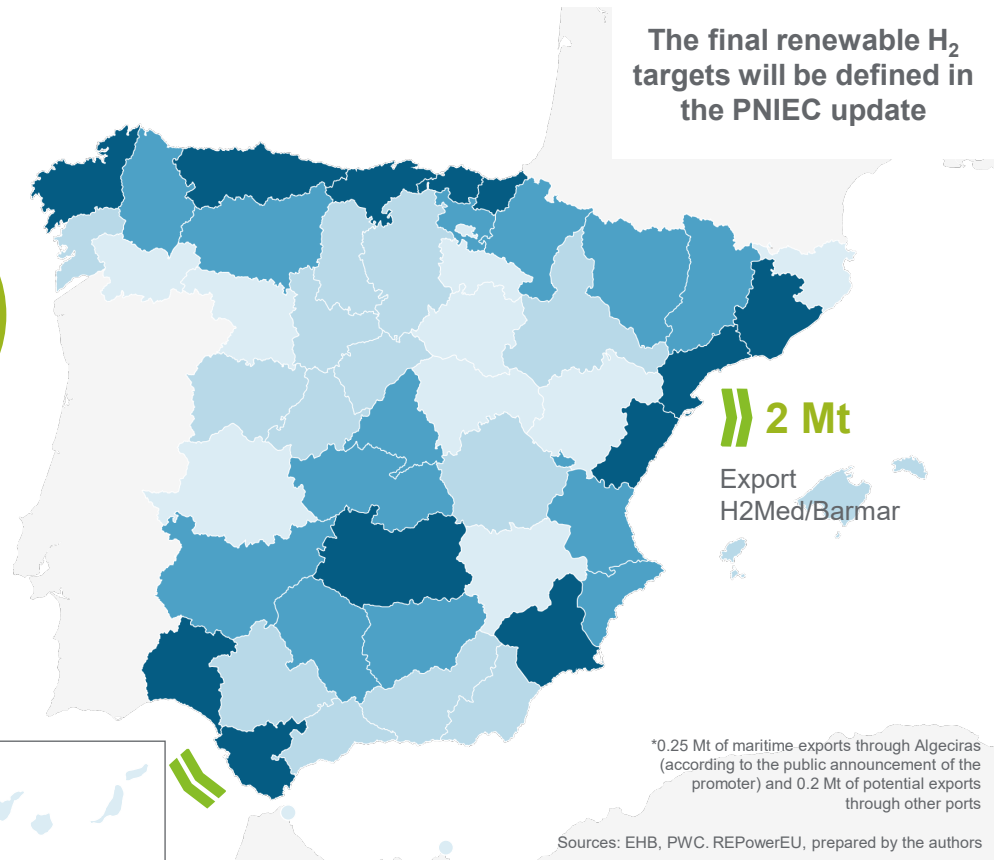
1.3 Mt  
National  
demand

2 Mt  
Export  
H2Med/  
BarMar

~0.45 Mt  
Carriers  
(Maritime  
transmission)\*

■ Domestic demand includes industries that are difficult to decarbonise (**refining, chemicals, steel and ceramics**). Heavy transport, which could be a potential additional demand, is not included.

■ The unequal **distribution between production and demand** in Spain justifies the need for an **H<sub>2</sub> transmission network**



# Spain, first hub in Europe

## Spanish H<sub>2</sub> Backbone by 2030\*

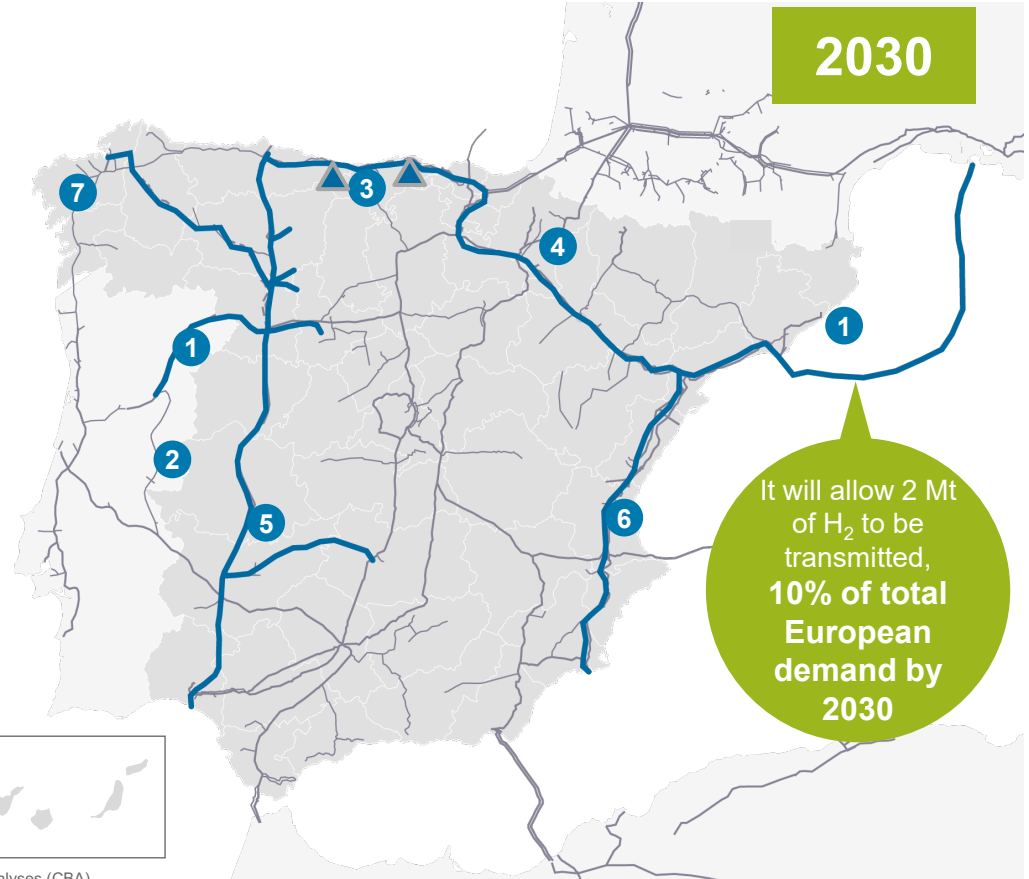
Transmission and storage projects submitted to PCI call for proposals

High H<sub>2</sub> production potential connection with unmet local demand

- 1 H2Med (Barmar-CelZa)
- 2 Vía de la Plata Axis
- 3 Cantabrian Coast Axis
- 4 Valle del Ebro Axis

Connection “H<sub>2</sub> valleys” for supply guarantee

- 5 Puertollano Connection
  - 6 Levante Axis
  - 7 Coruña - Zamora Connection  
Project submitted by Reganosa to the PCIs
- ▲ Underground storage facilities

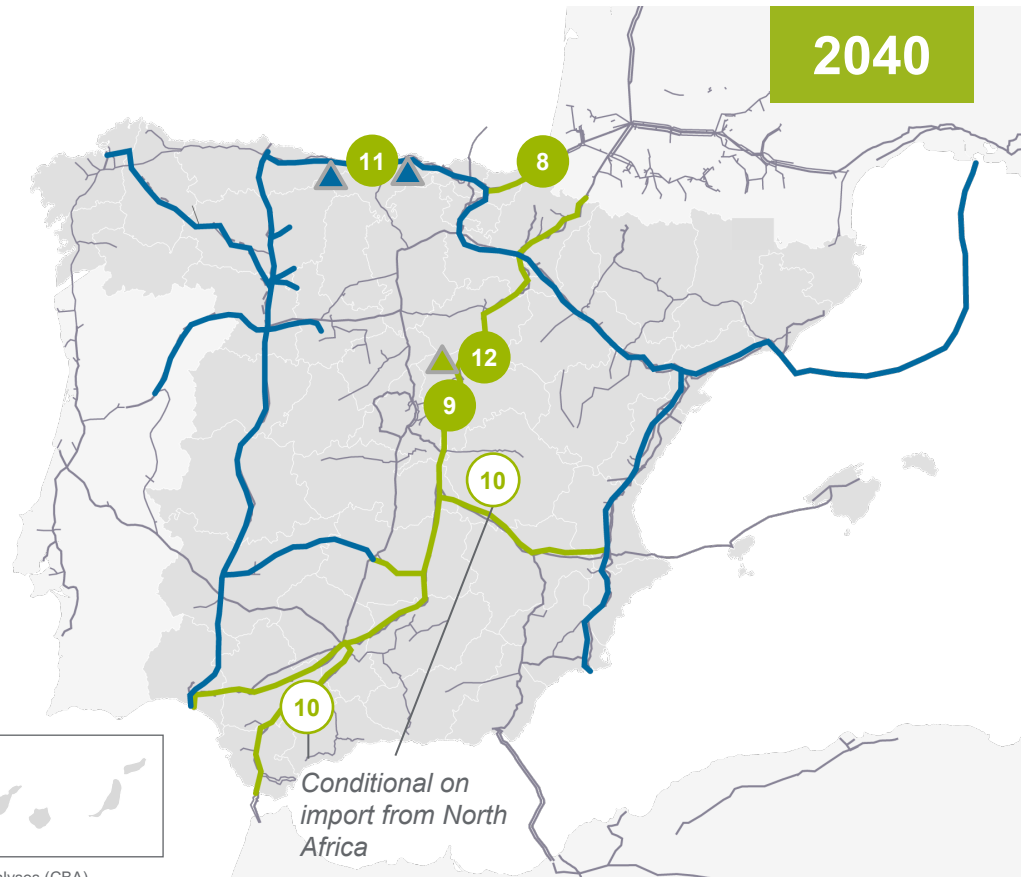


\*This network is subject to what is defined in the Government's Binding Planning and prior cost-benefit analyses (CBA)

# Spain, first hub in Europe

## Spanish H<sub>2</sub> Backbone by 2040\*

- 8 **Irún and Larrau exports:** existing interconnections dedicated to H<sub>2</sub> to increase exports to France.
- 9 **Meshing of the Central Zone (Huelva-Córdoba-Madrid-Navarra):** meshing to satisfy demand in the central area, provide security of supply, and guarantee exports and imports North Africa-Europe.
- 10 **North Africa import, Tarifa-Córdoba and Alcázar de San Juan-Montesa:** the following interconnections exist to increase exports to the rest of Europe.
- 11 **H<sub>2</sub> Storage Facilities in Cantabria and Basque Country:** incorporation of storage facilities to guarantee supply to the H<sub>2</sub> transmission infrastructure.
- 12 **Yela H<sub>2</sub> storage facility.** (Other potential storage facilities in southern Spain are under study).



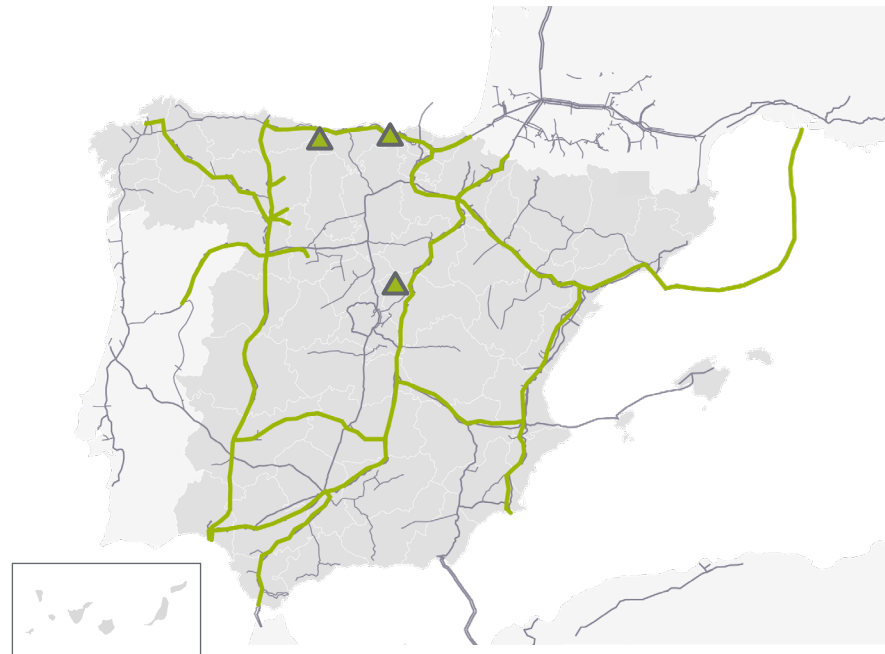
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# Spain, first hub in Europe

Current infrastructure network



Spanish H<sub>2</sub> Backbone by 2040



# Spain, first hub in Europe

## Synergies between gas grid and H<sub>2</sub> grid in 2040



\*Contemplates backbone, excluding H2MED

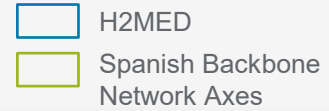
- Enagás' **current** pipeline network technically ready for H<sub>2</sub>
- **Already identified more than 30%** of reusable pipeline sections. **The aim** is to increase this percentage to **60-70%**



# Schedule

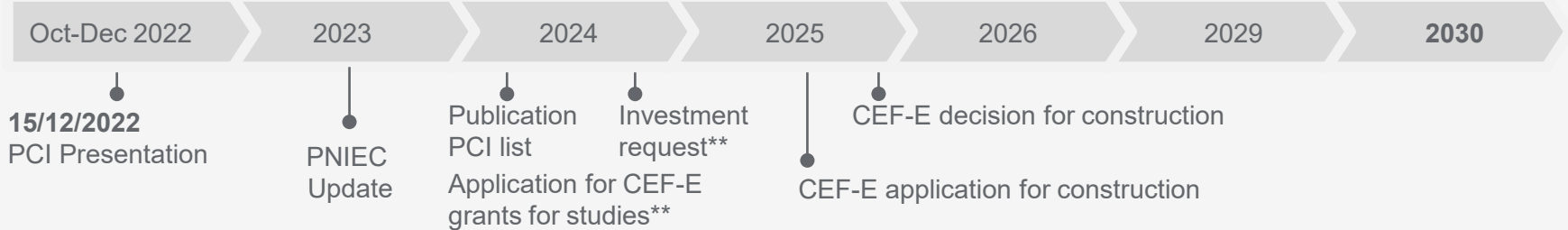
# Schedule

## H2MED and axes of the Spanish H<sub>2</sub> Backbone Network



**09/12/2022**  
 Mandate to TSOs to create development consortium for H2MED

*Non-binding calls for interest\**  
 Spanish backbone network axis



\*Binding future Planning defined by the Government as part of the energy policy will mark the following steps  
 \*\*Conditional on schedule for resolution of PCIs

# Conclusions

# Conclusions

- Enagás, **catalyst of the H<sub>2</sub> market in its triple capacity** as TSO (potential HNO), participates in the promotion of renewable gas projects through Enagás Renovable and as GTS
- As a European TSO, Enagás is ready to be an **operator of the future hydrogen network**
- **Enagás submitted the H2MED projects** and the backbone lines of the Spanish H<sub>2</sub> Backbone Network to the EU's Project of Common Interest candidacy in December, as **announced by the Spanish Government**
- The company is **working on the projects in full coordination with the TSOs in Portugal and France**, as commissioned in December and **in line with European plans** and Enagás' **Strategic Plan**
- **Net Zero** infrastructure
- **Enagás is a pioneer** in the development of renewable gases and has the **technical know-how and societal instruments** for the development of a renewable hydrogen market.
- The Iberian Peninsula has a **network of infrastructures** that will be the starting point for the development of a future **H<sub>2</sub> backbone network**
- Enagás will start **non-binding supply and demand matching mechanisms in 2023** to optimise the development of the backbone network
- **Spain** has the conditions to become **Europe's main renewable H<sub>2</sub> hub**

Thank you very much

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