Co-funded by the European Union

PCI 9.24.1.

Hydrogen Storage North-1

Non-technical summary

INFRAESTRUCTURAS DE HIDRÓGENO DE ESPAÑA

Contents

1. Background and milestones in the development of green hydrogen

The commitment to the fight against climate change enshrined in European and national energy policy highlights the need for a transition to a decarbonised economy. This represents a profound paradigm shift in the energy model, in which energy sovereignty is a priority for Europe and Spain.

Green hydrogen is emerging as the energy vector that will enable the decarbonisation of industry and heavy transport, mainly by replacing fossil fuels.

This new context calls for the development of the necessary infrastructure, to:

- **Bring supply and demand closer together** and enable the penetration of green hydrogen into the energy mix.
- Achieve **energy storage** capacity that fosters the adequacy of energy supplies with a renewable energy mix that is characterised by its high variability and scant manageability.
- Ensure **industrial competitiveness** in a scenario that approaches NetZero by 2050.
- Enable the **penetration of green hydrogen** in the energy *mix* , considering the characteristics and location of its production and demand.

1.1 European context

The **2015 Paris Agreement** and the **United Nations 2030 Agenda for Sustainable Development** marked the onset of a global agenda committed to sustainability and the fight against climate change, which involves the transformation of the economic and energy model in order to move towards decarbonisation.

The European Commission confirmed its strategic commitment to this agenda and the energy transition with its December 2019 presentation of the Green Deal, a package of policy initiatives aimed at putting the European Union (EU) on a pathway toward climate neutrality (net-zero emissions) by 2050. With the European Green Deal, the EU became the first region in the world to make a long-term net-zero emissions commitment, strengthening its leading position in the global fight against climate change. The European Council endorsed the Pact, recognising that **all relevant EU policies should be aligned with the goal of climate neutrality**.

In February 2022, the war in Ukraine brought about a paradigm shift in energy policy. Two weeks after Russia's invasion, the European Union presented the REPowerEU Plan, which endowed the continent with a common energy policy with the security of supply, decarbonisation and competitiveness as its main pillars. As a clean and indigenous resource, Europe made a commitment to green hydrogen as a key ally to be Net Zero by 2050 and with REPowerEU set a **continent-wide consumption target of 20 million tonnes of renewable hydrogen by 2030**.

The EU strengthened the commitment to green hydrogen and its infrastructure and made very significant progress in 2024:

- In April, the European Commission published the list of **European Projects of Common Interest** (PCIs), which for the first time included hydrogen infrastructures, and announced the results of the first auction of the **European Hydrogen Bank** (created in 2023), which confirmed the potential of the Iberian Peninsula to produce the most competitive hydrogen in Europe: five of the seven projects awarded were from Spain and Portugal.
- In June, the EU adopted the **Directive and Regulation on Hydrogen and Decarbonised Gas**, which were decisive in constructing the European hydrogen network.
- In December, the European Hydrogen Bank opened a new tender with 50% more funds, to which the Spanish government added €400 million to support the development of projects in our country.

Most EU member states have taken key steps towards 2024 for the development of this vector:

- 17 countries have already published their final Integrated National Energy and Climate Plans (INECP) with electrolysis capacity targets (≈52 GW in total).
- 48 infrastructure projects recognised as hydrogen PCIs.
- ≈ 21,000 km of hydrogen PCI infrastructure.
- ≈ €60 billion of CAPEX in PCI infrastructure.

Spain's hydrogen infrastructure will form part of Europe's future hydrogen network, which is essential for meeting the European Union's objectives of decarbonisation, energy autonomy and competitiveness.

1.2 Domestic context

The Spanish government has transferred the European energy policy framework to the domestic sphere. Fully aligned with the European Green Pact, since February 2019 Spain has had a **Strategic Energy and Climate Framework**, the key tool for achieving the objective of decarbonising our economy. Through it a regulatory and legal framework is provided for the measures that can facilitate the change towards a sustainable and competitive economic model that will play its part in slowing climate change.

The main tenets are: the Climate Change and Energy Transition Law *(Ley de Cambio Climático y Transición Energética)*, the Integrated National Energy and Climate Plan (INECP), the Long Term Decarbonisation Strategy 2050 (*Estrategia de Descarbonización a Largo Plazo 2050* - ELP), the Energy Poverty Strategy *(Estrategia Contra la Pobreza Energética)*, and the Fair Transition Strategy *(Estrategia de Transición Justa)*. These elements are backed by a range of sector-based strategies and roadmaps, such as the **Renewable Hydrogen Roadmap** *(Hoja de Ruta del Hidrógeno Renovable)*.

The **Integrated National Energy and Climate Plan (INECP) 2023-2030**, approved in September 2024 by the Council of Ministers, at the proposal of the Ministry for Ecological Transition and the Demographic Challenge (MITECO for its Spanish initials), ambitiously pursues **the deployment of renewable energies and increases the hydrogen consumption target for Spanish industry to 74% in 2030**, compared to the 42% set out in the RED III Directive. Out of a consumption of approximately 650,000 tonnes, some 500,000 tonnes would be renewable hydrogen.

Furthermore, the INECP triples the capacity of electrolysers for renewable hydrogen production foreseen in the previous 2021 plan to 12 GW in 2030, and sets the target that by that date 17.26% of the fuels used by Spanish transport will be **non-biological renewables, such as hydrogen**.

These objectives show that **renewable hydrogen is a national project which gives Spain** a historic opportunity to emerge as a European hub. The INECP highlights the development of the Spanish Hydrogen Backbone and the international H2med corridor as strategic infrastructures.

2. Renewable hydrogen

2.1 What is renewable hydrogen?

Hydrogen is the most abundant chemical element on the planet and is found in 75% of all matter on earth. It is often found together in compounds with other chemical elements such as oxygen, to form water, or carbon, to form other organic compounds, such as hydrocarbons.

Green hydrogen as an energy vector is a clean—it generates no emissions—as well as natively-produced and versatile, making it the perfect ally for the decarbonisation of many key sectors of the economy, in particular those where electrification is not a viable solution, such as energy-intensive industry or heavy transport.

This energy vector is an essential part of accelerating the energy transition process and fostering a future net-zero emissions economy. For all these reasons, green hydrogen is essential for achieving the goals of decarbonisation, security of supply and energy sovereignty set out by the European Union in its REPowerEU Plan.

2.2 How is it produced?

Green hydrogen is produced by the electrolysis of water in devices called electrolysers that use electricity to separate water (H_2O) into hydrogen (H_2) and oxygen (O_2). When this electricity comes from renewable sources, such as solar or wind, the resulting hydrogen is called "green" or "renewable". This process emits no CO_2, making it a worthwhile option for cutting down on emissions.

The **main electrolysers currently in use** are the so-called alkaline and **PEM** (proton-exchange membrane) electrolysers. The former are more suitable for industrial processes with stable electricity supply, because they respond less quickly to changes in electricity demand. However, PEM electrolysers are capable of operating with high efficiency and respond quickly to electrical variability, making them the best choice for renewable energies such as solar and wind.

Thanks to the capacity of green hydrogen to be stored and transported, the production and consumption processes can be decoupled, meaning it can be **produced in one place and used in another when needed**.

2.3 Advantages of renewable hydrogen

Green hydrogen brings numerous benefits to different areas and throughout the value chain, from environmental sustainability to its contribution to the country's economic fabric and technological development:

- **Lower emissions:** by not emitting CO_2 during the production thereof, it is key in the fight against climate change.
- **Versatility:** it can be used in all sectors, especially in sectors that are hard to electrify, such as high-temperature process-intensive industries, industrial steel and fertiliser production, or heavy transport.
- **Energy storage:** it is effective for storing renewable energy, allowing it to be used when production is low. It therefore helps to manage the intermittency of energies such as solar and wind, providing stability.
- It is **native, abundant** and key to improving the competitiveness of industry.
- **It cuts down on energy dependence** on imported fuels by being locally produced from renewable sources such as solar and wind.
- **It can also be efficiently transported and stored**, which facilitates its integration into the existing energy infrastructure.

Socio-economic benefits

The impetus of green hydrogen can contribute to industrial development and innovation while attracting socially responsible investment.

Spain's hydrogen infrastructure network will have a "pull" effect on multiple sectors of the national economy.

The deployment of this infrastructure and international connections will have a significant positive impact on **Spain's economy and in Cantabria**:

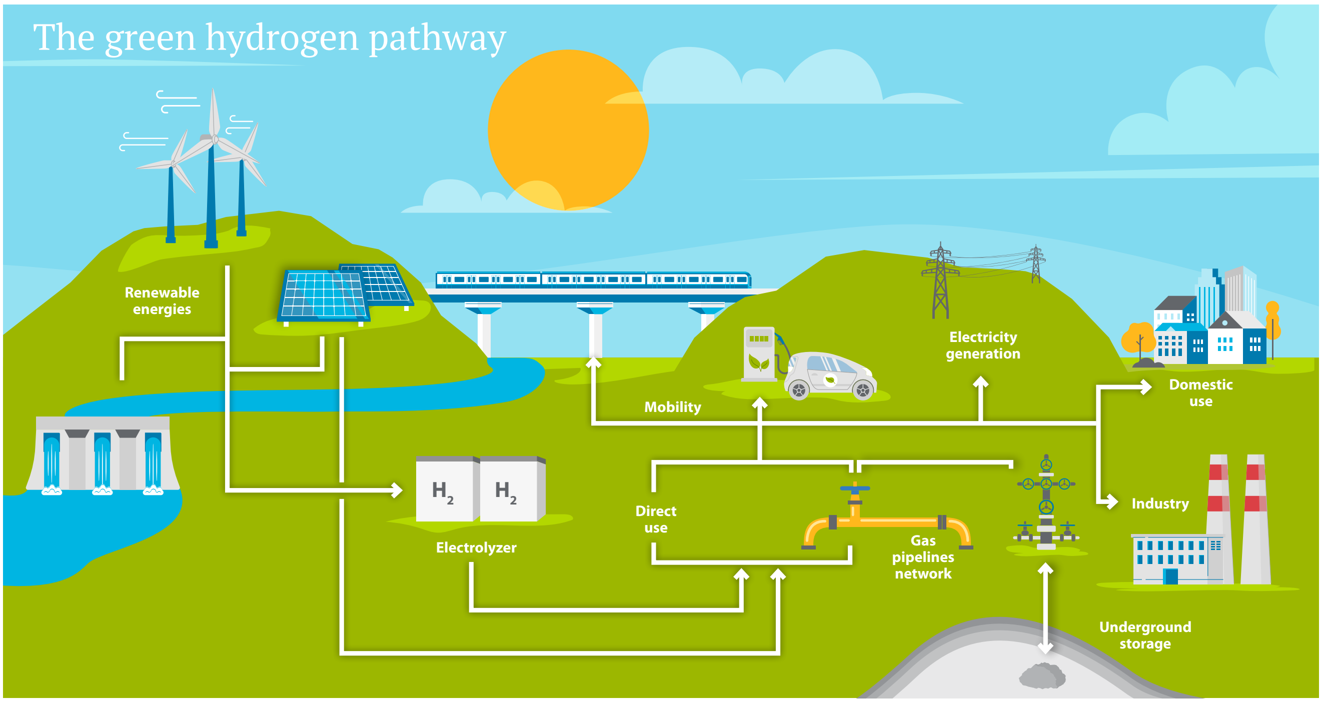
- It will boost growth and competitiveness. There shall be a gross investment of €3.31 billion between 2024 and 2030 for the Spanish hydrogen backbone and a gross investment of €860 million for underground storage. It will foster industrial and technological development, promoting the creation of a hydrogen industry and the generation of an **innovative business fabric** in Spain[1].
- Around **17,200 new jobs** shall be created during the construction of the network and storage facilities and approximately **900** jobs shall be maintained in the operation and maintenance phases[2].

The Spanish hydrogen economy will generate more than €32 billion in GDP and maintain some 81,000 jobs each year during its development[3]

1,2,3 Source: "Socio-economic impact of the development of the hydrogen economy in Spain", a report issued by PWC for Enagás (2023)

2.4 Uses and applications of green hydrogen

The following infograph shows the path of renewable hydrogen from production to final use in different sectors and its storage.



Some of the most frequent uses of this energy vector are:

1 Industrial
This energy vector will enable the industry to minimise its environmental footprint

2 Mobility
Green hydrogen will help decarbonise heavy transport, one of the sectors that emits the most CO_2 into the atmosphere, and improve air quality

3 Residential
Green hydrogen for domestic and commercial consumption.

4 Energy storage vector
It will enable the use of surplus renewable energy production.

5 Electricity generation
At times of peak electricity demand, it acts as a future substitute for natural gas.

2.5 Green hydrogen: a challenge and an opportunity for Cantabria and Spain

Spain is in an excellent position to become the first green hydrogen hub in the European Union thanks to its large capacity for renewable energy generation, excellent geographical position, industrial technological capacity, powerful network of infrastructures and broad experience in network management.

The development of this energy vector opens up a wonderful opportunity. To this end, great strides are being made in order to:

- Build a competitive hydrogen economy, enabling the creation of a liquid market.

- Have regulatory clarity and secure European funding to produce an integrated market.
- Commit to research and innovation to scale up existing technologies that guarantee the efficiency of this market.
- Encourage public-private collaboration and facilitate synergies and alliances between companies to accelerate the energy transition and sustainable development.
- Move cohesively forward and involve the entire green hydrogen value chain in the process.

3. Presentation of the project

3.1 Enagás Infraestructuras de Hidrógeno

In April 2022, Enagás set up the company Enagás Infraestructuras de Hidrógeno, through which the company separates its functions as natural gas infrastructure operator, or *Transmission System Operator* (TSO), from the **management of hydrogen infrastructures**.

The company's objective is the development, construction and operation of infrastructures to meet the need for hydrogen transport and storage, in line with **domestic and European legislation, plans and roadmaps**.

In December 2023, Enagás was designated by Royal Decree-Law 8/2023 of 27 December as the *Hydrogen Transmission Network Operator (HTNO)*.

By Agreement of the Council of Ministers, at the proposal of the Ministry for Ecological Transition and the Demographic Challenge (MITECO), in July 2024, **Enagás Infraestructuras de Hidrógeno (EIH)** was authorised to provisionally exercise the functions of developing European Projects of Common Interest (PCI) for hydrogen networks. These functions range from the authorisation application, construction, and start-up to the monitoring and maintenance of hydrogen transport and storage infrastructures recognised as PCIs.

3.2 Hydrogen Storage North-1 underground hydrogen storage facility

PCI Project 9.24.1. "Hydrogen Storage North-1", located in Cantabria, strives to develop a hydrogen storage system that provides flexibility to the hydrogen network, covering a large part of the intermittency in the generation of renewable hydrogen, as well as seasonal variations in generation. Hydrogen storage thus becomes a grid enabler.

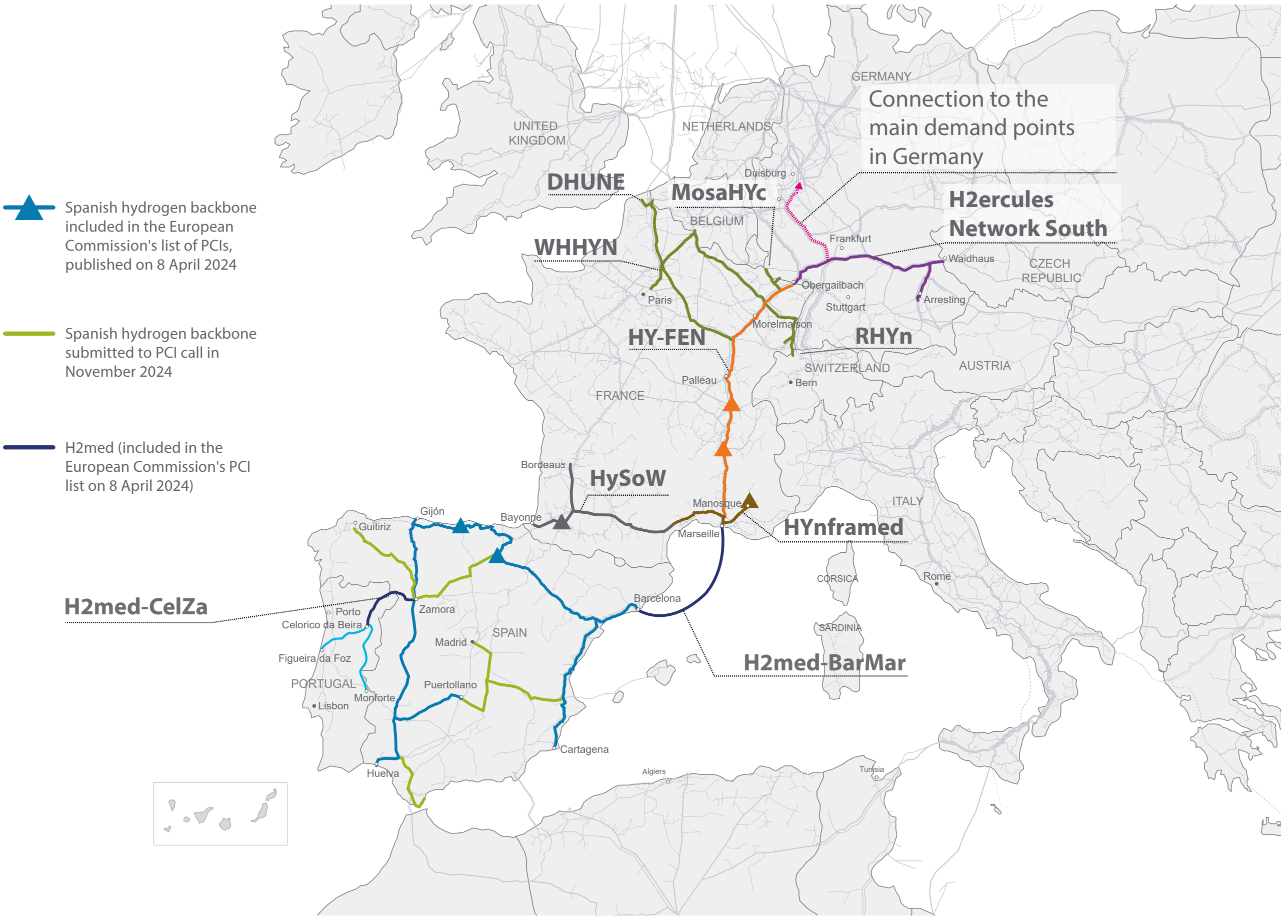
One of the main advantages of underground hydrogen storage is its safety and efficiency. Salt caverns, designed specifically for this purpose, provide a safe and controlled environment for storing large quantities of hydrogen. This is a storage technique widely used around the world for storing natural gas, particularly in Europe.

In terms of sustainability, underground hydrogen storage makes the best use of available natural resources. The salt caverns created, in the case of PCI North-1 during the salt mining for consumption in the production process at the Solvay factory in Torrelavega, provide an efficient solution for storing hydrogen and also contribute to the circular economy by integrating the construction of the storage cavities with the use of the brine for industrial processes.

In short, underground hydrogen storage offers a wide range of benefits: flexibility and stability of the grid, safe and efficient storage, and the sustainable use of natural resources. These advantages make storage a key building block in the development of the infrastructure needed for an energy transition to a greener and more sustainable future.

The North -1 Storage facility, along with the domestic Hydrogen Backbone and the European H2med corridor, form the so-called 'Iberian Hydrogen Corridor', considered in the 2023-2030 Integrated National Energy and Climate Plan (IPNEC) as the infrastructure needed to make Spain the leading renewable hydrogen hub in Europe and the world.

All of them have been designated by the European Commission as Projects of Common European Interest (PCI) under the first call for hydrogen projects in April 2024. Furthermore, in January 2025, the European Commission's Climate, Infrastructure and Environment Executive Agency (CINEA) awarded 100% of the Connecting Europe Facility (CEF) Energy funds requested by Enagás for PCI 9.24.1. Hydrogen Storage North-1.


Spanish hydrogen backbone included in the European Commission's list of PCIs, published on 8 April 2024
Spanish hydrogen backbone submitted to PCI call in November 2024
H2med (included in the European Commission's PCI list on 8 April 2024)
Connection to the main demand points in Germany
DHUNE
MosaHYc
WHHYN
H2ercules Network South
HY-FEN
RHYn
HySoW
HYnframed
H2med-CelZa
H2med-BarMar
UNITED KINGDOM
NETHERLANDS
GERMANY
BELGIUM
Duisburg
Frankfurt
Waidhaus
CZECH REPUBLIC
Obergailbach
Stuttgart
Arresting
Paris
Morelmaison
SWITZERLAND
AUSTRIA
Bern
Palleau
FRANCE
Bordeaux
Manosque
Marseille
ITALY
CORSICA
Rome
SARDINIA
Gijón
Bayonne
Guitiriz
Porto
Celorico da Beira
Zamora
Madrid
SPAIN
Figueira da Foz
PORTUGAL
Monforte
Lisbon
Puertollano
Barcelona
Cartagena
Huelva
Algiers
Tunisia

3.3 Main project facilities

The North-1 underground hydrogen storage facility will consist of the following facilities:

- **Eight salt caverns:** The international chemical group Solvay, whose plants manufacture essential chemicals such as carbonate or sodium bicarbonate, has been operating a plant in Torrelavega since 1908, with the best available technologies. Solvay has a salt mine in Polanco to supply it with brine for its production process.

  In that mine, using the borehole technique, Solvay will develop eight salt caverns, each with a geometric volume of some 250,000 m^3, specifically designed to be used for hydrogen storage. The creation of these caverns shall be carried out as part of Solvay's normal activity, so that the brine obtained shall be used in the production process at its Torrelavega factory. After the creation of the caverns, Solvay will transfer them to Enagás Infraestructuras de Hidrógeno to be used as storage, and EIH will operate and maintain them throughout the useful life of the infrastructure.

- **Hydrogen compression and purification facilities:** hydrogen from the grid shall be injected into the salt caverns at times of peak renewable generation and extracted at times when hydrogen demand exceeds generation. This calls for compressors to raise the hydrogen pressure to the injection pressure needed at this time. In these caverns, the hydrogen is wetted and, when extracted, can carry away small solid particles present in the caverns. It therefore needs to be filtered and dried before being sent back to the grid to ensure that its purity is the same as that of the injected hydrogen.

- **Power line:** the compressors shall be operated by electric motors, so an external renewable electricity supply shall be required.

- **Hydrogen pipeline connecting the salt caverns and the compression and purification facilities:** the salt caverns shall be located at a certain distance from the area where the hydrogen compression and purification facilities are located.

- **Hydrogen pipeline connecting the network to the compression and purification facilities.**

In terms of safety, the design of all storage facilities will comply with all applicable and current international and national regulations and standards for hydrogen facilities.

3.3.1 Salt caverns

A first step in the project is the design of the caverns. Geomechanical studies are carried out for this purpose, which take into account the properties of the salt and the geological conditions, define the geometry of the caverns, the distance between them and the parameters of the future operation of the storage facility, guaranteeing safety and stability.

The cavern design will provide for a volume of around 250,000 m^3 each. They are expected to be located at a depth of more than 800 m below ground level. The project envisages the sequential creation of a total of eight caverns. In the first phase, four caverns shall be developed and, once completed, the development of the other four caverns shall begin.

The cavern creation process begins with the drilling of the directional boreholes where the cavities will later be generated. Specialised equipment capable of reaching the required depth is used for drilling.

Once the well is drilled, the salt dissolution phase begins with water injection. This dissolution process is periodically monitored to check that it develops according to the initial design, leading to the formation of the caverns. The water needed for the construction of the caverns does not represent any increase in its usual consumption, since it is the same dissolution process that Solvay uses to supply its industrial plant with brine. Furthermore, a large part of its consumption is recirculated.

Once the caverns have been created, they are subjected to rigorous watertightness tests that must be approved by the mining authorities, following the best practices currently developed in Europe for this type of facility. Continuous monitoring systems are implemented to detect and correct any anomalies, always ensuring the safety and efficiency of hydrogen storage.

The advantage of salt over other types of underground storage is its greater capacity to absorb the pressure variations that occur during hydrogen injection and extraction, thus enhancing the integrity and stability of the storage.

3.3.2 Connecting pipelines

The project envisages the installation of connecting pipelines that will link the salt caverns to the treatment plant and compression facilities and these to the main transport network, ensuring a safe and efficient transfer of hydrogen. These pipelines shall be designed under strict safety regulations and will use materials with high resistance to pressure and corrosion. Furthermore, monitoring systems shall be implemented to detect any anomalies and ensure the system's integrity at all times.

The technology used for hydrogen transport, both for purposes of public safety and economic and environmental reasons, is underground conduits.

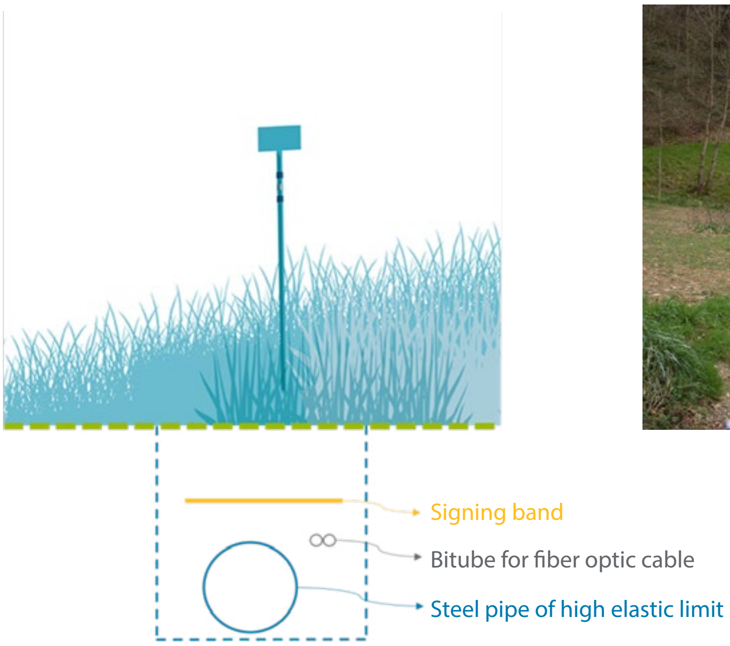
The technical characteristics of the conduit system are specified below:

- Diameters: diameters between 16" and 24" shall be used.
- Material: high-elastic-limit steel.
- External cladding and internal protection.
- The pipeline shall be buried along its entire length, with a minimum cover of 1 m above the upper generatrix of the pipeline.
- Impressed current system to protect against corrosion.

Outer cladding of the pipeline	Provides protection against the ground conditions
Inner cladding of the pipeline	Provides protection and isolation between the pipe and the hydrogen

The pipeline shall be buried as follows, accompanied by a twin-pipe to facilitate the laying of cable, control communications and security.

To execute the works, a work track is required on the site. This shall be temporary while the work is being carried out and shall be restored to its original state once completed.



Once the work is completed, there shall be two areas, the so-called "Access easement" and "Area of ownership restriction", as follows:

Access easement and area of ownership restriction

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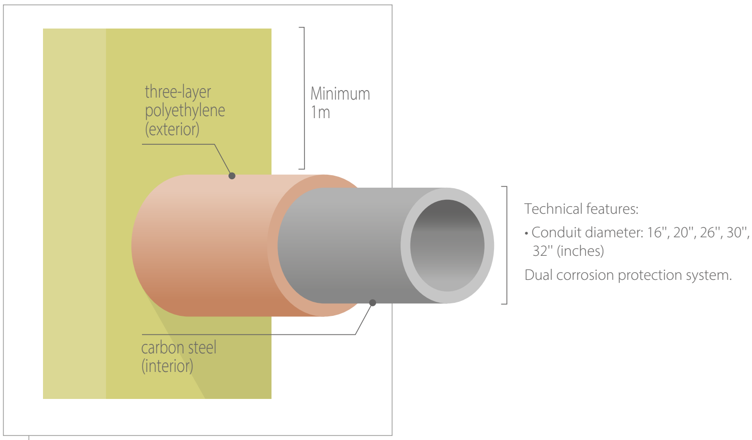
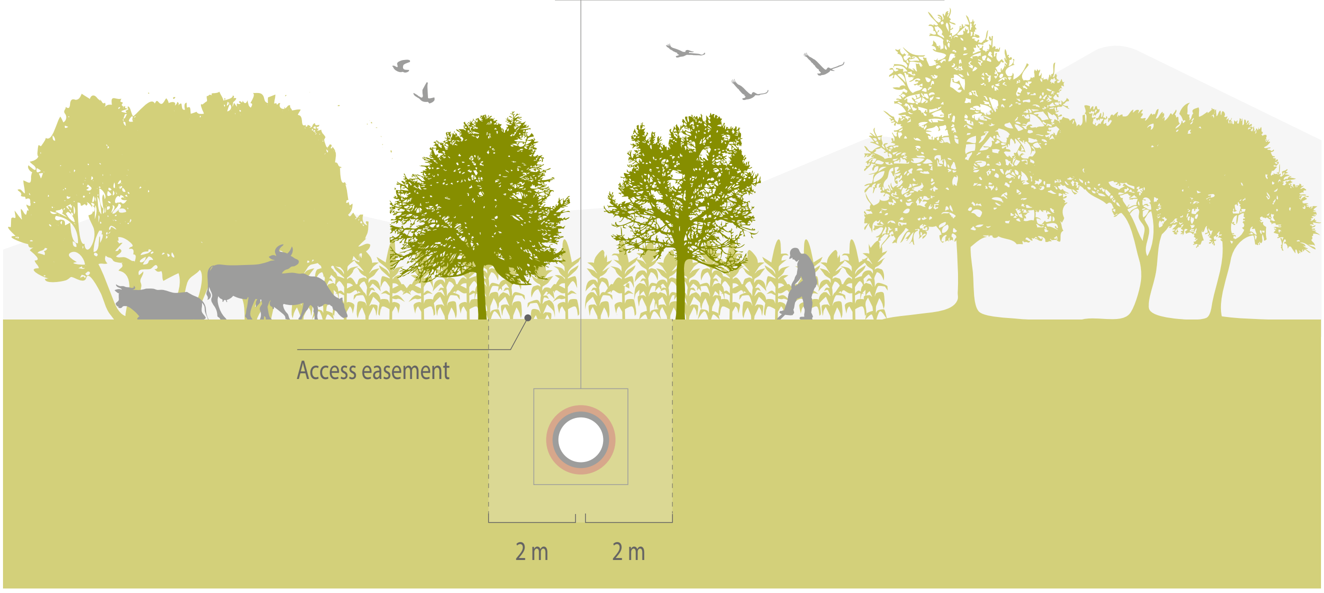




In Zone 1 (access easement) a permanent access easement shall be created on a strip of land two metres wide on each side of the axis of the pipeline to facilitate access by personnel for surveillance and maintenance work. The planting of trees or tall-stemmed shrubs that may affect the pipeline installations shall not be permitted in this area.

In the so-called Zone 2 or area of ownership restriction, no works, constructions or buildings are allowed without permission of the competent authorities.

Furthermore, the network will have a series of valve positions, an infrastructure that allows the segmentation and blocking of a pipeline section for maintenance and safety purposes, and other ancillary facilities that enable the operation and integrity of the system.

Above the physical infrastructure, there is a layer of control and maintenance management systems to enable the efficient and safe monitoring, operation and maintenance of all the facilities.

3.3.3 Compression and purification facilities

Once construction is complete, the caverns will initially be filled with brine. This brine is recovered at the surface by injecting hydrogen before the storage is put into operation. The storage, once in operation, will have two main processes depending on the needs of the system, helping to adjust the differences between hydrogen demand and consumption by injecting or withdrawing hydrogen. Compression facilities are needed for the injection process, while drying and purification facilities are needed in the extraction process for treatment purposes.

The compression facilities are similar to those of a water pumping station with compressors that provide energy, in the form of pressure, to the hydrogen so that it can be transported through the conduits and injected at the storage pressure in the caverns, which are found at around 210 bar when full.

The hydrogen coming from the grid is filtered before passing through the compressors.

Once filtered, the hydrogen passes through the plant's conduit system to the compressor units where it is pressurised accordingly. The compressors are powered by electric motors.

Since the compression process also raises the temperature of the hydrogen, it must be cooled before returning it to the transport system. A cooler is used for this purpose.

The hydrogen extracted from the salt caverns will first pass through gas-water separators to remove water and solids that it may have entrained from the wells. This series of equipment is referred to as purification plants.

The drying technology consists of several sieves that pass the hydrogen through zeolites (microporous material) at high pressure and ambient temperature, and then through filters that will remove any dust or solids that may have been entrained.

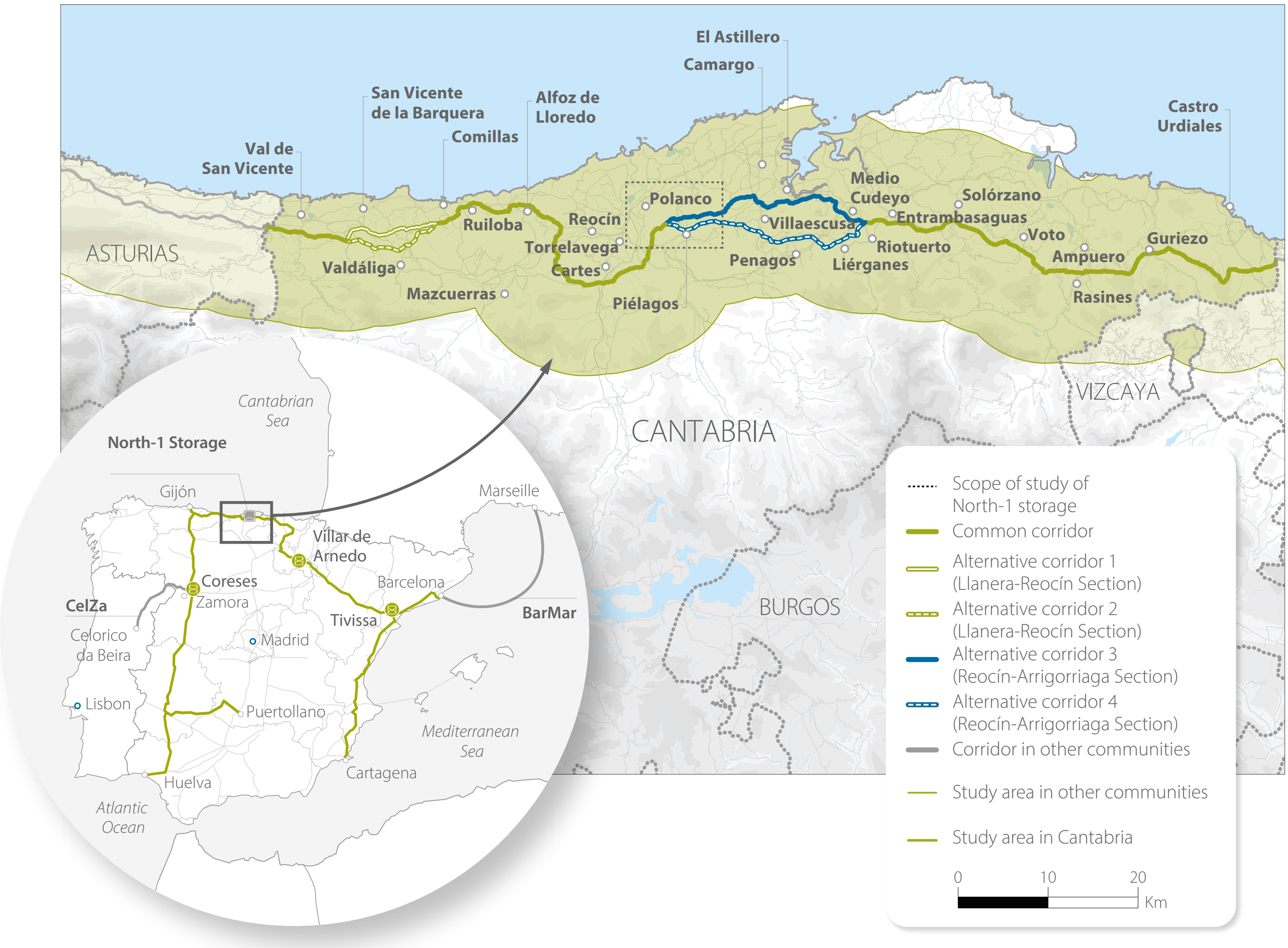
The location and implementation of this facility shall be determined during the development of the engineering studies for the project.

3.4 Project timeline

- **December 2023** Designation of Enagás as interim **Hydrogen Transmission Network Operator** (HTNO)
- **January 2024** Ratification in the Spanish Parliament of the designation of Enagás as interim HTNO
- **April 2024** Inclusion of the hydrogen infrastructure backbone and North-1 in the final list of PCIs
- **July 2024** Authorisation by the Council of Ministers to Enagás for the development of the PCIs
- **November 2024** Presentation of candidates PCI 2nd list
- **January 2025** CEF funding for the study phase of the first axes of the backbone network
- **March 2025** Approval of the PPCP North-1 by the Government of Cantabria
- **April 2025** Launch of the Conceptual Public Participation Plan (PPCP) in the hydrogen network
- **July 2025** Deployment of PPCP North-1 in Cantabria
- **Q3 2025** Procurement of engineering works and environmental studies
- **2025-2026** Development of engineering, environmental studies and permits
- **2026** Application for CEF funds for construction
- **2027** FID (Final Investment Decision)
- **2027- 2028** Purchase of equipment and materials
- **2028- 2030** Construction
- **From 2030 onwards** Start-up

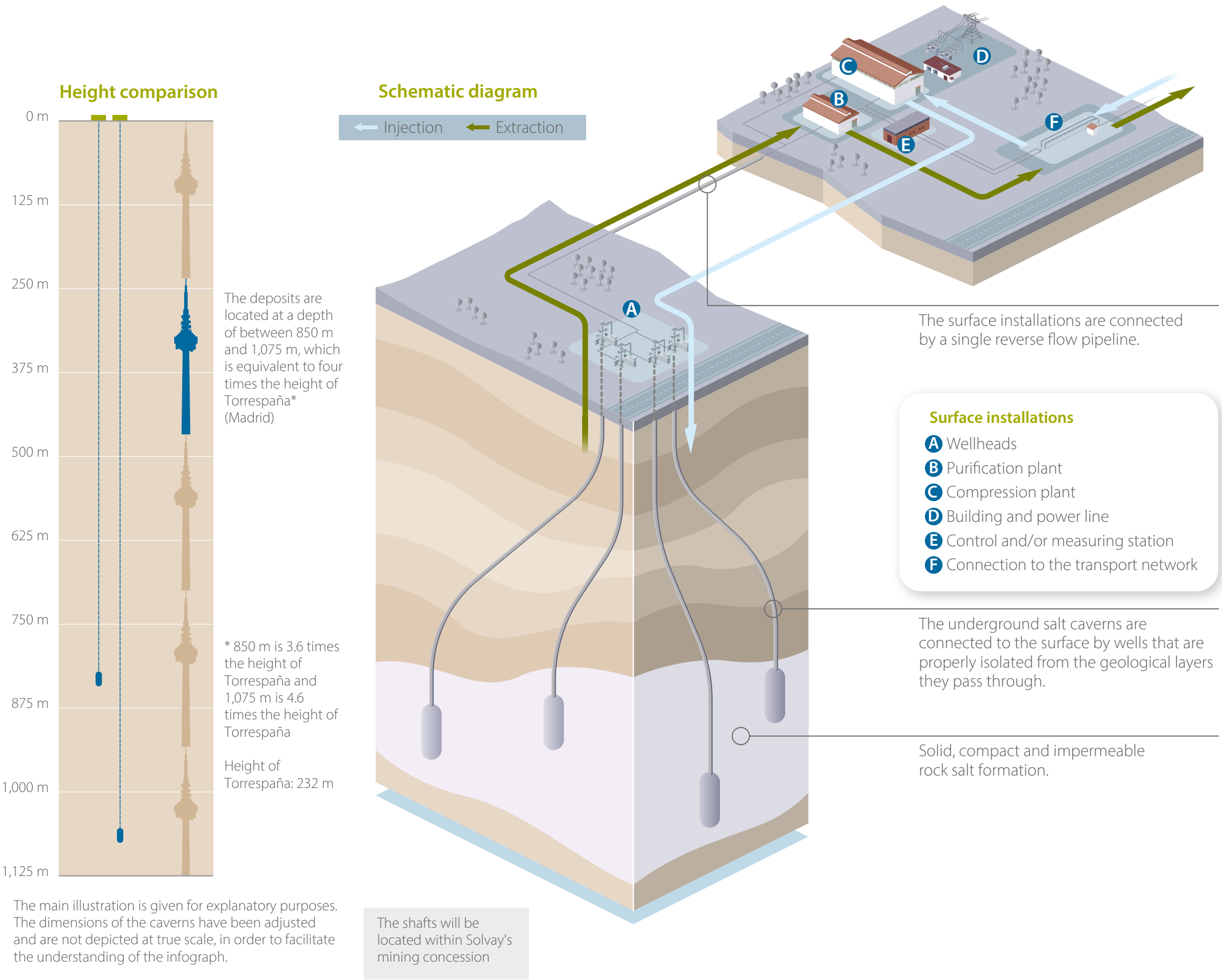
4. Geographical scope

The study area is located in the autonomous community of Cantabria, southwest of Santander, and covers seven municipalities, the largest of which are Piélagos and Polanco.



More information on the pipeline network of the Spanish Hydrogen Backbone can be found at www.infraestructurasdehidrogeno.es and in the non-technical summary of the project.

The following diagram shows the facilities that will make up the North-1 Storage:



The location of the salt caverns has been selected on the basis of geological studies and corroborated by two independent geomechanical studies, ensuring their suitability and stability during construction and in the operation phase of the underground storage.

With regard to the compression and purification facilities, possible locations will be studied at the design stage to minimise distances to the caverns, the grid and the impact of the power line.

Once this issue has been determined, the suitable site for such a facility should avoid more environmentally and socially sensitive areas.
In any case, the connection pipelines will avoid:

- Being located or run nearby urban centres and areas with high population density and the concentration of vehicles and people.
- Generating interferences with the general land use plans of the different municipalities affected or with opencast mining concessions.
- The incompatibility with aeronautical, road, rail and water infrastructures, whether existing or at the design or construction stage.
- Being located in areas classified as Protected Natural Spaces, Sites of Community Interest (SCI) or Special Bird Sanctuaries (SBS) to ensure compatibility with the conservation of fauna and flora.
- Causing interference with or not mitigating effects on the Historical, Cultural and Archaeological Heritage.
- Being located in geologically unstable areas.

5. Main project impacts and planned mitigation measures

5.1 Main project impacts

The study area is made up of different types of spaces, from industrial spaces such as the area around Torrelavega and Barreda, to green spaces such as Monte Cucona or Monte de Barcenilla.

The areas considered for the possible location of the compression and purification facilities also meet the established requirements, minimising impacts and preserving environmental, social and territorial values at the local and regional level.

Under the foreseen conditions, the most significant impacts will occur during the construction phase, being an event limited in time and without long-term repercussions. Preventive measures shall be put in place to avoid affecting elements of interest. The traffic of heavy machinery producing noise and dust could indirectly affect the area' animal populations and vegetation to a small degree in the construction area of the facilities. However, given the scale of the project and its actions, there is no foreseen fragmentation or loss of habitats due to the temporary occupation of certain areas.

The environmental effects are compatible and none will have a significant impact on the environment, as the corresponding preventive and corrective measures have been implemented. Land use, landscaping and fauna shall be preventively protected

During the detailed studies, preventive and corrective measures shall be determined to ensure that the project's environmental impact is fully compatible with the applicable legal imperatives, especially with regard to the integration of the surface elements, in addition to the flora for which habitats of community interest and protected fauna are declared.

Protected natural areas and areas of environmental or cultural heritage interest will not be affected.

The main elements of the project to be taken into account in this respect are:

SURFACE HYDROLOGY: During the construction phase of the connecting pipelines, special attention shall be paid to the crossing of the various nearby streams and the pipeline corridor.

VEGETATION: The facilities shall be located on meadows, riparian forests and eucalyptus plantation forests, grasslands and shrub pastures. Special care shall be taken with the vegetation cover in the area where the facilities and access areas are located.

FAUNA: The potential impacts are limited to those that could be caused during the construction phase, and are limited to possible disturbances to the different animal populations, which could cause temporary displacements of these groups to other areas with less disturbance, with these impacts being reversible once the construction work is completed.

SOIL. The soil shall be protected at all times and the potential impact shall be minimised. The aim is to avoid soil modification, waterproofing of the land of surface installations, and alteration of the natural run-off system.

LANDSCAPE. Potential impacts on the landscape would be a consequence of the effects on vegetation and will depend on the quality and visual fragility of the landscape.

USE OF ENERGY RESOURCES. During construction and operation, the consumption of energy resources shall be required. This shall be particularly relevant during the operation phase of the storage facility, as the running of the compressors needed to inject and extract the hydrogen is electricity intensive.

WASTE GENERATION. Broadly speaking, small quantities of waste associated with the maintenance of site machinery and plant equipment (oil, paint, etc.) could be produced during the construction phase, which shall be specifically handled to ensure the protection of soil and water. The generation of solid urban waste fractions (packaging, cardboard, wood, etc.), especially during construction works.

5.2 Planned mitigation measures

The identification and assessment of the potential impacts enable the definition of the preventive and corrective measures necessary to minimise their consequences, acting in the different phases of the project's development: design, construction and operation.

The main preventive measure is to take into account the environmental conditions of the site in order to choose the optimal location for the compression and purification facilities. Similarly, the optimal location shall be sought for the route of the connecting pipelines so that they have the least environmental impact.

A series of measures are proposed which strive to:

- To make better use of the opportunities offered by the area for purposes of environmental protection.
- To nullify, mitigate, avoid, correct or compensate for the effects that the actions derived from the project may have on the environment where these are located.
- To increase, improve and enhance any positive effects that may exist.

The measures to be introduced are broken down into:

- Preventive measures: those set forth in current legislation and those which, although not established, are taken to prevent the effect of the activity's defining elements of the activity (waste generation, dumping, emissions, etc.) from occurring.
- Corrective measures: aimed at nullifying, attenuating, rectifying or modifying the actions and effects on the environment once the works have been completed.

Preventive measures in the design phase

Take advantage of the existing road and energy infrastructure (especially electricity lines) for the hydrogen connecting pipeline corridors and electricity lines to the surface facilities, avoiding the impact to the forest cover.

- Avoid water bodies and watercourses, both permanent and temporary, and where appropriate choose a crossing point with watercourses that does not affect the associated vegetation and fauna.
- Keep away from population centres, locating installations as far as possible from populated and other urban areas.
- The location in cultivated land or developed areas shall be favoured over natural or semi-natural areas of forest, scrubland or riverside vegetation, promoting the preservation of areas of ecological value and the presence of unique flora.
- Those areas of greatest wildlife sensitivity shall be preserved, taking into consideration the zoning of the specific animal territorial protection figures.
- Facilities on land with little activity or on large tracts of land shall be favoured with a view to minimising the impact on property.

Preventive measures during construction

The main preventive measures during the construction phase shall be the following, subject to any additional measures required by the competent environmental agencies:

- Suitable maintenance of the machinery use.
- Proper management and maintenance of soil and vegetation with limitations on construction work and machinery near watercourses.
- Protection of the vegetation during the execution of the works.
- Study, surveys and verification of the presence of protected species with the possible adjustment of the work schedule according to the reproductive season of the species.
- Signposting of the work area and ban of dumping of any type of waste.

Corrective measures

Once the construction work has been completed, the land and watercourses shall be restituted, consisting of:

- Re-establishment of the topsoil to where it was before the start of the works and removal of any debris.
- In open water crossings, there shall be restoration of the riverbed and banks and the cleaning of waste materials or debris, which shall be managed in accordance with the regulations.

Once the restoration work has been completed, the vegetation shall be restored, which consists of the tasks to restore and recover the vegetation, such as planting, hydroseeding, replanting, etc.

6. Public Participation Plan

In accordance with the provisions of the Council of Ministers Agreement of 30 July 2024, Enagás Infraestructuras de Hidrógeno has begun formal processing for the granting of authorisations applicable to Project of Common Interest 9.24.1. Hydrogen Storage North-1 in Spain, in accordance with Regulation (EU) 2022/869 and the Manual of the Procedure for the Authorisation of Energy PCIs in Spain, published by the Ministry for Ecological Transition and the Demographic Challenge (MITECO) in October 2023.

To do so, a Public Participation process must be carried out beforehand.

6.1 What is Public Participation?

Public participation or consultation has the following objectives:

- Include the environmental and social sensitivity of the population from the project's phase zero.
- Ensure that no relevant decision is taken without consulting the public concerned.
- Make the relevant information about the project accessible, in a way that is easily understandable for citizens and without technicalities.
- Inform all interested members of the public about the right to participate and how to exercise this right.
- Set up a direct channel of communication for the population's questions with those responsible and experts in each phase and area of a project of extraordinary complexity.
- Involve the public from the outset of the decision-making process and on an ongoing basis, facilitating the understanding of the project information, explaining clearly and transparently the need for the project and setting out the issues to be addressed in the different project phases. The activities must be carried out in a language that is understandable and accessible to the entire population, highlighting how environmental, social and landscape variables have been taken into account.
- Obtain useful information from the interested public.
- Justify the option adopted and how public input has been incorporated.
- Enable broad forms of public consultation and citizen participation in order to inform about the right to participate and how to exercise this right from the beginning to the end of the procedure.
- Enable the diversity of opinions to have a voice through the citizen participation associations organised to discuss the project.
- Identify potential conflicts in advance and encourage action to resolve them.
- Consider community input in the description of potentially affected territorial, environmental and social conditions when evaluating project alternatives.

6.2 Stakeholder roles

The roles of the stakeholders in the participation process:

Role of the Developer

- Develop a Public Participation Conceptual Plan.
- Provide the necessary resources for the public participation process.
- Ensure that citizens have adequate opportunities to participate.
- Ensure that information presented to the public is clear, complete, truthful and understandable.
- Take into account the views of the general public.
- Give due attention and response to citizens' comments, recommendations and interests.
- Seek out consensus.
- Make the final decisions.

Role of the public concerned

- Take an active part in the participation process.
- Acquire an awareness of the different interests and views that converge in the country and understand the need to seek consensus solutions.
- Contribute from their particular perspective to improve and enrich the proposals.

6.3 Development of the Public Participation Plan

The process shall be carried out as follows:

Public and citizen consultation shall be carried out in the **Preliminary Procedure**, with a view to informing all stakeholders about the project at an early stage and helping to identify the most appropriate alternatives and relevant issues to be addressed in the application process.
As part of this public consultation process, the project developer must prepare and develop a Public Participation Conceptual Plan (PPCP), which will take into account all forms of public participation and consultation.

During this phase, the national, regional and local authorities, land owners and citizens living in the vicinity of the project, the general public and their associations, organisations or groups shall be informed.

The Public Participation Conceptual Plan shall, as a minimum, contain the following information elements:

- The project information leaflet, which will contain:
    - General description of the objective.
    - The project timeline.
    - Preliminary storage location area.
    - Expected impacts.
    - Palliative measures.
    - Storage facilities.
    - Transparency platform.
    - Procedural manual.

This information leaflet shall clearly and concisely present the contents listed above, including the project's website and contact details for consultation.

- Project website, which will contain:
    - The information leaflet.
    - A non-technical summary, to be updated on a regular basis, giving the current status of the project and clearly indicating the changes compared to previous versions.
    - The timeline for the project and public consultation, the dates and locations of public consultations and forums.
    - The contact details for obtaining documents.
    - The contact details for comments and objections.

This website shall be set up and regularly updated by the project developer and shall be linked to the Commission's website.

- Public communication plan: the public shall be invited to in-person information seminars, where all relevant information on the project shall be made available, and attendees shall be able to express their views and comments.

As a final point of this public consultation, the infrastructure developer will have sufficient information on the study area and on the effects of the project to put forward a solution that, while complying with the project's technical requirements, will accommodate the best integration possible of the facility in the region from an environmental, social, etc. stand point.

The project developer **shall draw up a final report** summarising the results of the activities related to public participation prior to the submission of the application dossier. The project developer shall submit this report together with the application dossier to the competent authority. Due account shall be taken of these results in the overall decision.

7. Procedure for granting regulatory approvals

Once the public information and participation process has been completed, the standard procedure for granting regulatory authorisations shall be initiated in accordance with the applicable mining sector regulations and Laws 17/2006 of 11 December, on integrated environmental control, and 21/2013 of 9 December, on environmental assessment.

The developer shall submit to the National Competent Authority (NCA) all documentation necessary to conduct the regulatory licensing procedure in order for the overall decision to be taken.

The Competent Authority in Spain for the authorisation of energy infrastructure projects designated as Projects of Common Interest (PCI) for the purposes of the provisions of Article 8.1 of European Parliament and of the Council Regulation (EU) 2022/869 of 30 May 2022 on guidelines for trans-European energy infrastructures (TEN-E Regulation), is the Directorate-General for Energy Policy and Mines (DGPEM) under the State Secretariat for Energy of the Ministry for Ecological Transition and the Demographic Challenge, as established in the Fifth Additional Provision of Royal Decree1054/2014 of 12 December, which regulates the procedure for the assignment of the collection rights of the 2013 electricity system deficit and implements the methodology for calculating the interest rate that the collection rights of the aforementioned deficit will accrue and, where appropriate, of the subsequent negative temporary mismatches.

In this project, it should be noted that on 7 December 2024, the DGPEM sent a letter to the Directorate General for Industry, Energy and Mines of the Government of Cantabria, in which it communicates that, in application of the provisions of Article 8.2 of the TEN-E Regulation, it has proceeded to notify the European Commission on 23 October 2024 of the delegation of responsibilities to the Directorate General for Industry, Energy and Mines of the Government of Cantabria for the Project of Common Interest entitled "9.24.1. Hydrogen Storage North-1". As a result, the DGPEM considers, unless the European Commission has a better judgement, that the aforementioned delegation of responsibilities is effective for all intents and purposes.

For the presentation of these applications, the developer must draft two main documents as well as the Environmental Impact Assessment (EIA); the appropriate processing shall be carried out in accordance with the applicable regulations.

ANNEX TO THE PCI PROCEDURE MANUAL
Art 10.1.b) Procedure for granting regulatory authorisations. Regulation 869/2022

8. Additional Information

Enagás has made the email almacenamientoNorth1@infraestructurasdehidrogeno.es available to the public for any questions, doubts, complaints and suggestions.

All information about the project is available on the website:

www.infraestructurasdehidrogeno.es

INFRAESTRUCTURAS DE HIDRÓGENO DE ESPAÑA

enagas

Hydrogen Storage North-1

Co-funded by the European Union