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gás natural

Green Pipeline Project

09
Dez´20

WEBINAR AGN
Sistema Nacional de Gás
- Novos Horizontes

Nuno Nascimento
Galp Gás Natural
Distribuição

01.

Framework

A changing world

↘

Europe is facing an unprecedented economic crisis. Nonetheless, the urgent need to take action in favour of the climate should not be overlooked.

Never before has it been this important to maintain the green transition to **carbon neutrality** on the path to economic recovery, and for countries to make use of their existing natural resources and infrastructures to reduce carbon emissions.

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01.

Framework

The role of gas distribution companies

Gas distribution companies face an important and challenging path in terms of the contribution they can make to decarbonise the economy.

There is now a broad consensus that gas infrastructures need to go digital, become smarter and more available to maximise their **association with the renewable energy sector**, thereby creating the best conditions for these to receive and distribute renewable gases such as hydrogen and biomethane.

Gas networks, **known for their high resilience**, are an extremely relevant asset as they are able to provide renewable gas in conjunction with intermittent energy sources, as well as in places where electricity can't be the solution (whether it be from a technical or economic point of view).

Renewable gases

Offer a **credible solution** to reduce greenhouse gas emissions in the residential, industrial and transport sectors

Promote a **circular economy** model, transforming waste into value and creating jobs

Reduce countries' dependence on energy by increasing energy security

02.

The European Strategy

A Hydrogen Strategy for a Climate-Neutral Europe

European Commission, 8th July 2020

Betting on Hydrogen: a current and relevant priority

> A progressive uptake of hydrogen solutions can also lead to repurposing or re-using parts of the existing natural gas infrastructure, helping to **avoid stranded assets in pipelines.**

> Repurposing may provide an opportunity for a cost-effective **energy transition** in combination with (relatively limited) newly built hydrogen dedicated infrastructure.

E.g. it is expected that a hydrogen network in Germany and the Netherlands may consist of up to 90% of the of repurposed natural gas infrastructure.

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03.

The National Strategy

NECP2030 – National Energy and Climate Plan
Council of Ministers Resolution 53/2020, July 2020

> With a view to transitioning the energy sector, the current infrastructure to receive, store, transport and distribute natural gas will play an important role in allowing the introduction, distribution and consumption of **renewable gases**, particularly biomethane and hydrogen, in various sectors of the economy, making it possible to incorporate higher levels of renewable sources of energy in final energy consumption.

Encourage the production and consumption of renewable gases

Adjust the role of NG in the energy mix, focusing on decarbonising the sector

Promote suitable planning for the national energy system on a path to energy transition

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03.

The National Strategy

> With regard to **natural gas distribution networks**, the scenario is even more optimistic when compared to the transmission network, as these networks are more modern and therefore mostly constructed with materials that are more **suitable for the injection of hydrogen**, such as polyethylene, which, with the necessary adaptations, allows for the injection of up to 100% of hydrogen.

National Hydrogen Plan

Ministry of Environment and Climatic Action, August 2020

Recent gas infrastructure can be easily adapted to distribute H2:

- Reducing the costs and barriers of hydrogen entry into the system
- Allows the injection of hydrogen into the national energy system
- Preventing stranded assets in the future
- Mitigating the risk of an excessive expansion of electrical networks, which could represent an increased cost for decarbonisation

Portugal's commitment to decarbonise the National Gas System is evident in the ambitious and mandatory targets set for the 2030 horizon:

Targets and indicative trajectories on hydrogen blending into the National Gas System

	2025	2030	2040	2050
Hydrogen blend level	1% - 5%	10% - 15%	40% - 50%	75% - 80%

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04.

The Pilot Project

GREEN HYDROGEN INJECTION INTO THE GAS GRID

01 ↘

As the leading gas DSO in Portugal, Galp Gás Natural Distribuição (GGND) **is deeply committed to the decarbonisation of gas distribution activity,** through the injection of renewable gases, such as H2.

02 ↘

The injection of hydrogen into the gas distribution network raises a set of **technical questions** to be addressed and optimised.

In order to overcome this, GGND has been looking for opportunities in projects that allow to deepen the practical knowledge in this area.

THE GREEN PIPELINE PROJECT...

... is a pioneer pilot project in Portugal.

We intend to test, over the course of 2 years, in a real environment, the **injection of green hydrogen** (up to a 20%vol) in the distribution network.

05.

Green Pipeline Project

Hydrogen Producer

Solar panels: 25 kW
Batteries: 34 kW

Electroliser

Alkaline Water Electrolyser
57 kW / 10 Nm3/h / 99.999% purity

Hydrogen Tank

Capacity
12 m3 @10 bar

Odorization

100% H_2 / 1400 m

illustrative purpose

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05.

Green Pipeline Project

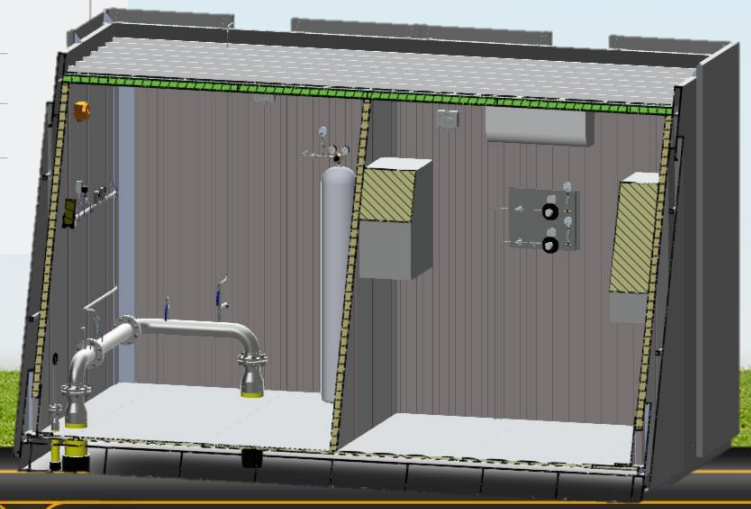
01
Static mixer

02
Calorimeter to control calorific value

03
SCADA monitoring

- ↘ H_2 line pressure
- ↘ NG and H_2 flows
- ↘ H_2/NG ratio setpoint
- ↘ Calorific value, Wobbe index and density of the mixture

Mixing Unit



NG/H_2 Blend

100% H_2

Bypass for Inspections and tests
(pipe and fittings)

100% NG

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05.

Green Pipeline Project

Unit for Inspections and tests

(appliances)

NG/H_2 Blend

Final Customers

Mainly residential (70), some commercial (10) and one industrial

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06.

Our Objectives

This unique opportunity will mark the beginning of a new era for the National Energy System, both for its **contribution to the potential decarbonisation of the gas sector** and for its experimental nature and consequent **acquisition of knowledge:**

It is a contribution to European and national goals, given its strong connection to subjects such as **power-to-gas** and **energy system integration**, combining renewable energy generation with hydrogen (renewable gas) production, storage, distribution and consumption.

This project makes it possible to study the **effect of hydrogen on distribution infrastructures** and gas appliances, gathering know-how and essential skills so that GGND can safely contribute to the **development of the National Gas System, its legislation and regulation, and the hydrogen sector in Portugal**.

Given its pioneering character, this project marks a position of leadership, innovation, and commitment to the decarbonisation of gas distribution activities

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07.

A Project that we want to share

Stakeholders

- Customers
- Distributor
- H2 Producer
- Engineering and Equipment Construction
- Academia
- Technical Advisory
- Inspections and Equipments
- Policy Makers, Regulators and Institutional

Due to the nature and ambition of this project, we consider all stakeholders as part of our project team.

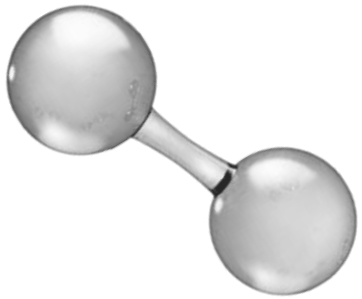
They will bring value and expertise to help ensure that the project is a success!

*tbc

08.

Project Steps

Key moments



Beginning of Construction

Inform Suppliers

Training Attendance

Communication with Customers

Census and Customer Inspections

100% H2 Injection

NG/H2 Blend Distribution

8 weeks

Time required to have completed a robust 100% H2 network inspection and test plan

tbd

1st Stage

Preparation of legal and regulatory conditions for the development of the project.
Definition of the technical conditions of the project and communication procedures.
Alignment with the involved stakeholders.

2nd Stage

Construction of the equipment and infrastructure necessary for the injection of H2 into the NG network.

Training of teams, communication with suppliers and customers, and inspection of the covered facilities.
Start of hydrogen production.

3th Stage

Beginning of the H2/NG mixture (incremental during the next two years).
Series of tests to obtain the best learning.

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“Electrification and decarbonisation are not synonyms.”

João Pedro
Matos Fernandes

@ “Portugal na Vanguarda do Hidrogénio Verde na Europa” Conference
2 December, 2020

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