HYDROGEN

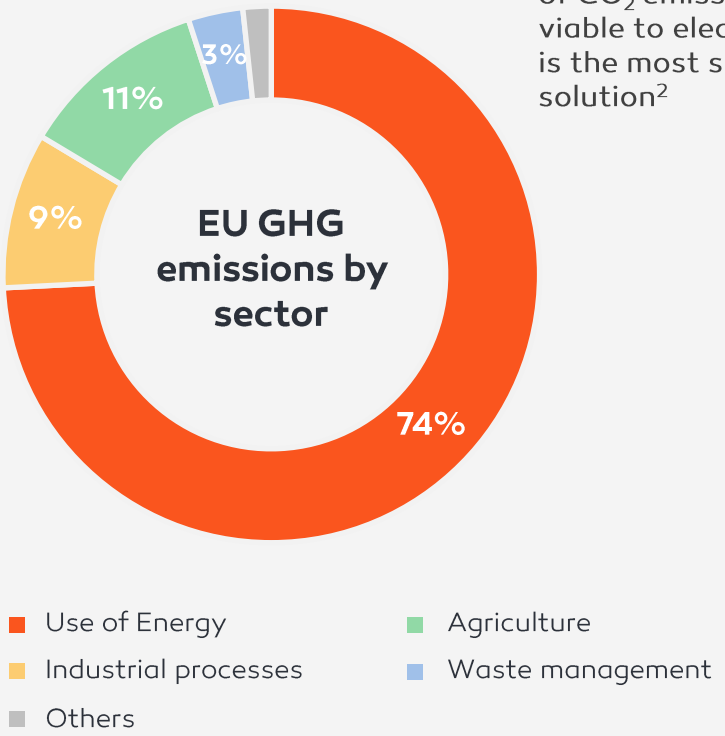
REGENERATING THE FUTURE

June, 2023

European energy strategy highly dependent on green H_2

EU has set extremely ambitious targets by 2030

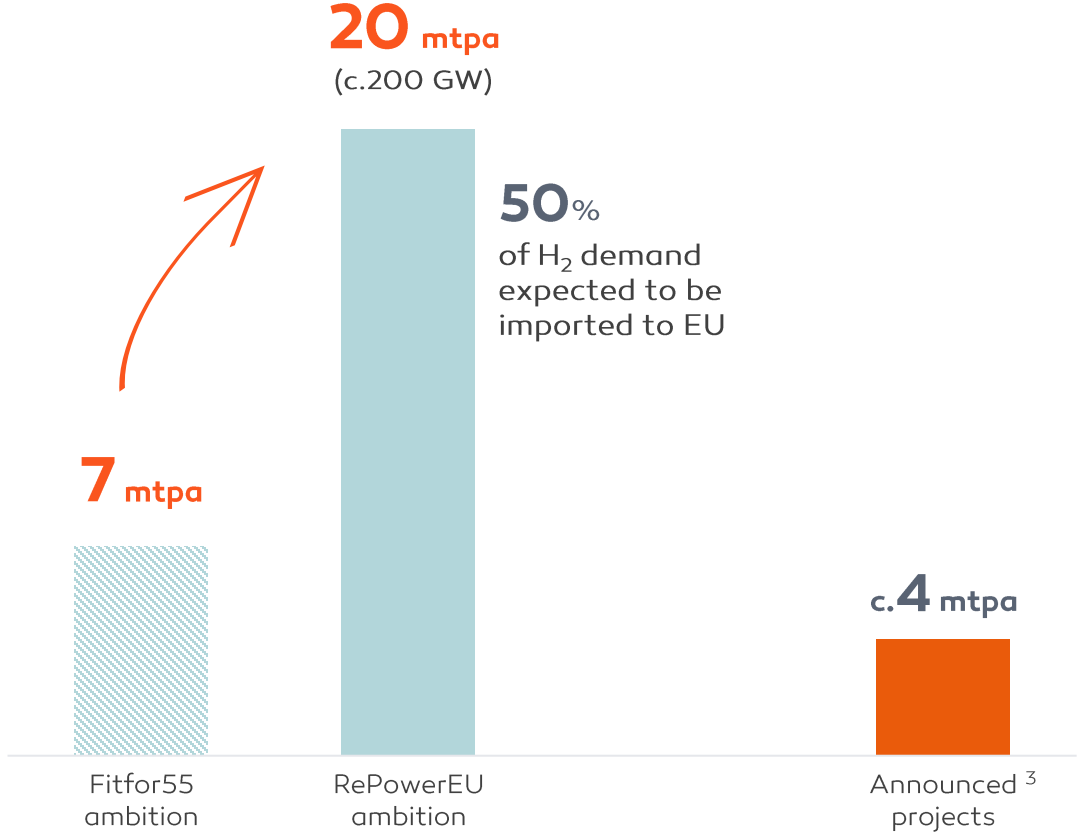
c.74% of EU CO_2e emissions are related to the use of energy[1]



20-30%

of CO_2 emissions are not viable to electrify and H_2 is the most suitable solution[2]

2030 EU green H_2 ambition



[1] Source: EEA, 2020. [2] Credit Suisse, Green Hydrogen update. September 2022. [3] Source: Project pipeline of the European Clean Hydrogen Alliance, August 2022.

The future role of H_2 goes beyond its direct end-use

promoting the development of additional value-chains

H_2 may be used as...

Fuel

Hard-to-abate mobility
direct use of H_2 in long-haul transports or e-fuels

Power
H_2 and ammonia can be used in gas turbines to increase power systems flexibility

Heat

Industries
as a substitute of natural gas allowing to decarbonise high-grade heat processes (e.g. steel, cement, paper)

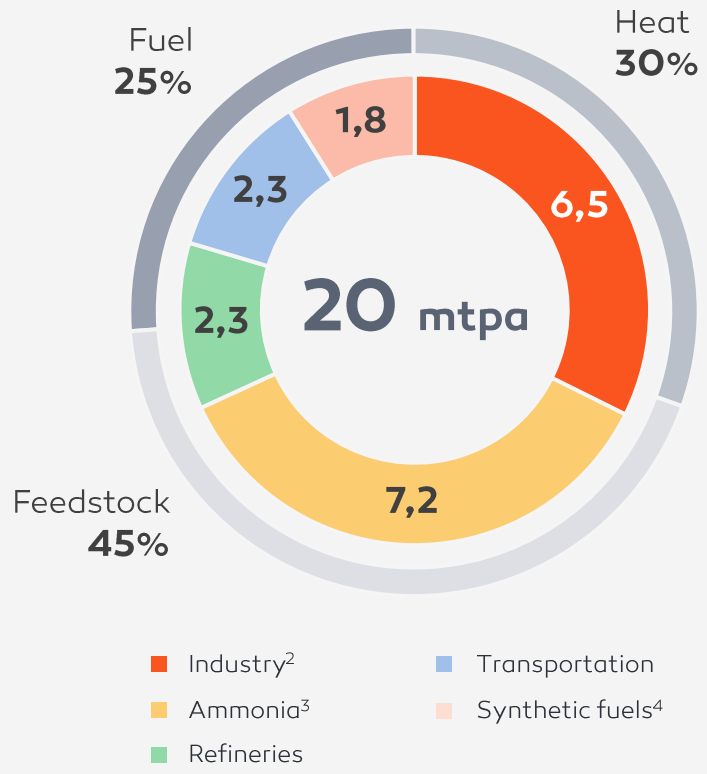
Buildings
H_2 could be blended into existing natural gas networks

Feedstock

Chemicals & refining
which are the main uses of H_2 today, namely oil refining, ammonia and methanol

Products
may be used as feedstock to steel and food industries

EU H_2 use by sector in 2030 (RePower EU)[1], mtpa



[1] European Commission, RePower EU – May 2022. [2] Includes heat, steel and blending. [3] Includes ammonia from imports and petrochemicals. [4] Includes ammonia and methanol.

Galp well-positioned to develop green hydrogen solutions

taking advantage of the energy hub's industrial skillset

Deep know-how of H_2

- Main **H_2 producer** in Portugal and a **relevant scale for world class developments**
- **Significant experience** on large chemical and industrial processes

Robust industrial asset base

- **Industrial asset base** where decarbonisation will be anchored on green H_2
- **Strong renewables portfolio** in Iberia and Brazil

Integrated energy business

- Energy transition **leveraging synergies** among all businesses
- Benefiting from **regulatory incentives** across Galp's businesses

Galp present throughout the green hydrogen value chain

with the strategy supported on four pillars

1

Develop of large electrolyser capacity in Sines

Replace all grey H_2 by green H_2 in Sines refinery

2

Reduce our products **carbon footprint**

Develop the production of **maritime** and **aviation e-fuels**

3

Key partner of our industrial customers in the energy transition path

Provide **green H_2 solutions to our B2B industrial customers**

4

Active presence in **heavy-duty road transport decarbonisation**

Build HRS network in Iberia with direct supply to our **B2B customers**

Galp focused on the execution of the first projects in Sines

which will leverage the expansion to new geographies

Pilot project
2 MW

Project located in the refinery, providing expertise and know-how to Galp's team

Galp H2 park – Phase I
100 MW

The first large step to convert the grey H_2 to green H_2 in the refinery

Green H2 Atlantic
100 MW

Located in Sines with a joint consortium of 13 companies and awarded by Green Deal Fund

Galp H2 park – Phase II
600 MW[1]

Conclusion of Sines refinery transition to green H_2

[1] Final capacity to depend on engineering studies. Includes potential needs from new projects (e.g. HVO) .

Galp exploring further opportunities in e-fuels value chain

ammonia and methanol expected to be widely used in maritime transportation

E-fuels production is a natural next step for Galp

Large presence in **marine bunkers** and **aviation fuels**

Local presence in **premium geographies** with access to low-cost renewables

Track record on **industrial projects** and **solid partnerships**

Assessing top locations, namely Sines and Brazil

Top solar and wind resources with potential for hybrid renewable

Strong and **large renewable portfolio** in both locations

Skilled Energy Management team with operations in both countries

Several **maritime ports** and **logistic infrastructures**

Taking the first steps on ammonia and e-methanol value chains

Advancing with **feasibility and engineering studies**

Developing **partnerships** and **synergies** to support projects competitiveness

Analysing different **offtake possibilities** (marine bunkers, fertilisers, H_2 export and others)

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