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The green hydrogen market outlook

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Types of hidrogen production

- Grey Hydrogen: Derived from fossil fuels, releasing CO_2 as a by-product.

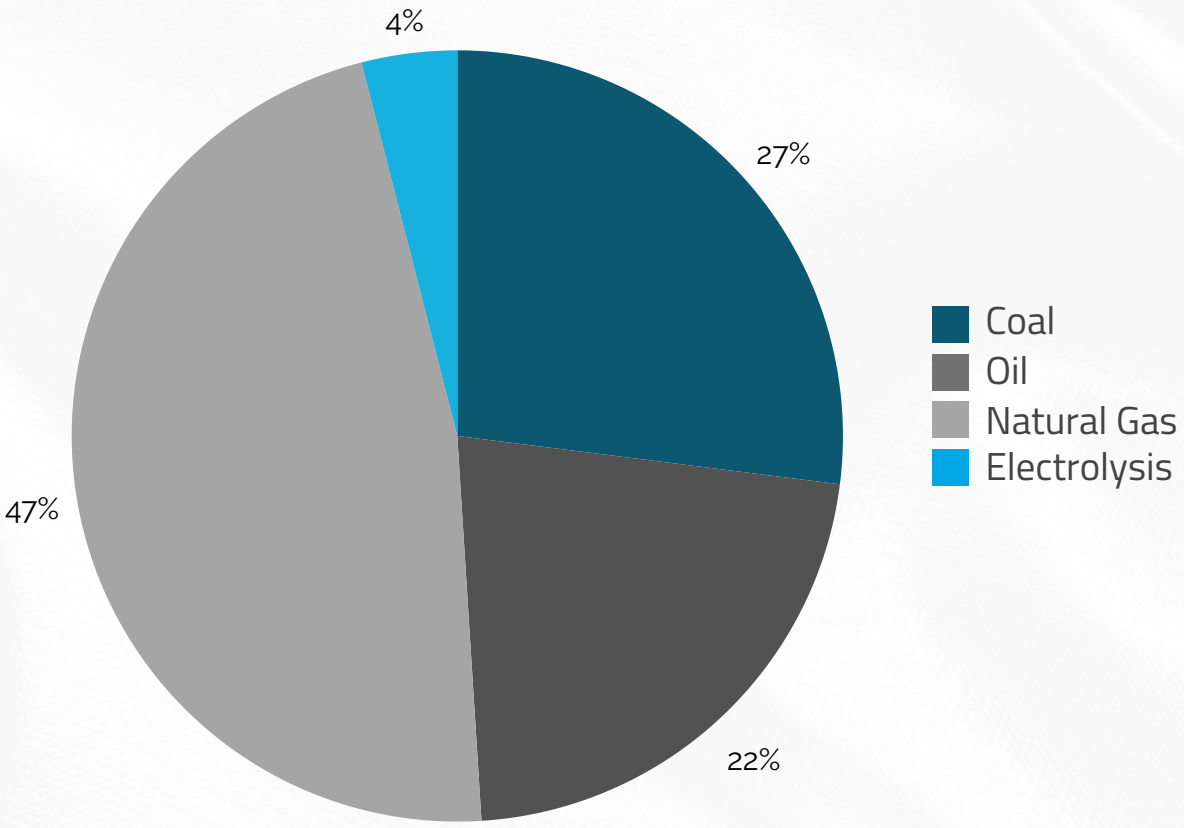
- Blue Hydrogen: Produced using fossil fuels through the same methods as grey hydrogen but incorporates carbon capture and storage (CCS) technologies.

- Green Hydrogen: Produced through the electrolysis of water using electricity generated from renewable energy sources. Its production emits no CO_2, and the only by-product is gaseous oxygen (O_2).

Sources of hidrogen production

According to the International Renewable Energy Agency (IRENA, 2022), by the end of 2021, nearly 47% of global hydrogen production came from natural gas, 27% from coal, 22% from oil (as a by-product), and only around 4% was produced through electrolysis — the method used to generate green hydrogen.

Figure 1. Sources of hidrogen production



Source: Own elaboration based on International Renewable Energy Agency, 2022.

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Stages of green hydrogen production

- Raw material: Water is required as the primary input.

- Renewable energy: Electricity generated from renewable sources, such as solar and wind power, is used to operate the electrolyzer, which breaks down the water molecule.

- Electrolysis: Through the application of electricity, water molecules are separated isolating hydrogen from oxygen.

- Storage: Hydrogen is stored in gaseous or liquid form, in specially designed tanks and containers.

- Distribution: Green hydrogen can be transported via pipelines, specialized trucks, or ships.

Green hydrogen production costs

There are significant regional differences in production costs due to the availability of renewable resources, geographical conditions, and the energy infrastructure of each area.

Chile, due to its low production costs, is positioned as one of the most competitive countries globally. Similarly, low costs are projected in regions such as Australia, North Africa, and the Middle East. In contrast, South America (excluding Chile), Central and Northern Europe, as well as much of Canada and Russia, face higher production costs—exceeding US$2/kg or even US$3/kg.

Green hydrogen production costs

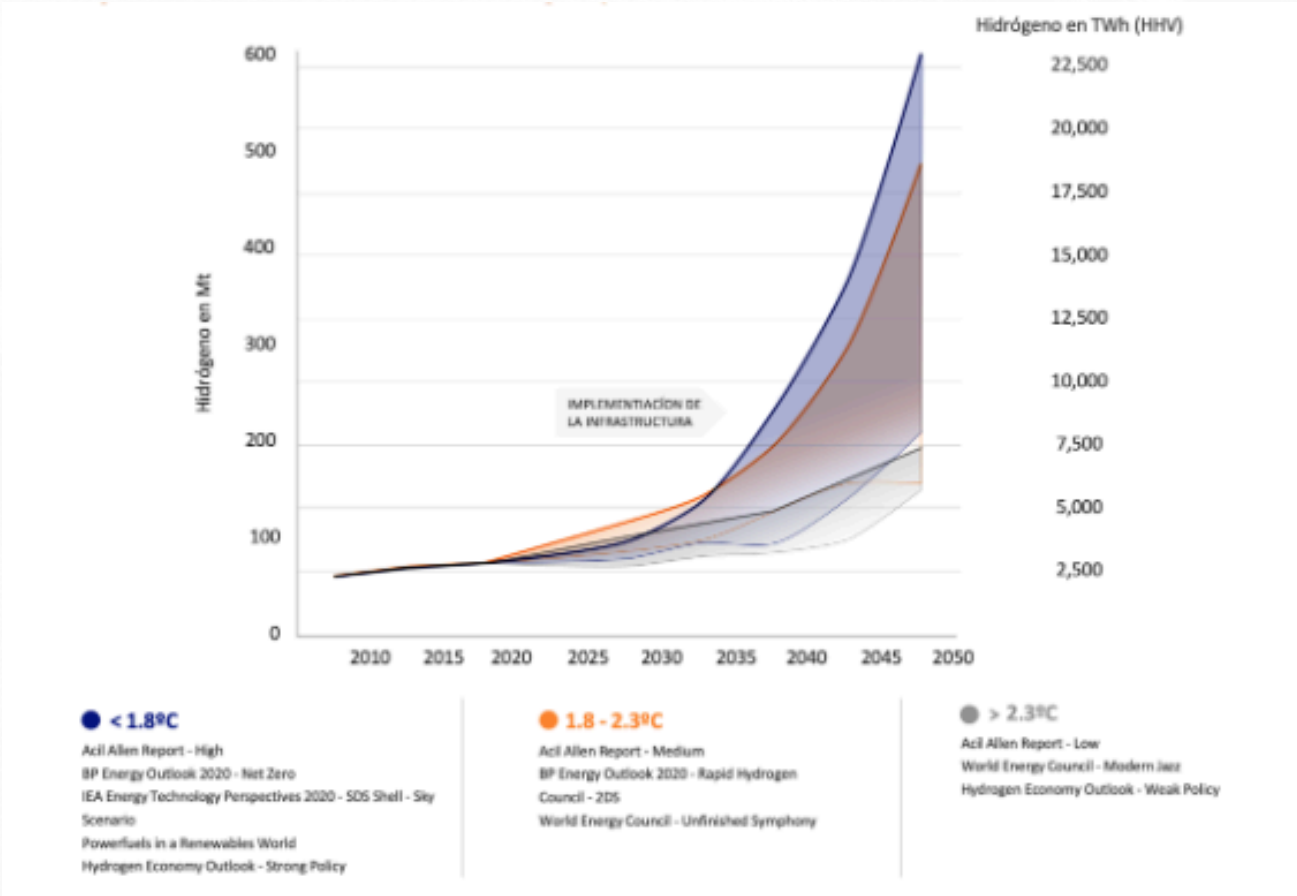
Figure 2. Estimated Green Hydrogen Production Costs by Country in 2030

Souce: Centro de Estudios Financieros, 2023.

Demand for green hydrogen

Green hydrogen demand is expected to grow rapidly starting in 2030, a timeline linked to the rollout of supporting infrastructure. Demand projections vary significantly depending on the level of climate ambition. In high-ambition scenarios (limiting warming to below 1.8 °C), demand exceeds 600 million tonnes by 2050. In contrast, under weaker policy scenarios (above 2.3 °C), demand barely reaches 200 Mt.

Figura 3. Projection of Green Hydrogen Demand for 2050



Source: World Energy Council, 2025.

Uses of green hydrogen

- **Green ammonia**: 54% of global hydrogen production is used for ammonia production, which is utilized in fertilizers and explosives. Grey and green ammonia differ only in their production method, meaning they share the same applications, and no infrastructure adaptation is needed to use green ammonia.

- **Synthetic fuels**: Similar to ammonia, conventional and synthetic fuels differ only in their production process. Therefore, no modifications to current infrastructure are required to use synthetic fuels in cars, buses, power engines, and other applications.

- **Others**: Batteries, hard-to-electrify industrial processes, and marine fuels (ammonia or methanol).

Global investment in green hydrogen

- Global investments in green hydrogen have increased significantly. A report by the Hydrogen Council indicates that Europe leads in project proposals, with total investments of USD 117 billion, representing 35% of global investments (McKinsey & Company, 2023).

- Several countries have developed national strategies, investing in infrastructure and promoting the development of technologies for storage, transportation, and use across various sectors.

Hydrogen investment in Chile

- Chile is driving the development of green hydrogen as part of its commitment to decarbonization and a sustainable energy transition. To achieve this goal, the government has designed the National Green Hydrogen Strategy, aiming to position Chile as a key player in the production and export of this resource, leveraging its significant renewable energy potential.

- Currently, Chile has 77 green hydrogen or derivative projects announced at various stages of development. Of these, ten have entered the Environmental Impact Assessment System or SEIA (by its acronym in Spanish), and four have received approval to commence. The latest announced project is led by TotalEnergies H2 in the Magallanes Region, with a budget of USD 16 million for green hydrogen and ammonia production.

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