FINANCIANDO EL COMBUSTIBLE DEL FUTURO EN ESPAÑA Y AMÉRICA LATINA: EL HIDRÓGENO VERDE

Cinco cosas que debemos de saber sobre el desarrollo del hidrógeno verde en América Latina

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IDB Vision 2025

To promote growth opportunities for all in a sustainable manner.

Goals: reactivate the productive sector, promote social progress, and strengthen good governance

- Commercial integration of the LAC region
- Promote digital economy through policy and new investments
- Support SMEs with financing and new regulatory frameworks
- Committed with gender equality and diversity
- Promoting actions to fight climate change
Latin America and the Caribbean could produce highly price-competitive green hydrogen
In Latin-America and the Caribbean, 56% of the power generation already comes from renewable sources. And it is just expected to grow in the next decades.

Expected new generation capacity by technology until 2040 in LAC

Source: OLADE, 2019
Besides, the region is expected to have the lowest costs from solar PV in the next years.

Source: IEA, 2020
Besides, the region is expected to have the lowest costs from wind generation in the next years.

Source: IEA, 2020
Hydrogen H2: a product with multiple applications

- Hydrogen is a product widely used today: 94% of it used in the petrochemical refining processes and for the production of ammonia and methanol. Nevertheless, 98% is grey.

- Hydrogen is a clean fuel with high energy content:
  - 1 kg of H2 = 1 gallon of gasoline = 50 kWh

Economics are not highly impacted!
GH2 can bring long distance market opportunities to now locked renewable resources in LAC
LAC has huge solar, wind and geothermal renewable resources, GH2 can allow international demand from them

Solar potential in LAC (source: ESMAP)

Wind Speed in LAC (source: ESMAP)

Geothermal Potential (source: Coro and Trumpy)
And this international demand may not be satisfied directly with hydrogen, but with other energy carriers.
LAC region is rich in renewable energy sources (hydro, solar, wind and geothermal) to produce and export H2
The global demand for Hydrogen is expected to multiply between 3 and 7 times from current values by 2050, out of which 60% is expected to be green hydrogen.

CAGR: Compound Annual Growth Rate
(3) Price of GH2 depends on renewable prices... ...but also on the capacity factor of the supply
With energy prices at around US$30/MWh, still it is necessary capacity factors above 40% to offer prices below US$3/kgH₂

(Source: McKinsey, 2020)
(4) some other renewable technologies may find in GH2 an interesting business option
We see all the potential of geothermal energy in the current clean energy transition. Now, how do we transform it into projects?
Geothermal energy: key for clean fuels production?

- Green hydrogen, ammonia and methanol are sought as key players in the decarbonization efforts. The **global demand for Hydrogen is expected to multiply between 3 and 7 times** from current values by 2050, out which 60% is expected to be green hydrogen.

- With lowering prices in electrolyzers, the key elements in the reduction of price of green hydrogen are the **cost of electricity** and the **capacity factor of supply**.

- **Geothermal energy** provides **capacity factor of 90%**, which may allow producing cost-competitive green hydrogen.

![Estimated relation between LCOE, Capacity Factor and LCOH (i-deals, 2021)](image1)

![Geothermal for H2 production (Busra Sen et al, 2019)](image2)
Hydrogen is both a fuel and a chemical reactant that can be key for industrial decarbonization.
Important opportunities in transport and the heavy industry activities

Hydrogen Applications (IEA, 2020)
Synergy with the cement industry: decarbonization and resiliency

- **Decarbonization of cement industry:** Hydrogen can be used as direct fuel for the kiln or as an improver of heat rate of biomass fuel.
Iron and Steel

Hydrogen can be used as a reductant of Iron ore and as clean fuel for furnaces.

Chemical and Petrochemical

Hydrogen can be used as fuel for chemical crackers.

Hydrogen can be used for the production of green ammonia, for fertilizers or synthetic fuels.

Hydrogen can be mixed with natural gas (~15%) to reduce emissions.
Transport
Ammonia or synthetic fuels produced from green hydrogen can be a cleaner substitute of fossil fuel in large ships

Energy Storage
Hydrogen fuel cells or direct storage can be used as a source of flexibility to the power systems and for long distance energy exchange
Thank You

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