

WORLD

Green hydrogen: Latin America makes moves on ‘fuel of the future’

Projects and green hydrogen roadmaps are being launched across the region, with countries looking to the fuel as key part of their energy transition and decarbonisation goals

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Lucía Cuberos November 22, 2022 



[Ecopetrol](#)'s oil refinery in Cartagena, Colombia, where the company started a pilot test of green hydrogen production last March (Image: [Ecopetrol](#)).

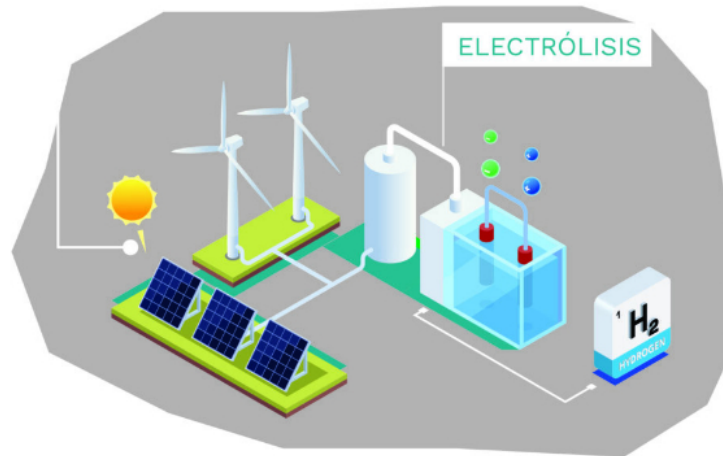
Latin American countries are taking their first steps into the burgeoning global [green hydrogen](#) industry, seeking to take advantage of their high potential in renewable energies and drive their efforts towards carbon neutrality by mid-century.

Hydrogen gas, used as a fuel for transport, power generation and industrial activities, releases no greenhouse gas emissions when it is burned, but has often been obtained as a by-product of polluting processes. Its recent “green” spin, however, has been the

subject of much industry and media buzz, and refers to hydrogen gas that has been produced using zero-emissions renewable energy sources.

WHAT IS GREEN HYDROGEN?

Hydrogen does not release greenhouse gas emissions such as carbon dioxide when it is burned. Hydrogen can be considered “green” if produced using sources such as wind or solar power, which also emit no greenhouse gases.



 Diálogo Chino

Graphic: Facundo Da Roza / Diálogo Chino

The energy sector accounts for 43% of all emissions in Latin America and the Caribbean, according to [World Bank data](#). The transformation of energy mixes is therefore an unavoidable reality, if the region’s countries are to meet their obligations of the Paris Agreement and attempts to limit global warming to 1.5C above pre-industrial levels.

“We are currently far from reaching that target, if we continue to only make small moves,” warns Noelia Medina, an advisor to Uruguay’s National Energy Directorate and member of an inter-institutional group for green hydrogen development. “Something really drastic and revolutionary, like green hydrogen, which affects all value chains, is needed to reach that climate goal.”

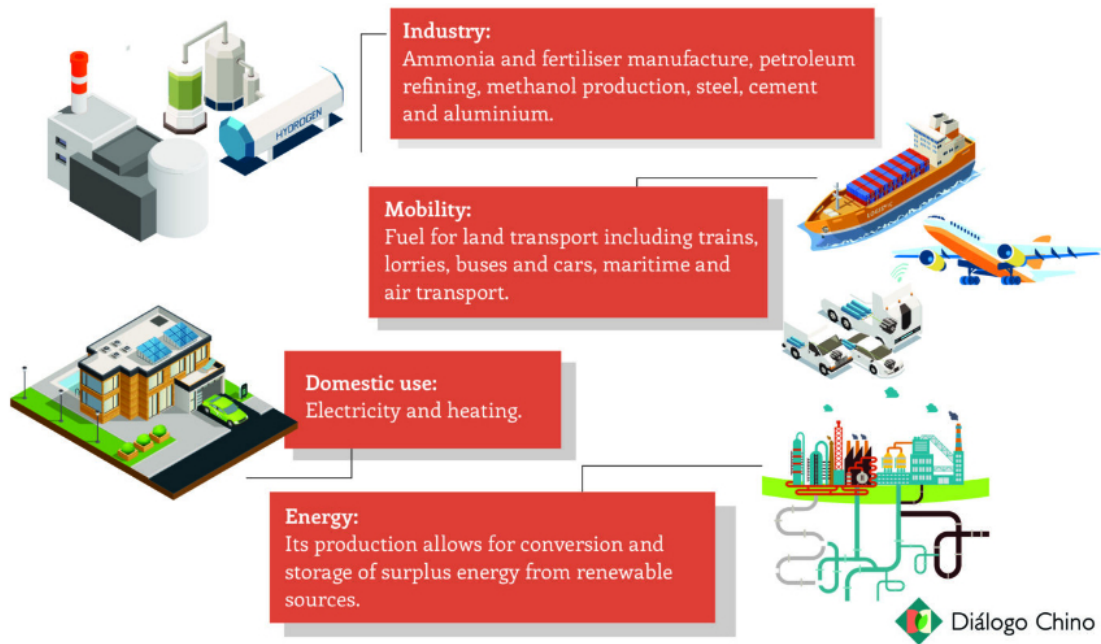
Regulating green hydrogen

For some countries, green hydrogen presents a promising opportunity to export the fuel, while for others, the focus is on using it for local production of by-products, whether for the development of synthetic fuels, clean fertilisers, powering electric vehicles, and a host of other industrial and domestic uses.

María Paz de la Cruz, general manager of H₂ Chile, the Chilean

maría Paz de la Cruz, general manager of H2 Chile, the Chilean hydrogen association, says green hydrogen “will be one of the spearheads” in Chile’s contribution to global warming mitigation measures. She said that the fuel could contribute towards 24% of the country’s total carbon dioxide reductions by mid-century.

WHAT CAN GREEN HYDROGEN BE USED FOR?



Graphic: Facundo Da Roza / Diálogo Chino

“Green hydrogen is our best option to accelerate the energy transition,” de la Cruz added. Though Chile currently derives 68% of its energy from fossil fuels, the nation leads the way on green hydrogen in Latin America, having launched a national strategy for the fuel in 2020, which set out specific goals such as being the country with the cheapest green hydrogen on the planet, at less than U\$1.5 per kg by 2030.

Along with Chile, Colombia is another country making progress in its hydrogen development. In addition to publishing a roadmap for the sector in 2021, the country established tax incentives for green and “blue” hydrogen projects (those generated using fossil fuels but with emissions capture) with the aim of attracting new investments.

Colombia hopes to reduce its emissions by 51% by 2030 and the development of green hydrogen is “central to that discussion,” said Katharina Grosso, who until October this year was executive director of the Non-Conventional Energy and Efficient Energy Management Fund



and Efficient Energy Management Fund (FENOGÉ), a Colombian government agency. Last year, the country passed its [Energy Transition Law](#), which also highlights hydrogen, and has since seen the election of Gustavo Petro as its president, who has [promised to wean the country off fossil fuels](#), and may provide further impetus to green initiatives.



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Uruguay, meanwhile, has featured green hydrogen in its [Long-Term Climate Strategy](#) and launched a call for pilot projects that is still underway. Although these initiatives are focused on domestic applications, authorities expect them to serve as a “learning curve” to help train technicians in the world of hydrogen, said Uruguay’s Minister of Industry, Energy and Mining, Omar Paganini.

Adrián Peña, Uruguay’s environment minister, echoed these sentiments, saying that the intention is for green hydrogen to be “a transitional, clean energy that has no environmental collateral”.

“So,” Peña added, “preparing our people for this development is key.”

HOW IS GREEN HYDROGEN PRODUCED?

01

ELECTROLYSIS

Desalinated water enters the electrolyser and an electrical charge from a clean energy source is passed through it. This facilitates separation of H₂ and O₂ molecules.



Fotos: www.freepik.es

02

STORAGE

The hydrogen is then stored in compression tanks in a gaseous state, aiming to increase its density and facilitate its distribution.



03

TRANSPORTATION

Hydrogen is transported by trucks in pressurised gas cylinders. For transport by sea, the gas must be in liquid form, achieved by converting hydrogen into ammonia.



04

FUEL

Green hydrogen is used as a fuel for the transport system or energy for industry, among other uses.



 Diálogo Chino

Graphic: Facundo Da Roza / Diálogo Chino

Uruguay’s goal is to start producing green hydrogen in 2025, according to its own [roadmap](#). Paganini said the country has “comparative advantages” that will allow it to position itself as a “supplier of green alternative fuels” to new markets, such as its already developed renewable energy sector. Uruguay generates

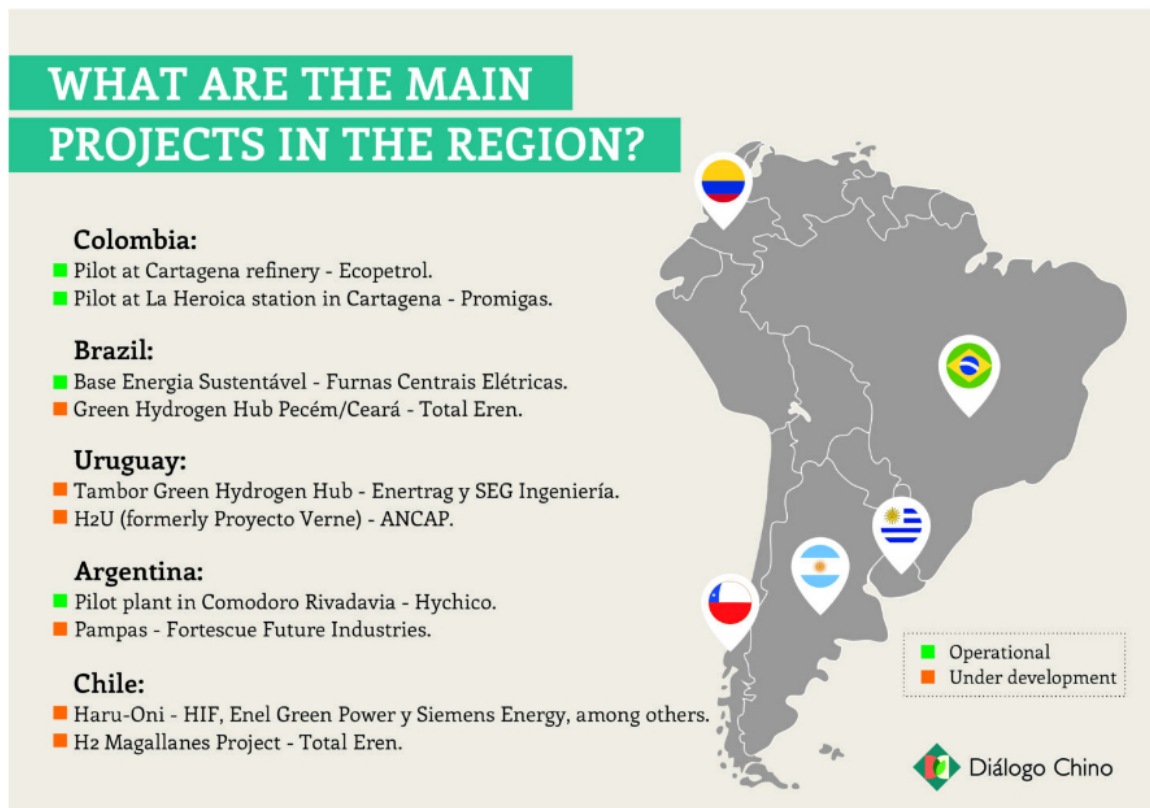
over 98% of its electricity from renewable energy sources.

Meanwhile in Argentina, Juan Carlos Villalonga, a former national deputy and an expert on energy issues, describes the country's situation as a little more "precarious". Although the country passed the National Hydrogen Promotion Law in 2006, regulation never followed, which is why the H2 Argentina platform, of which Villalonga is a member, is calling for progress on a regulatory framework to promote hydrogen investments in the long term.

"Argentina has the whole 20th century on its back, and the fossil fuel sector – which supplies almost 80% of its energy mix – is not willing to lose privileges," he added.

Hydrogen projects in Latin America

The World Bank has pointed to Latin America as having the potential to become one of the world's most competitive regions in green hydrogen production by 2030. In the latest regional report by H2LAC, an initiative of the bank, it is highlighted that, although they are at different degrees of progress, there are already 13 operational projects in the region and more than 70 in development.



Graphic: Facundo Da Roza / Diálogo Chino

Chile, for example, has almost 30 initiatives ranging from the application of hydrogen in public and cargo transport, to the production of methanol or "green" ammonia for the explosives

industry.

Among the most notable projects under development are: the [H2 Magallanes](#) in Southern Chile, promoted by Paris-based Total Eren, which will include a port facility for export; the [Haru Oni](#) pilot project backed by Chilean firm HIF, the Italian Enel Green Power and German multinational Siemens Energy, which will focus on renewables-based fuel production in the Magallanes region; and the [HyEx](#) project led by the French energy company Engie and the Chilean Enaex, in Antofagasta province.

Colombia has more than ten projects under study, and the areas of application range from the construction of a green hydrogen hub to supply the steel industry, to the production of fuel from renewable energy surpluses, for mobility and industrial use. For example, a green hydrogen initiative is already in operation at [Ecopetrol's Cartagena oil refinery](#), powered by solar panels. Natural gas supplier [Promigas](#) also has an active project in the country.

Uruguay, meanwhile, is working on the [H2U pilot](#), an official strategy that can be applied both in heavy transport and in the production of ammonia and green fertilisers. In the private sector, the German company Enertrag, in cooperation with the Uruguayan SEG Ingeniería, is promoting the [Tambor Green Hydrogen Hub](#), a plant for the production of green hydrogen and derivatives such as methanol, in the department of Tacuarembó.

In Argentina, a [clean hydrogen production plant](#) already exists in Comodoro Rivadavia, in the Patagonian province of Chubut, run by the domestic company Hychico. Authorities have also announced the landing of the [Pampas project](#) in the province of Río Negro, a multi-million dollar initiative focused on green hydrogen production on an industrial scale led by Australian firm Fortescue Future Industries.

Projections for green hydrogen

Amid the excitement of entering a potential billion-dollar market and difficulties in launching new technologies, the race to be the regional leader in green hydrogen has already begun, and Latin America is preparing its next moves for the future.

Some questions have been raised over the sustainability of green hydrogen, particularly regarding the water consumption required for its production, in a region that has regularly seen periods of intense drought, from [Chile to Argentina and Brazil](#). To obtain one tonne of green hydrogen can require as much as [9 tonnes of water](#), which could present a stumbling block in some of the region's drier climes. But in Uruguay, for



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example, such volumes are not considered to be problematic when compared to water usage in other productive sectors.

For Monica Gasca, the executive director of Hidrógeno Colombia, the Colombian hydrogen association, the biggest challenge for the industry will be to encourage local demand for green hydrogen, as well as to establish new financial instruments to leverage projects. Gasca also expressed caution over the development of green hydrogen, saying that the fuel “is not the solution for everything”.

“It is not a Swiss army knife or a silver bullet,” Gasca said. “Hydrogen has certain niches that need to be exploited, but first we have to solve energy efficiency and electrification issues.”

Other challenges will be the creation of public policies that encourage technological advances, and ensuring that initiatives are implemented in a way that does not bring conflict with or disturbances to urban and indigenous communities, the experts consulted agreed.

“

Green hydrogen is not a Swiss army knife or a silver bullet

Ivan Zimmermann, an electrical engineer who served as chief of staff at Chile’s energy ministry until September, said that it will be essential to “generate a synergy” between public and private action, which will allow for long-term sustainable development of the industry.

“If this is not addressed as a state policy, it will generate socio-environmental conflicts in the territories that may hinder the healthy maturation of the technology,” Zimmerman explained.

H2 Argentina’s Villalonga also pointed to complexities and opportunities arising from the current geopolitical context, notably the effects of Russia’s war in Ukraine. As European countries encounter difficulties in disentangling from one of their main energy suppliers, energy security “becomes a value in itself” and opens the door to new market opportunities for Latin America, he said.

That is why the industry’s development will need to be thought through “strategically”, Uruguayan advisor Medina said, while the sector’s regulations are perfected, competitive energy prices for green hydrogen are achieved, and large-scale logistical issues are ironed out.

Moreover, with many countries moving in the same direction, said Uruguayan minister Paganini, both competition among emerging markets and “uncertainty” about the viability of green hydrogen

initiatives will be further challenges faced across the sector in Latin America.

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