

AkuaippaHy Project: Development of sustainable hydrogen and methanol in La Guajira, Colombia

The Challenge

Colombia has significant potential to become a leader in green hydrogen production in South America, due to its abundant renewable potential. The best capacity factors are found in the La Guajira region with an average and maximum solar factor of 19% and 21%, respectively, and in wind energy, with an average and maximum factor of 46% and 63%, respectively. In La Guajira, the renewable potential is at least 25 GW of onshore wind energy and 45 GW of solar energy, thus bringing together the necessary elements to become a global hub for green hydrogen production.

Despite being a country with an abundance of natural resources, dependence on fossil fuels persists in the industrial and transportation sectors. In addition, in regions such as La Guajira, there are socioeconomic challenges and access to basic services that can be overcome through initiatives that promote economic development and improve the quality of life of its inhabitants.

This is how in 2021, the Colombian government launched its hydrogen roadmap, positioning it as one of the strategic energy vectors given the country's potential in solar energy (45 GW) and wind energy (20 GW onshore and 50 GW offshore), in addition to having abundant natural resources, port infrastructure and a privileged position for export.

Some of the short-term challenges for Colombia, aimed at developing a solid and competitive hydrogen ecosystem at a regional and global level, are

- Accelerate enabling regulations aimed at defining the low-emissions threshold for hydrogen and derivatives.
- Establish tax and tariff incentives.
- Strengthen local capacities for export to the European Union.
- Develop technical capabilities.
- Financial support for hydrogen project developers.
- Regulatory development at an environmental and social level.



Image 1. Potential areas

These challenges are being addressed by the public and private sectors that make up the ecosystem in the country.

In this context, the AkuaippaHy project emerges as an innovative solution for the energy transition, focusing on the production of green methanol from renewable hydrogen and CO₂ capture. The project will contribute to strengthening local capacities, generating employment and promoting the economic development of the region.

The Solution

The AkuaippaHy project, led by the German company VIRIDI RE, with the support of the International Hydrogen Ramp-up Program of the BMWK, proposes the creation of an integrated facility in La Guajira, a region with one of the highest renewable energy potentials in Latin America, combining solar and wind power generation for the production of low-emission hydrogen and a biogenic CO₂ plant for the production of e-methanol that can be exported to Europe.

This plant will have:

- 540 MWp of solar energy
- 460 MW of wind energy
- 413 MW in electrolysis capacity
- 40.000 t/year of H2 production
- 210.900 t/year of e-methanol

This project is expected to achieve a reduction of 6 million tons of CO2eq in the first 10 years of operation.

How it will be done

Within the framework of public-private cooperation, the aim is to boost the growth of low-emission hydrogen and e-methanol projects by developing capacities and knowledge for off-grid production. Within this framework, VIRIDI will develop:

- Market analysis focused on Colombia's potential to develop a local market for H2 and methanol.
- Analysis of carbon resources and their compatibility with European Union regulations to ensure export viability.
- Technical study of the project, including the conceptual design of green methanol production, integrating renewable energy and the required infrastructure.
- Environmental and regulatory assessment, considering compliance with applicable regulations.
- Financial assessment consisting of costs, profitability and financing models to ensure the sustainability of the project.
- Capacity building plan and communication plan focused on training local stakeholders and disseminating key information to encourage acceptance and participation in the project.

These results will allow the project to reduce regulatory, financial, environmental and market risks to achieve feasibility. They will also allow its replication in other regions of the country, achieving a greater scope for the development of the sector in Colombia.

Expected outcomes

This collaboration is expected to benefit the development of capacities and qualified labour for the development and operation of large-scale hydrogen and derivatives projects.

Given the location conditions, availability of natural resources and access to ports, it is expected to facilitate replicability in other areas of the Caribbean and other countries in the region.

Project at a glance

Duration	October 2024 – September 2027
Country	Caribbean region -La Guajira Colombia
Objective	Accelerating the growth of the green hydrogen and e-methanol projects in Colombia by developing enhanced capabilities and knowledge for off-grid e-methanol production, therefore enabling the development of the Colombian hydrogen economy.
Partners	GIZ and VIRIDI RE
Expected results	Technical, regulatory, financial, social and environmental feasibility analysis for project development in the Colombian Caribbean region.

The International Hydrogen Ramp-up Programme (H2Uppp) of the German Federal Ministry for Economic Affairs and Climate Action (BMWK) promotes projects and market development for green hydrogen in selected developing and emerging countries as part of the National Hydrogen Strategy.

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