INSIGHT BRIEF

Global maritime decarbonisation: New opportunities for Latin America

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The opportunity

Latin America finds itself facing several untapped opportunities connected to the global maritime ecosystem's transition to scalable zero emission fuels.

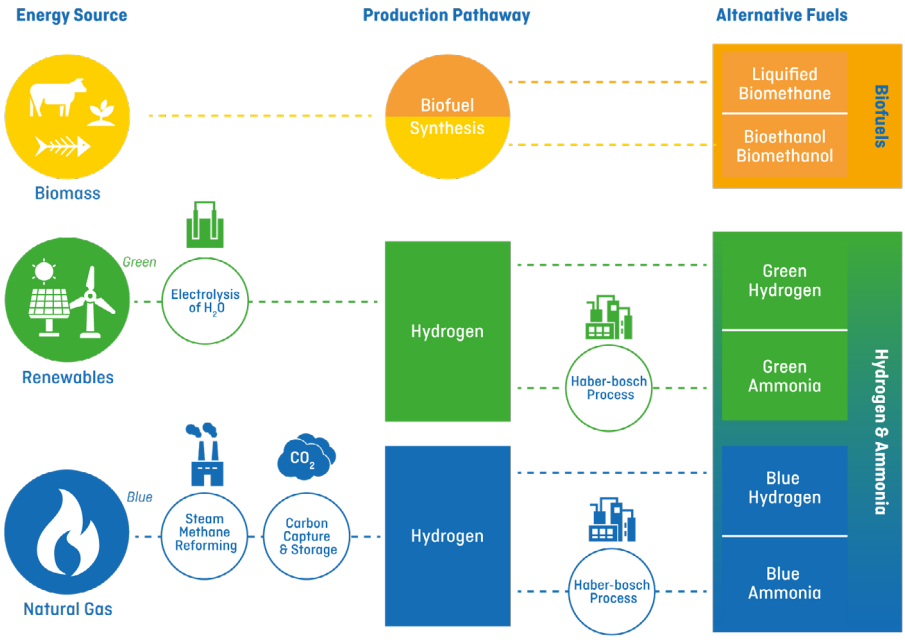
Currently, international shipping is highly reliant on fossil fuels as an industry, in particular heavy fuel oil (HFO), burning around **300m metric tons per year** and emitting around **1bn metric tons of CO_2** in the process. This means that emissions from international shipping account for 2-3% of global emissions annually, a total which is projected to grow overall and increase relative to other parts of the economy which will be able to electrify and curtail emissions at a faster pace.

In order to meet the goals of the Paris Agreement it is imperative that the maritime ecosystem is able to **reach zero emissions before 2050**. This means that there is a need for a full-scale transition to scalable zero emission technologies over the coming decades, creating huge shifts in terms of fuel supply and creating new opportunities for several geographies.

For illustrative purposes, assuming the maritime ecosystem transitions entirely from HFO to green ammonia, this would represent over **900 million tons per year** of green ammonia, which is more than five times today's total global output of conventional ammonia. This reflects the emergence of a new **trillion dollar market opportunity**, with countries that are able to produce green hydrogen, the basis for all scalable zero emission fuels, at the lowest cost having a massive potential to supply the fuels needed to ultimately decarbonise the international maritime value chain.

Consequently, maritime decarbonisation presents a wide range of opportunities connected to supplying these fuels domestically, **exporting these to areas of the world with less renewable potential** and ultimately leveraging international maritime decarbonisation to accelerate the transition to renewable forms of energy regionally.

The need for green hydrogen



Source: Inspired by World Bank *(World Bank Group (2021). The Potential of Zero-Carbon Bunker Fuels in Developing Countries.)*

For international shipping to fully decarbonise it will be necessary to accelerate the shift to scalable zero emission fuels. These will, to a great extent, be derived from **green hydrogen** in the form of fuels including green ammonia and green methanol.

Green hydrogen, created through using renewable electricity to split water into oxygen and hydrogen, offers a clean alternative to fossil fuels. Where electrification isn't feasible, green hydrogen will be required to support the decarbonisation of sectors like **agriculture, steel, cement, chemicals, aviation, and shipping.**

Decarbonising these sectors over the coming decades will require a massive scaling up of green hydrogen production. By 2050, the International Renewable Energy Agency (IRENA) predicts that hydrogen could make up around **12% of global energy consumption**, representing the growth of a huge new market necessary to support the decarbonisation of many important industrial sectors.

For the maritime industry specifically, green hydrogen will be needed in large quantities to synthesise zero emission marine fuels like green ammonia and green methanol. Conversion to these fuels will then allow for hydrogen-based energy to be used over long distances in marine engines in addition to being transported globally in a more stable form, before potentially being converted back into hydrogen for use in other industrial applications.

The ability to transport hydrogen in the form of green ammonia could usher in a significant transition in terms of energy trade flows. Currently, fossil fuels account for around **40% of shipping cargo in weight globally**, which will need to be phased out and replaced with clean alternatives under a 1.5 degrees scenario.

In future, countries will likely satisfy more of their energy needs from locally produced renewables for the majority of domestic uses;

however, there will still be a need to generate and transport hydrogen to demand centres with low production capacity like Europe and parts of North East Asia. It is predicted that under a 1.5 degrees scenario, **around 25% of hydrogen could be globally traded**, potentially creating a huge new export commodity that will create significant opportunities for both fuel producing countries and the maritime industry.

Projects

The global transition to green hydrogen derived fuels is already fast underway in terms of projects and initiatives relating to the development of this new market, with the majority of these being based in **Europe and Northern Asia**. Several large shipping companies have also already **placed orders for large vessels capable of operating on zero emission fuels**, sending a strong signal around the need to ensure that existing fleets are ready for fuel supply to ramp up.

Some projects are also beginning to emerge across Latin America, including **supplying green hydrogen at ports, small vessel projects, and green hydrogen offtake coupled with other sectors**. This represents significant movement towards the engagement of Latin American stakeholders in the transition to scalable zero emission fuels; however, further efforts will be needed to ensure that the region maintains pace with global developments.

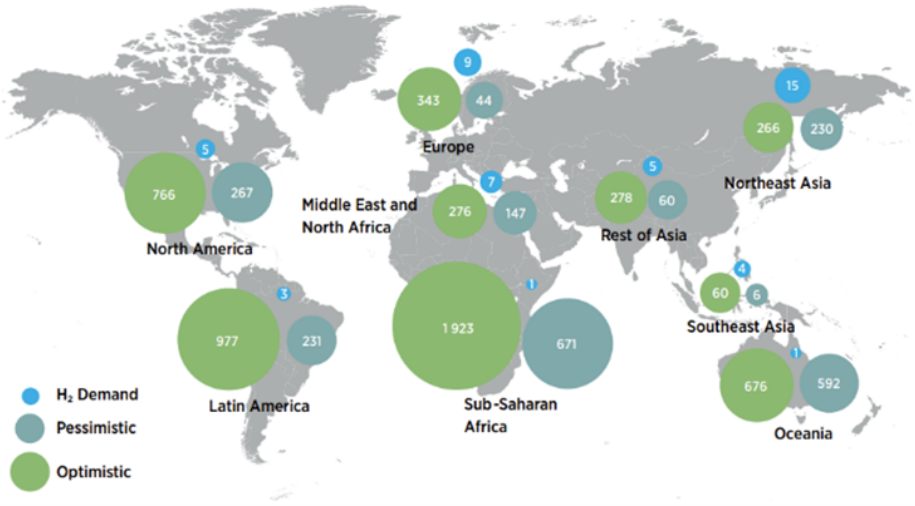
Energy opportunities

The Latin America region includes some of the most ideally suited countries for producing green hydrogen competitively and at scale. For example, in many studies, Chile is often cited as the country with the **most affordable potential production of green hydrogen globally**. Countries like Colombia, Brazil, Argentina, and Mexico are also consistently rated as having strong potential due to their access to both solar and wind resources.

Renewable energy also has a relatively high uptake in terms of energy systems and power generation across the region, with approximately **25% of energy needs being met by renewables** in 2020. In addition, a number of countries have set a collective target of achieving **70% of renewables by 2030**, representing some of the most ambitious targets globally.

Latin America's large access to renewables and high ambition levels mean that it could emerge as a leading exporter of green hydrogen over the next few decades. This would be well within reach in terms of renewable capacity, being potentially able to supply between 231 Extra Joules (EJ) and 977EJ of green hydrogen at below $2 per kilo (see figure). According to IRENA, the total demand for hydrogen, of which at least 2/3 would need to be green, **across all sectors will be around 74EJ by 2050**.

FIGURE 3.6. Comparison between economic potential of green hydrogen supply below USD 2/kgH_2 and forecasted hydrogen demand, in EJ/year, in 2050



Source: IRENA *(IRENA (2022), Global hydrogen trade to meet the 1.5°C climate goal: Part III – Green hydrogen cost and potential, International Renewable Energy Agency, Abu Dhabi.)*

In the maritime context, several studies have shown that there are clear opportunities to leverage international shipping to help ramp up green hydrogen production and ultimately produce future marine fuels. For example in Chile, where the Environmental Defense Fund and the sustainability consultancy Ricardo have found that innovation and projects focusing on electro-fuels represents a **$65-$90 billion opportunity in terms of potential investment**.

Countries like Mexico have also been shown to have significant opportunities in this regard, potentially through supporting wider national ambitions relating to the reduction of air pollution, increased energy security and independence, growth in its green job market, diversifying its value-add export products, building national capacity and skills, and generating new forms of foreign direct investment.

Regionally, there are also other countries like Panama that could play a significant role in this transition due to the **Panama Canal's role as a regional hub and bunkering site** for international shipping. This opportunity could allow for other countries in the region, like neighbouring Colombia, to export fuels to Panama to then sell as marine fuels.

Leveraging international maritime decarbonisation has the potential to support these developments, as well as providing an additional offtake opportunity that could help with the scaling up of green hydrogen production for national use. This additional capacity could then be used to support the decarbonisation of other industrial sectors with a high future demand for green hydrogen.

Policy

The transition to scalable zero emission fuels is still in its early stages, with the maritime sector currently relying heavily on fossil fuels. To accelerate a shift away from these incumbent fuels, there is a need for regulation to support the scaling and diffusion of future fuels. To achieve this, there are several levers that countries can activate nationally, for example through subsidising green fuel production, contributing towards green port development, or

supporting R&D projects focusing on domestic fleets. However, there is also a big role for international regulation, especially through the International Maritime Organization (IMO).

Many Latin American countries have high ambition levels when it comes to international climate negotiations, with several being part of the High Ambition Coalition. All Latin American countries have also signed the Paris Agreement and have submitted Nationally Determined Contributions (NDCs), outlining pledges from each country to address climate change and ultimately decarbonise their economies.

However, in spite of this ambition level in the context of climate action and the opportunities connected to scaling renewables and green hydrogen production, maritime decarbonisation is currently not high on many national agendas. As such, there currently exists a gap between the potential scale of these opportunities and the frameworks in place to unlock them. This is largely due to an asymmetry between different policy areas regarding maritime decarbonisation.

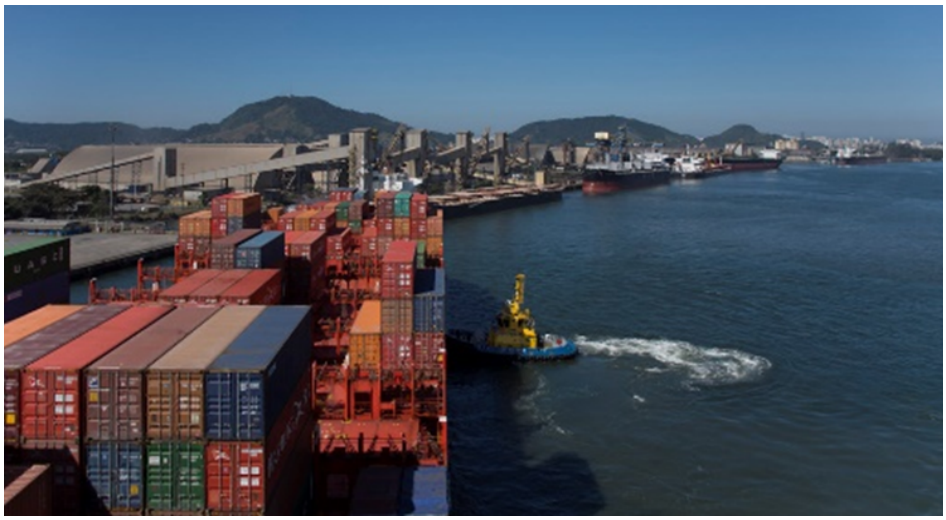
For example, different national ministries can have overlapping responsibilities in relevant areas, making it difficult to bridge perspectives and coordinate action capable of realising benefits and reducing costs associated with maritime decarbonisation. One practical example of this barrier is the lack of inclusion of green shipping within national transport strategies, despite strong support for green hydrogen production and export from energy ministries.

A lack of coordination in terms of policy further has the potential to result in a lack of coordination around infrastructure, like port development or establishing well connected fuel production plants that could export fuels in the future. Consequently, some opportunities to develop transport infrastructure and fuel production synergistically are currently unexplored, potentially creating inefficiencies and reducing the pace of transition.

This asymmetry is further exemplified in some countries' engagement within the IMO negotiations where countries are represented by a range of different ministries such as transport, foreign affairs, trade representatives, or through the navy. This means that often the opportunity presented by the transition to zero emission marine fuels is underexplored, with discussions focusing more on increased costs rather than future potential revenue streams.

The current debate shows this, with some leading Latin American countries being concerned mainly about the impacts of measures that could accelerate the transition to scalable zero emission marine fuels. Many of these countries raise concerns regarding the potential for these more expensive green fuels to increase transport costs, which has the potential to negatively impact trade and GDP (Gross Domestic Product), reducing the competitiveness of Latin exports and increasing the price of imports.

The impact of increased trade costs is **particularly relevant for Latin America**, given its distance from the largest export markets and major shipping lanes. Many countries in Latin America such as Brazil, Argentina, and Mexico are also large exporters of agricultural products, which are more heavily exposed to these risks. Due to the need to refrigerate products like bananas or cherries onboard ships, additional fuel is required that subsequently increases the impact of rises to fuel costs. These concerns will need to be addressed to avoid that the region is disadvantaged from the transition.



A well-designed global measure implemented across the value chain through the IMO could have the potential to alleviate some of these inequalities, allowing for costs to be passed onto end consumers across the global economy. **The measure itself could also include a revenue distribution mechanism** that could address trade costs and existing inequalities through providing compensation or supporting new projects capable of generating economic activity.

The debate around these impacts is still ongoing with negotiations progressing to a point where agreeing to market based measures is becoming more acceptable, recognising the need to close the competitiveness gap and by doing so to enable the transition. Additional attention is needed in this area, specifically in terms of weighing up decarbonisation related opportunities against impacts like trade costs to try to find a constructive way forward at the IMO.

An important milestone in this regard will be MEPC 80 in June, which will likely see the IMO's Initial Greenhouse Gas Strategy revised to target zero emissions by 2050. This will accelerate the debate on implementing market based measures, increasing the need to explore the opportunities and address the potential costs of maritime decarbonisation.

Current developments:

National Hydrogen Strategies

- Argentina 2030 National Low-Emission Hydrogen Strategy
- Baseline to support the Brazilian Hydrogen Strategy
- Chile Hydrogen Strategy
- Colombia Hydrogen Roadmap
- National Hydrogen Plan Mexico
- Panama Green Hydrogen Roadmap

Green Corridor Development

Discussions are underway regarding the development of a green shipping corridor with a focus on the Latin America region. This could be between Latin America and a major export market, such as Europe, the US, or East Asia, or between Latin American countries, for example linking the Panama Canal to fuel production in another country.

Pilot Projects

- Buquebus hydrogen ferries (Argentina)
- Ceara Green Hydrogen Hub (Brazil)
- Decarbonisation of the Paraguay-Paraná waterway (Brazil)
- HNH project (Chile)
- HyEx project (Chile)
- Port of Acu (Brazil)
- Wärtsilä Hybrid Solution: CBO Flamengo (Brazil)

Concluding remarks

The Getting to Zero Coalition's newly established Task Force hopes to both address important concerns as well as explore and promote potential opportunities for countries within the Latin American region. By bringing together stakeholders from across the maritime value chain with a significant presence in Latin America, it is hoped that this Task Force can help build connections between the global transition to scalable zero emission marine fuels and the extensive opportunities that Latin America possesses.