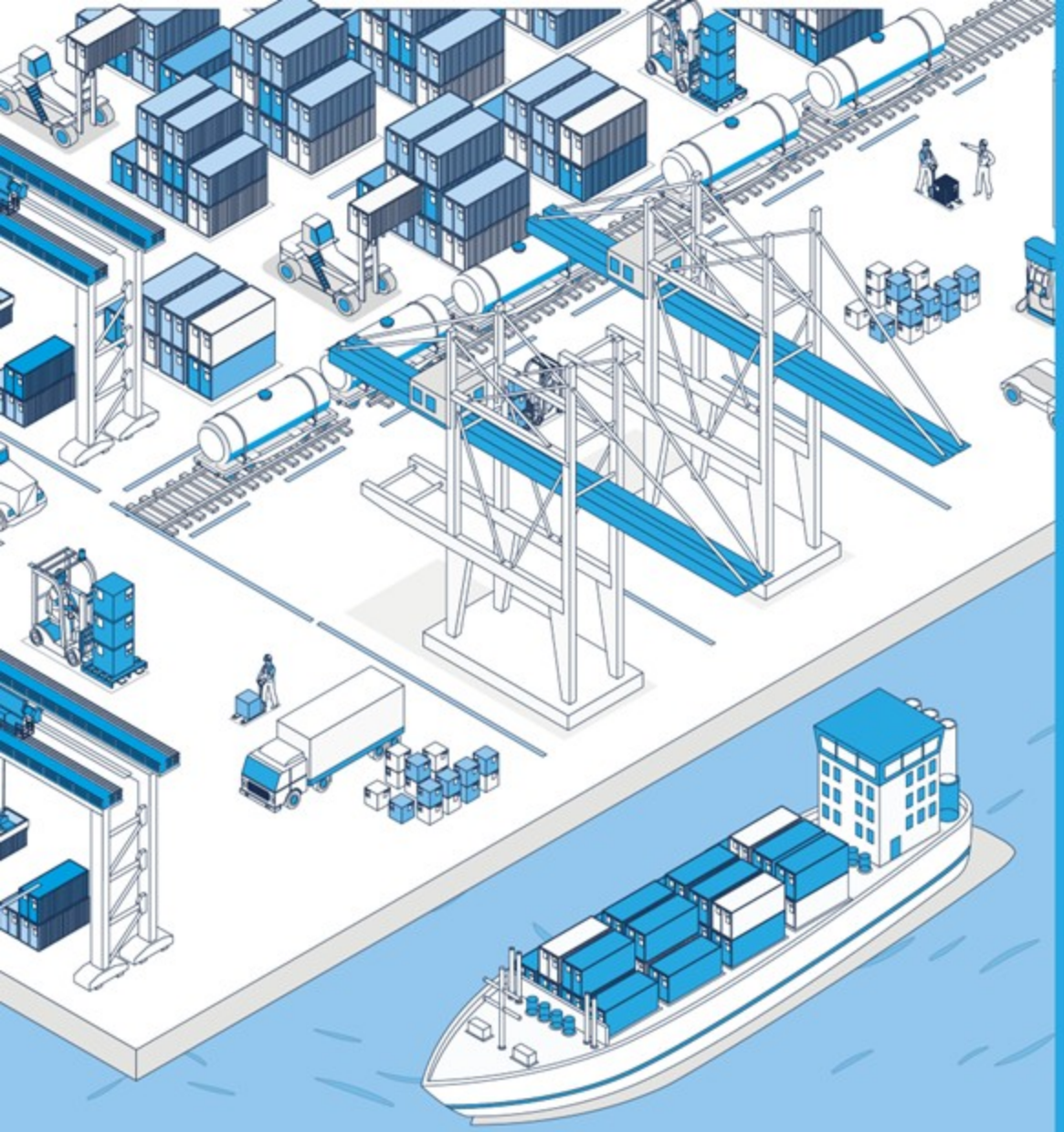


Hinicio

Welcome to our webinar

The Renewable Energy Directive:

The Overlooked Driver of Green Shipping Corridors under the new IMO Net Zero Framework

05 June 2025

Webinar agenda

10 min
Opening remarks

25 min
Keynote presentation

- An overview of how EU regulations incentivize full value chain decarbonization, including in maritime transport.
- Insights into how the IMO Net-Zero Framework impacts the use of zero- or near-zero-emission (ZNZ) fuels in shipping corridors.
- A case study on the export of green ammonia from Latin America (LATAM) to Europe

30 min
Panel discussion

OPENING REMARKS

Hans Kulenkampff
CEO
Hinicio

About HINICIO

Consulting firm specialized in the decarbonization challenges of hard-to-abate sectors with ~20yrs experience in hydrogen and its derivatives.

Since 2006, we have supported public and private pioneers in **navigating the complexities of hard-to-abate decarbonization**. With a unique multidisciplinary team of consultants, we advise **governments, multilateral entities, international institutions, investors, banks, project developers and industrial players** on **high-impact solutions across energy, transport, and industry** related sectors.

Hinicio brings a unique combination of engineering excellence, market insights and deep regulatory expertise to every engagement. **We bridge the gap between ambition and execution** by aligning **technical precision, off-take dynamics, and certification pathways** — all underpinned by trusted relationships with investors to **ensure bankability** from day one.

We have offices in **Brussels, Paris, Rotterdam, Santiago, Bogota and Madrid.**

Our History

- **2006** Founded in **Brussels** by Patrick Maio.
- **2009** Launch of Hinicio France in **Paris**.
- **2014** Start of Hinicio **Latin America** in Bogotá.
- **2014** Co-founding and launch of **Certifhy**.
- **2018** Start of Hinicio Netherlands in **Rotterdam**.
- **2020** Start of Hinicio Chile in **Santiago + Digital Solutions**
- **2023** Joined the **Vulcain Engineering** Group

Our Impact Focus

At Hinicio, we stay laser-focused on what matters most—our **three axes of impact**: the hardest-to-abate **sectors**, our **core services & solutions**, and the **clients and regions** where we create relations that deliver the greatest value.

The climate clock is ticking, and we are committed to delivering **the right actions, in the right sectors, at the right time—now**."

Sustainable Transport
- Shipping and Bunkering
- Material-Handling Equipment
- Off-Road Mobility
- Heavy Duty Mobility

Sustainable Aviation
- BioSAF / eSAF
- HVO/HEFA
- CCU

Sustainable (Process) Industry
- Hydrogen and Refineries
- Ammonia/Fertilizers
- Methanol
- Cement/Steel

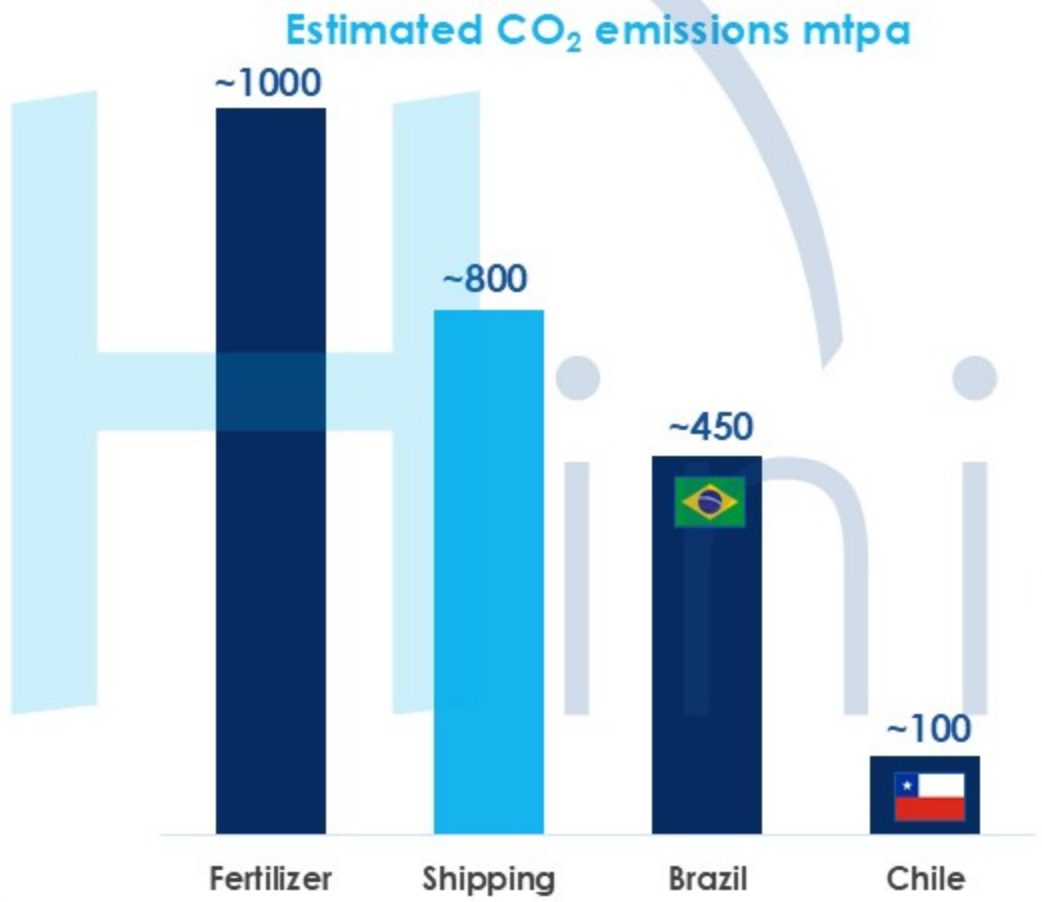
Policy & Regulation

Engineering & Digital Solutions

Investment | M&A

Market & Off-Take

Why are we here?



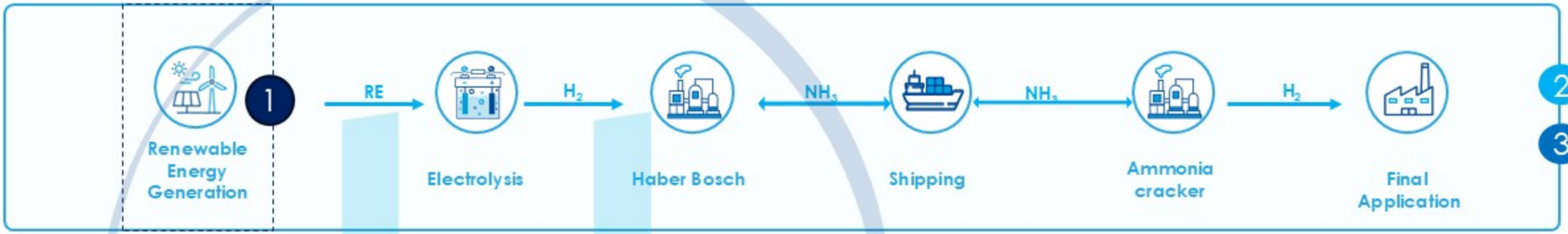
- Policy & Regulation
- Engineering & Digital Solutions
- Investment | M&A
- Market & Off-Take

Flavien Lescanne
Manager, Policy & Regulation Leader
Hinicio

Pilar Henríquez
Manager & Transport Leader
Hinicio

CASE STUDY:
Export of green ammonia from Latin America (LATAM) to Europe

To receive the "Green premium" in the EU the ammonia needs to comply with a set of requirements set out in the Renewable Energy Directive (RED)



The ammonia must comply with the RED II delegated acts along the entire value chain:

1 Renewability of electricity

Grid-based: Guarantees of Origin should be secured and cancelled

Grid-based >90% RE in grid mix OR electricity consumed during imbalance settlement

Direct connection / Under PPA:
- Additionality
- Temporal Correlation
- Geographical Correlation

2 GHG emission savings

70% GHG emissions savings threshold compared to references fuels

Applicable fuel comparator* for RFNBO → 94 $gCO_2eq/MJ\ H_2$

Carbon footprint threshold → **<28.2 $gCO_2eq/MJ\ H_2$**

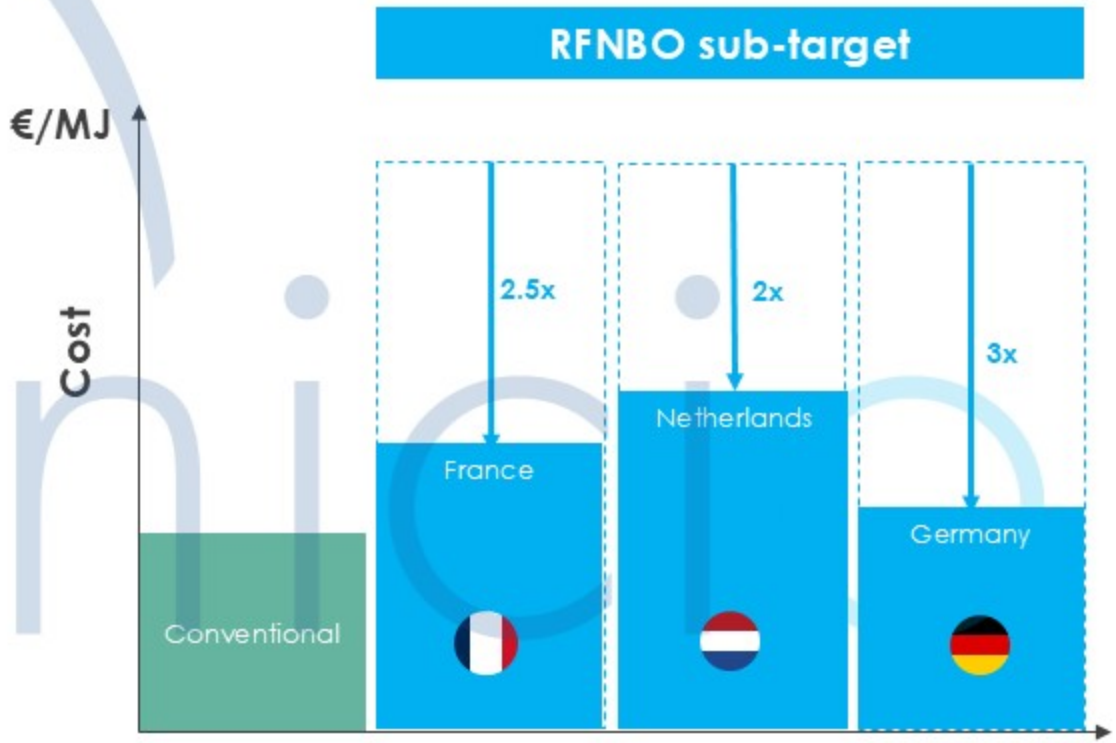
3 Mass balance

Mass balance bookkeeping must be applied along the supply chain and Proof of Sustainability declarations must be passed down by each economic operator.

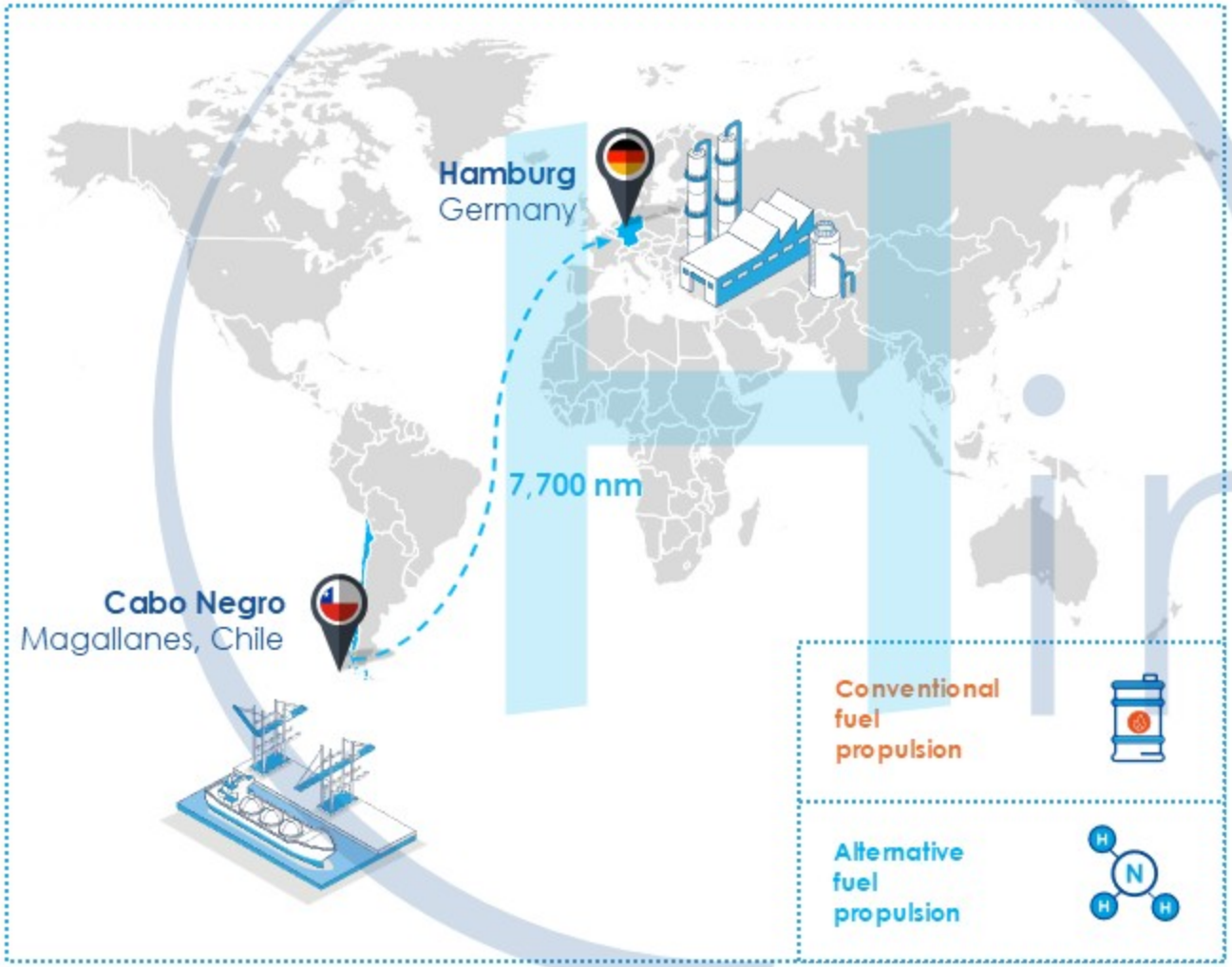
* A fuel comparator is a reference fuel set by the REDII Delegated Act on GHG emission quantification methodology. All emission savings of RFNBO fuels shall be calculated based on this comparator.

The RED regulation allows the use of multipliers and sub-targets for RFNBOs, increasing mandated volumes as well as their contribution toward national targets and enhancing their market value.

- **Multipliers under the Renewable Energy Directive (RED) amplify the certified contribution of RFNBOs toward national targets**, acting as a regulatory premium that can be monetized through higher demand or offtake prices.
- These multipliers are especially impactful in sectors like transport, where a 2x multiplier applies in many EU countries, **increasing the compliance value of each unit of imported fuel.**
- The way each member state transposes RED, through either GHG-intensity thresholds or energy share accounting, can lead to significant differences in market value, even for fuels with identical carbon performance.
- **As RED III is implemented, these variations will define which countries offer the best business case for green hydrogen and its derivatives**, thereby shaping export strategies, route selection, and investment prioritization.



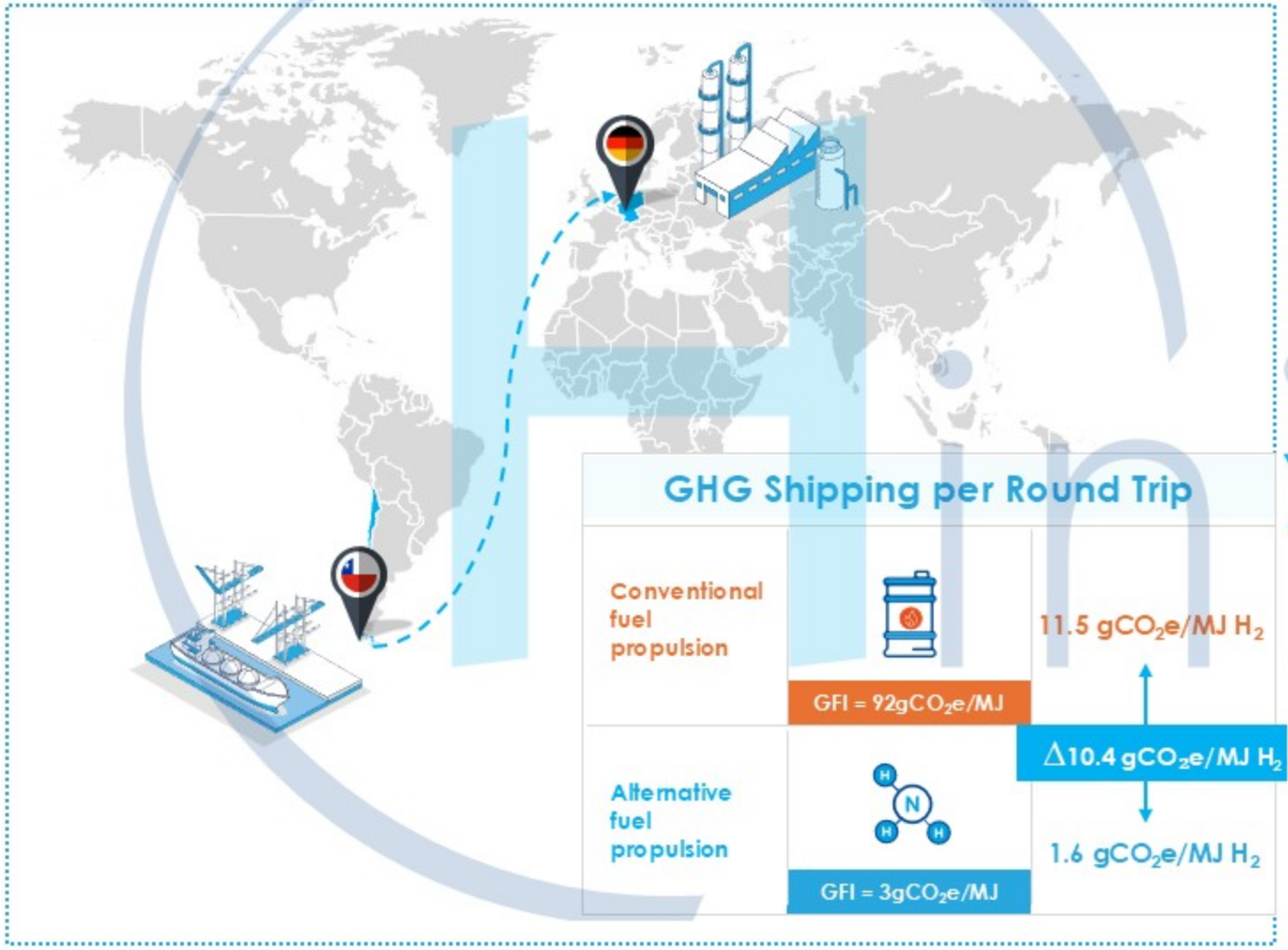
The case study assesses how maritime fuel choices impact RED compliance, emissions, and market value for green ammonia exports from LATAM to Europe



KEY ASSUMPTIONS

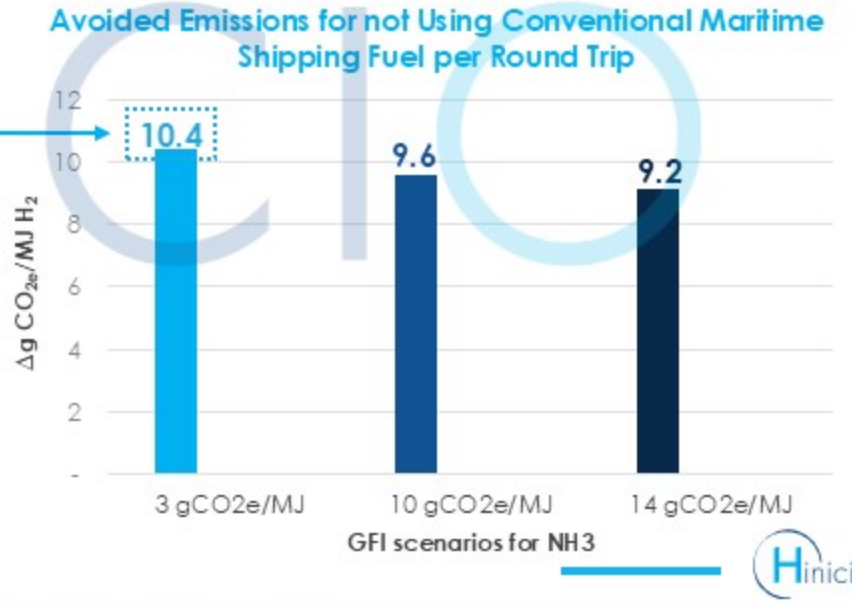
- **Origin and destination:**
  Export route from Cabo Negro to Hamburg, ~7,700 nautical miles
- **Commodity and configuration:**
  Shipment of ~32,100 t of green ammonia aboard a 46,000 m³ chemical tanker (Medium Range - MR)
- **Vessel fuel scenarios:**
  - Conventional: IFO with auxiliary engine on MGO
  - Alternative: NH_3 with 10% fuel oil pilot (main engine - ME), auxiliary engine remains on MGO
- **Technical assumptions:**
  - Speed: 15 knots → 24 days per voyage
  - Cracking efficiency in Europe: 75% → ~4,050 t of green hydrogen delivered
  - Well-to-Wake GHG emissions
  - GFI scenarios for NH_3: 3, 10, 14, and 28 gCO_2e/MJ.
- **Policy context:**
  - RED threshold for RFNBO eligibility: 28.2 gCO_{2e}/MJ
  - Monetization of avoided emissions based on Germany's GHG quota prices: 100–500 EUR/tCO_2e

Alternative pathways exist for exporting green molecules from any region to their destination markets. In a LATAM to EU export scenario, using RFNBO-certified NH_3 as propulsion fuel can lower the GHG intensity by up to 10 gCO_2 per MJ of H_2



KEY INSIGHTS

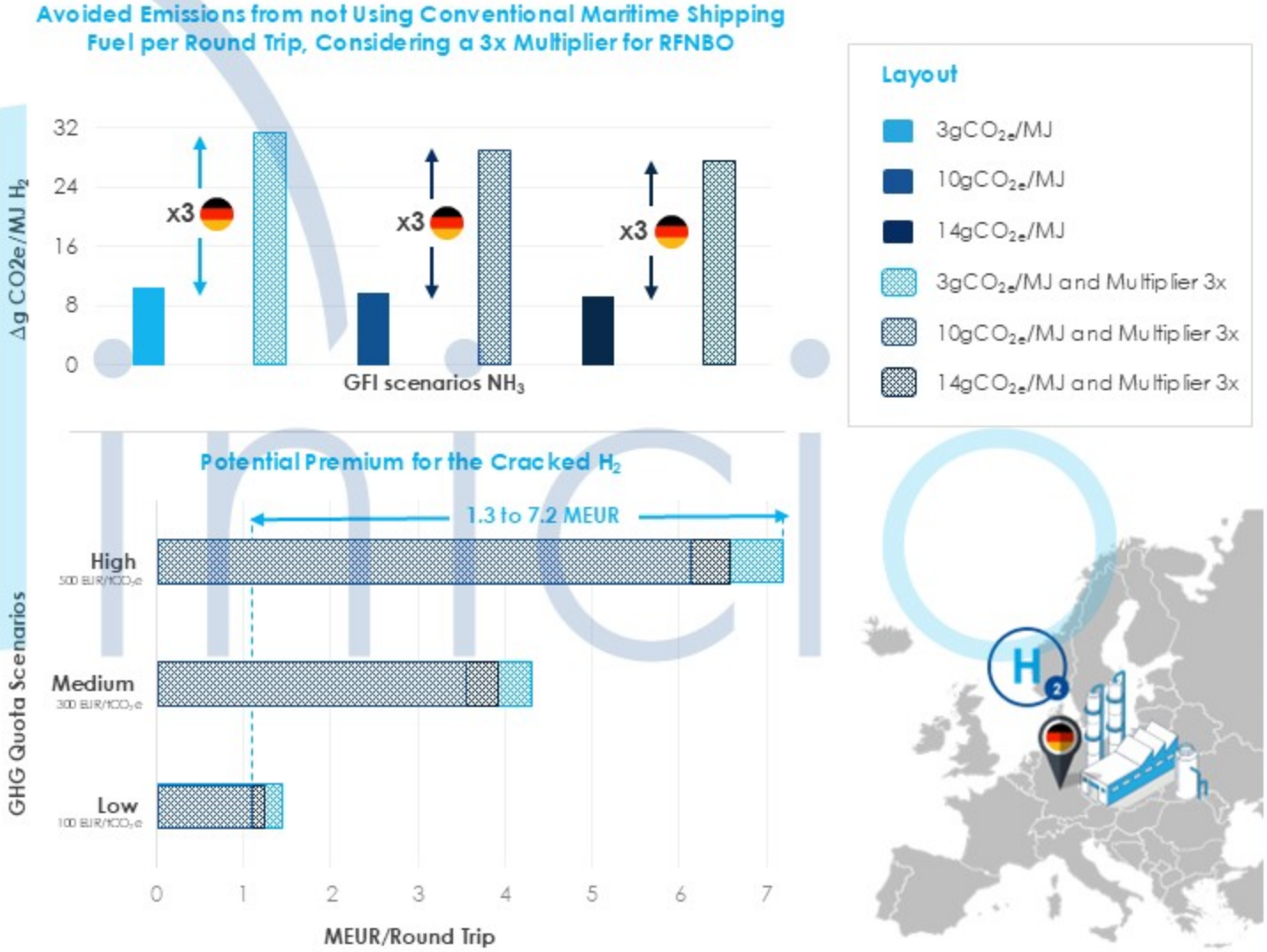
- Using conventional fuel to propel the ships within the trip, the molecule coming into **EU would receive an up to additional ~ 10 $gCO_2e/MJ\ H_2$**
- Even among alternative fuels, the **well-to-wake greenhouse fuel intensity** influences the additional emissions associated with the final molecule, H_2

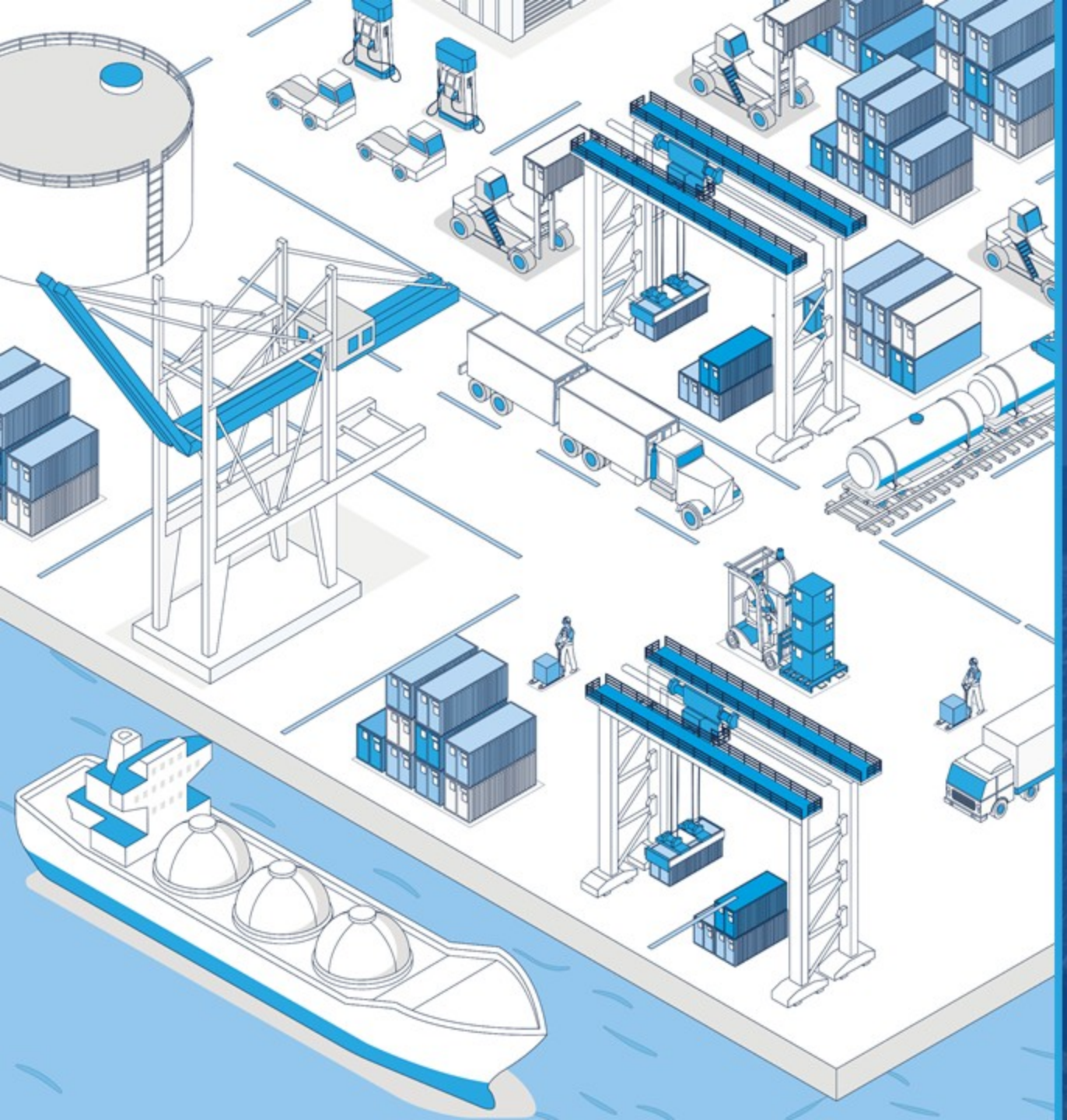


National transposition of the RED can support the adoption of RFNBO fuels across various sectors by applying multipliers and setting sufficient carbon prices

REGULATION INSIGHTS

- Decarbonization markets in the EU such as the **German** offer **multipliers for RFNBOs** when they comply with the energy targets (**x3**).
- Emissions avoided on the round trips transporting the equivalent of **4 kt of H_2** to the EU would range from **4.2 to 4.8 $ktCO_2e$** using ammonia with a GFI ranging from **3 to 14gCO_2e/MJ H_2**
- Considering the German multiplier as well as a **GHG Quota** ranging from **100 EUR/tCO_2e to 500 EUR/tCO_2e**. This could mean that a ~4 kt of H_2 payload going into the EU would receive an additional **1.3 to 7.2 MEUR** depending on the parameters.
- Although there is a sensibility that depends on the GFI of the fuel used for maritime transport, the **highest sensibility** is achieved on the price of the **GHG Quota** on the destination market.



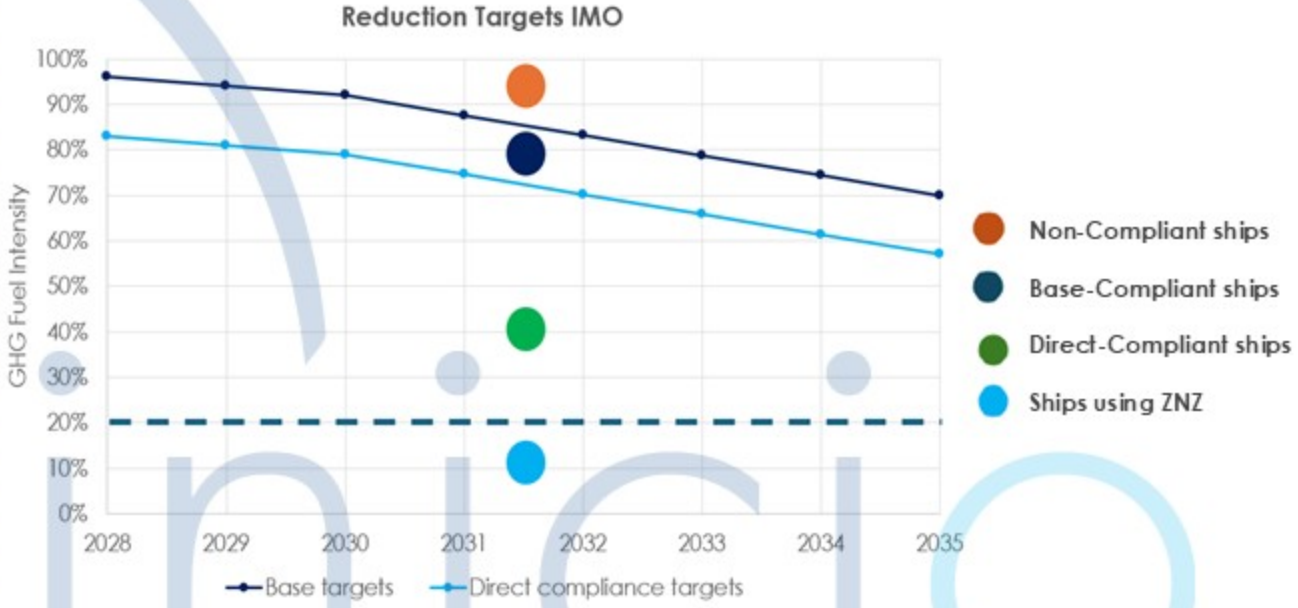


What would be the additional shipping cost implications?

In April 2025, the IMO MEPC 83 approved the Net Zero Framework which is expected to be adopted October 2025 and will represent a new tradable GHG compliance market in ship of 5000 GT or above.

KEY INSIGHTS

- **GHG reduction goals are driven by cutting GHG Fuel Intensity (GFI)** on a Well-to-Wake (WtW) basis, using a **2008 reference fossil value of 93 g CO_2e/MJ** (approximately the intensity of conventional fuel oil).
- To reach net-zero by 2050, the IMO has established two annual compliance trajectories (**a Direct Compliance Target and a Base Target**) with interim benchmarks through 2035.
- These requirements apply to international shipping of 5000 GT and above vessels



Depending on the level of compliance of the ship for a determined year, there could be a **penalty** for being in the **orange zone** (380 USD/tCO_2e), **dark blue zone** (Remedial Units = 100 USD/tCO_2e) or **incentives** for the **light blue zone**. **Surplus Units (SU)** can be generated in the **green zone**.

The draft was approved in April 2025, it is expected to be adopted in October 2025, with an entry into force for 2027 and first report in 2028.

The IMO's new framework features three key components that redefine the economics and compliance of international shipping: GHG Fuel Intensity (GFI) Targets, Market-based measures, and a Reward Zone Mechanism.

Two-Tier GHG Fuel Intensity Targets: Starting in 2027, all ships will be required to progressively reduce their greenhouse gas fuel intensity (GFI) on a well-to-wake basis.

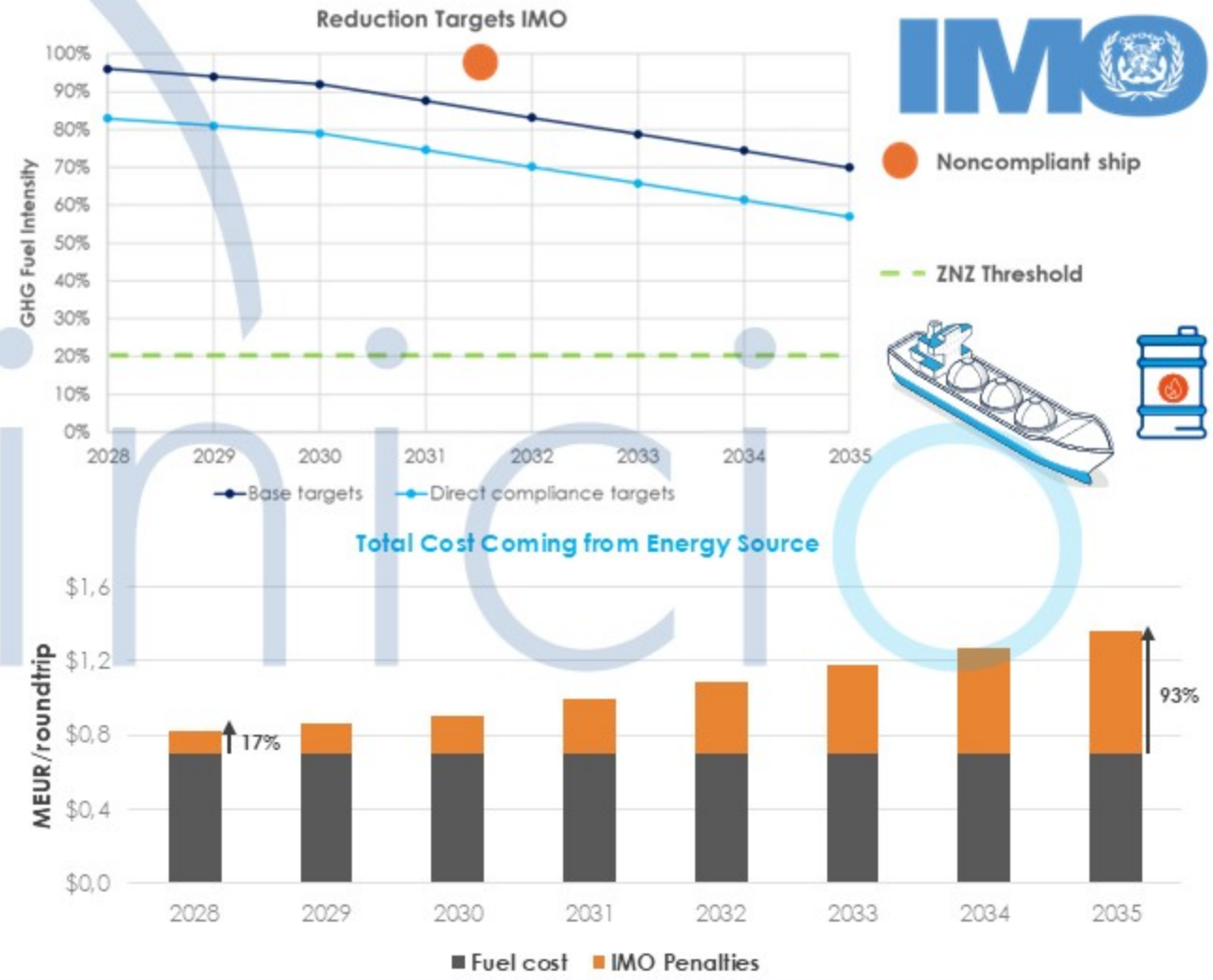
IMO Net Zero Fund: financial mechanism to **support the Zero or Near Zero Emission (ZNZ) fuels uptake.** Revenues collected from non-compliant ships (RU purchase)

Rewarding Zone: Green Fuels such as **e-methanol**, **e-ammonia**, and in some cases **B100**, that are **below 19 gCO_{2e}/MJ will** receive incentives that will be defined in October 2025.

The IMO Net Zero Framework could nearly double fossil fuel costs by 2035 by roundtrip and IFO GFI falls in the Non-compliant zone.

FOSSIL FUEL TRANSPORT INSIGHTS

- In Apr/2025 the IMO approved a draft regulation on decarbonization. As of 2028 it will impose penalties on ships exceeding **5000 GT on international routes** that rely on **conventional fuels and fail to meet the decarbonization targets.**
- Penalties for ships using conventional fuels (such as HFO or IFO) would come from failing to meet the **base targets** (100 USD/tCO_2e) and the **direct compliance targets** (380 USD/tCO_2e).
- The estimated consumption for a **roundtrip** in the **specified route (CL-DE)**, would yield around **~1.550 t of conventional fuel** for the main engine with an estimated cost of **0.7 MEUR**.
- The **penalties** would add around **120 kEUR** in the first year (2028) to around **650 kEUR** for 2035, **almost doubling the fuel costs per roundtrip**.

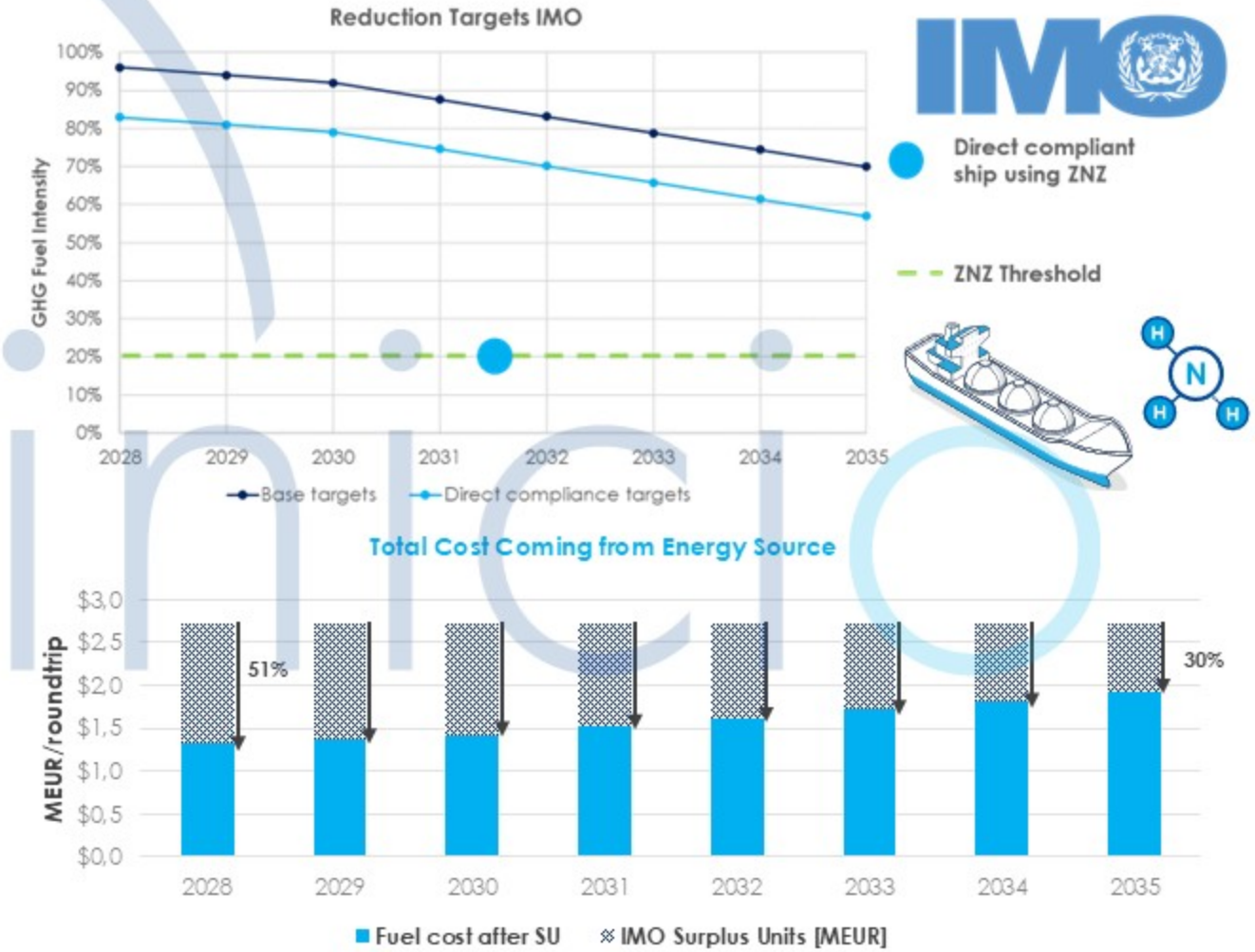


The use of green ammonia as a ZNZ maritime fuels generate surplus units (SU) which can lower fuel costs. Also, it qualifies for direct incentives, creating additional revenues streams.

ALTERNATIVE FUEL TRANSPORT INSIGHTS

GFI = 3gCO_{2e}/MJ

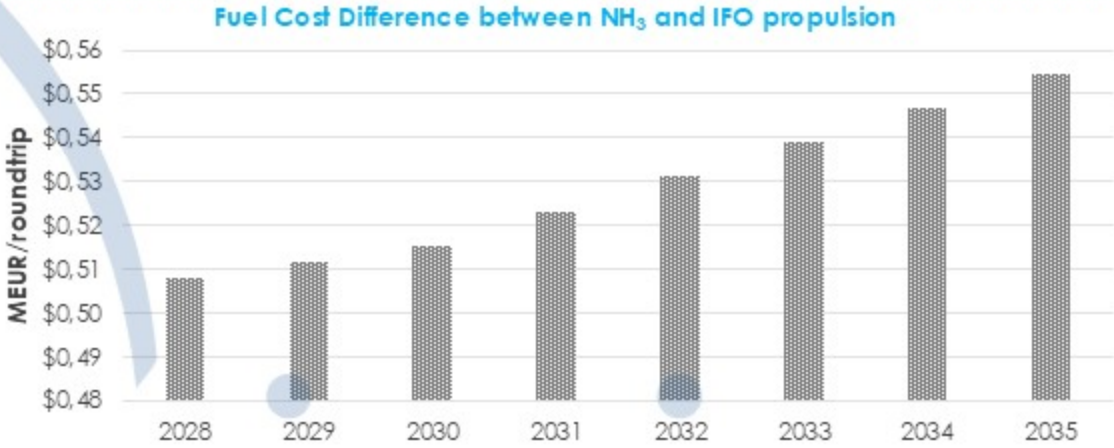
- The same approved draft also allow for direct compliant ships to **sell Surplus Units** to ships that **fail to meet the decarbonization base targets.**
- The sale of **surplus units (SU)** reduces fuel costs associated with **zero or near-zero fuel (ZNZ) fuels**. If the same **RFNBO NH_3 exported in the case (with NH_3 GFI=3 gCO_{2e}/MJ)** is used in the main engine (ME) and pilot fuel is included, its cost could fall by as much as **~50% in the initial years.**
- As decarbonization targets become more stringent by 2035, expected revenues from selling surplus units will decline. The IMO has also stated that **ships using zero and near zero fuels may qualify for incentives**, although specifics are not yet clear.

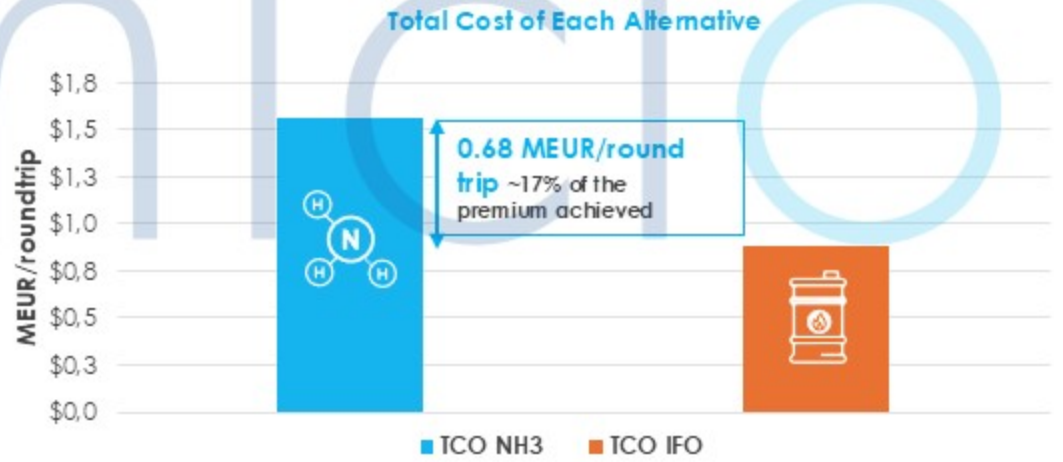


Although RFNBO ammonia may cost more than conventional fuels, the cargo premium could cover this extra "clean logistics" expense, which accounts ~17% of the extra revenue for this case (NH_3 GFI = 3 gCO_{2e}/MJ)

REGULATION + MARITIME TRANSPORT INSIGHTS

- Although conventional fuel costs in international shipping are projected to increase, the total cost of ownership (2028-2035) for alternative propulsion systems remains higher, **at approximately 680 kEUR per roundtrip***
- The economic gap in the total cost of ownership (including the retrofit cost for operating with NH_3) **could be covered by cargo premium (~4MEUR for NH_3 GFI = 3gCO_2/MJ).**
- The **RED II and their national transpositions**, such as the German case, encourage the **adoption of ZNZ fuels for "clean logistics" and import RFNBO NH_3.** In this case, the logistic cost gap accounts for around **17% of the premium achieved for NH_3 with GFI of 3gCO_{2e}/MJ**. This outlook may improve once the **IMO Reward Zone incentives** are defined in Q4 2025.





(*) Assumed 6 roundtrip per year.

Aligning export corridors for high-compliance markets with the IMO's Net Zero Framework becomes a strategic lever, creating a business landscape to bring together producers, ports, off-takers, and shipowners — and build real first-mover advantage.

Decarbonizing shipping enables premium markets.

Clean maritime transport enhances the RFNBO profile of hydrogen derivatives, unlocking higher premiums in high-compliance markets like Germany.

Regulatory alignment creates economic advantage.

RED III, Germany's GHG quota system, and the IMO Net Zero Framework jointly support a viable, incentive-driven business case for clean exports.

Significant emissions savings with economic value.

With ~5,000 tCO_2e avoided per roundtrip; up to €7M in market premium + €2M in surplus units under IMO compliance mechanisms.

This type of green corridors are becoming economically attractive while reducing CO_{2e} at both: end-use application and in the shipping sector .

Despite higher fuel costs, clean shipping generates net positive value — especially under tightening GHG rules and fuel penalties.

A unique moment to build a new export industry.

While some regulations are still being finalized, the current policy and market signals are strong enough to kick-start investment, collaboration, and project development.

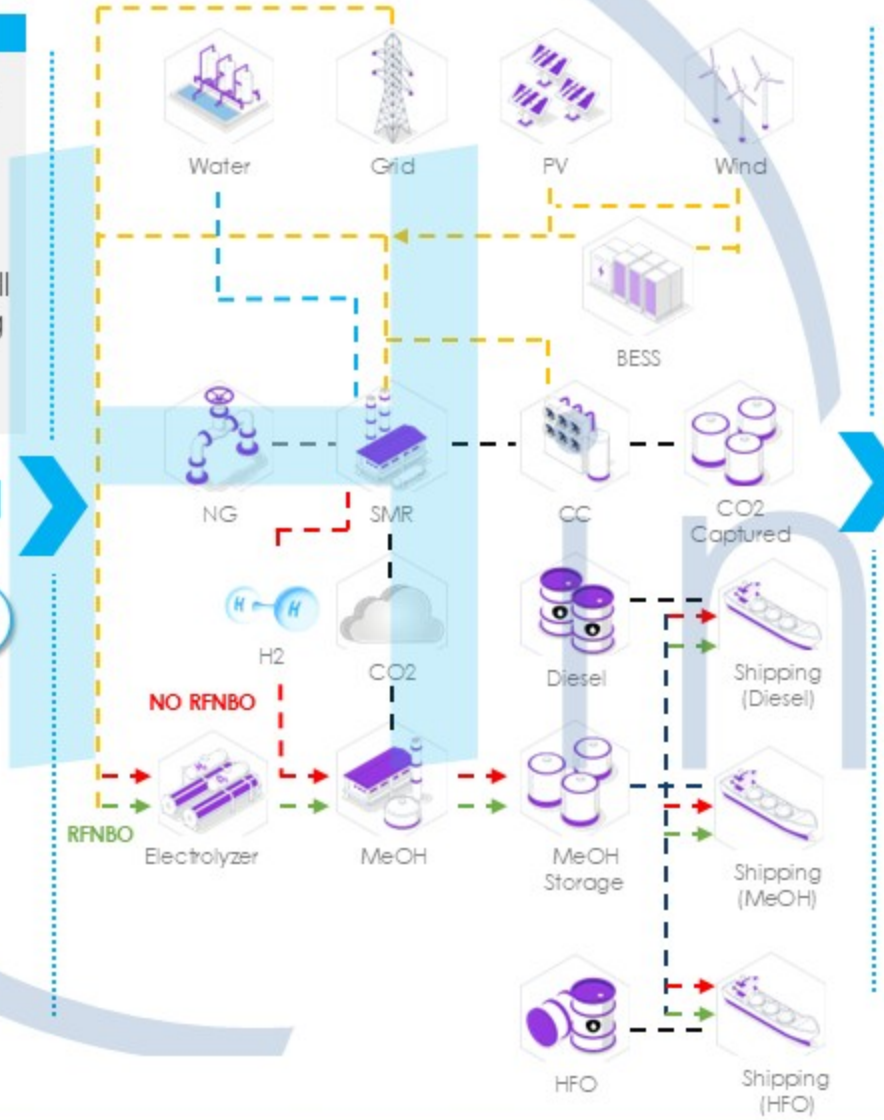
Optimize your business case considering regulatory, market and technical constrains all at once

ANDREA

Problem Statement

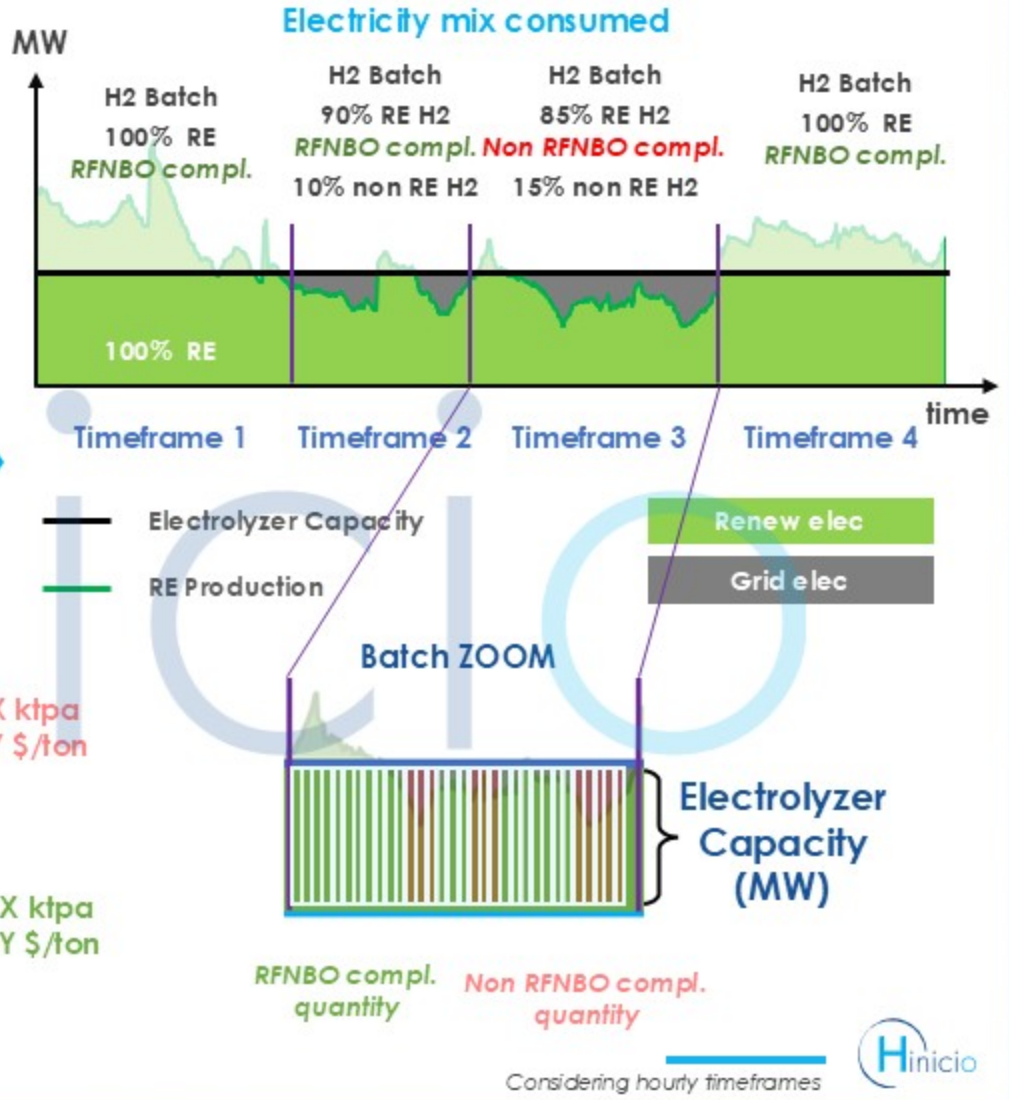
How can a brownfield Hydrogen and Methanol plant be retrofitted for export, incorporating a hybrid off-grid and on grid configuration that maximizes the production of REDII compliant Hydrogen while taking into account different fuel options for shipping?

Hinicio's Approach



X ktpa
Y $/ton

X ktpa
Y $/ton



ANDREA
by Hinicio

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[1]Limited spots available

DISCUSSION PANEL

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EDF power solutions is launching a request for interest (RFI) on a global commercialization approach of e-molecules towards industrial companies and off-takers internationally

EDF power solutions (ex-EDF Renewables) aims to develop a one-stop-shop to simplify and to de-risk supply of low carbon H2/NH3 notably, leaning on its global production.

As a leader of decarbonized electricity production, EDF power solutions is co-developing a portfolio of e-molecule projects – notably export large-scale projects in Oman, Canada, Chile and Egypt – and expects to ramp-up produced molecules volumes in early 2030.

Therefore, through this RFI, EDF power solutions goal is to deep-dive the customers' needs and test a tailor-made portfolio approach to accompany their decarbonization path thanks to our expertise in low-carbon hydrogen & derivatives production.

https://edf-renouvelables.com/rfi-hydrogene/

Dedicated contact : **Marie Foucault**, Head of H2 Market & Partnership Department **marie.foucault@edf-re.fr**

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THE RENEWABLE ENERGY DIRECTIVE:

The Overlooked Driver of Green Shipping Corridors under the new IMO Net Zero Framework

WANT TO ACCESS THE WEBINAR PRESENTATION?

Join Hinicio's experts to discover how European regulations and the maritime sector can convert compliance requirements into strategic business advantages.
We will explore this framework not only as a route to regulatory compliance but also as a catalyst for accelerating the uptake of zero and near-zero emission fuels across the offtake of RFNBO-compliant fuels.

Scan the QR code to download