

DECARBONISING VIETNAM'S STEEL INDUSTRY: CHALLENGES AND OPPORTUNITIES FOR A LOW-CARBON INDUSTRIAL FUTURE

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INTRODUCTION

Vietnam's steel industry has emerged as a key pillar of the country's industrialisation and economic growth, supporting major infrastructure, urban development and construction initiatives. As one of Southeast Asia's fastest-growing economies, Vietnam has seen its steel demand soar, driven by rapid urbanisation, government-led infrastructure spending and an expanding real estate market. However, the sector now faces complex challenges—ranging from overcapacity and reliance on imported raw materials to increasing exposure from international trade pressures and environmental regulation.

Historically shaped by state-led industrial strategies, Vietnam's steel sector has evolved through targeted investments and policy direction. While the industry has alleviated dependency on scrap imports, much of the industry is now tied to emissions-intensive blast furnace-basic oxygen furnace (BF-BOF) production. With the EU's Carbon Border Adjustment Mechanism (CBAM) and Vietnam's pilot Emissions Trading Scheme (ETS) on the horizon, the sector must now urgently confront the dual challenge of remaining globally competitive while aligning with national decarbonisation targets.

This report assesses the current state of Vietnam's steel industry and identifies key opportunities for low-carbon transformation. It explores the integration of green steel pathways with national strategies, such as the Draft Steel Industry Development Strategy and ongoing infrastructure master plans. By addressing structural inefficiencies, upgrading outdated technologies, and leveraging trade-driven decarbonisation incentives, Vietnam's steel sector could reposition itself for long-term sustainability in low-carbon industrial development.

OVERVIEW OF THE STEEL SECTOR

Vietnam's per capita steel consumption stands at around 240 kg, higher than the global average of 214 kg, and higher than the regional Southeast Asia average of 110 kg.^{1,2} By 2030, Vietnam's per capita steel consumption is set to increase to 290kg.³ The construction sector is the primary consumer of Vietnam's steel industry, making up more than 93% of total steel demand. This high demand is largely due to Vietnam's extensive infrastructure development and booming real estate market, which have become key components of Vietnam's strategy for economic growth.

1 <https://worldsteel.org/wp-content/uploads/World-Steel-in-Figures-2025-3.pdf>

2 https://wtocenter.vn/file/19046/02_steelvietnam-steel-industry-overview-and-trends_vsa14.04.2023.pdf

3 <https://www.metal.com/en/newscontent/103238138>

BACKGROUND AND GROWTH

The Vietnamese steel sector has experienced significant growth over the past two decades, evolving into one of the country's key industries. Initially limited in capacity and technology, the sector has received substantial investments and government initiatives aimed at fostering infrastructure development. In particular, the master plan for the development of Vietnam's steel industry (2007–2015), aligned the industry with national socio-economic and industrial goals.⁴ This policy focused on the domestic production of pig iron, ingot steel, and finished steel products, signifying a move away from imported scrap steel. Central to the policy was the utilisation of domestic iron ore. However, this approach has been less successful, as domestic ore has consistently been outcompeted on price by foreign alternatives, particularly Australian products. As Vietnam's economy expanded, the demand for steel has grown significantly, driven by rapid urbanisation and a booming construction industry.

STEEL PRODUCTION, TRADE AND CONSUMPTION

Vietnam's crude steel production reached 22 million tonnes and total finished steel production reached 30 million tonnes in 2024, representing a 7% increase compared to the previous year, according to the Ministry of Industry and Trade (MoIT). Despite anticipated recovery in the sector, the domestic steel market faces significant challenges, including oversupply, rising imports and global market instability. Steel exports in 2023 totalled nearly 4.9 million tonnes, marking a 6.8% increase. Cold-rolled coil (CRC) saw the highest growth at 40.6%, followed by coated and colour-coated steel, in addition to construction steel. However, exports of steel pipes and hot-rolled coil (HRC) declined by 1.2% and 0.8%, respectively. The structure of raw materials for production includes 42% from scrap steel (mainly imported) and 58% from iron ore. HRC steel capacity stands at 8 million tonnes per annum, while domestic demand is at 10 million tonnes.⁵

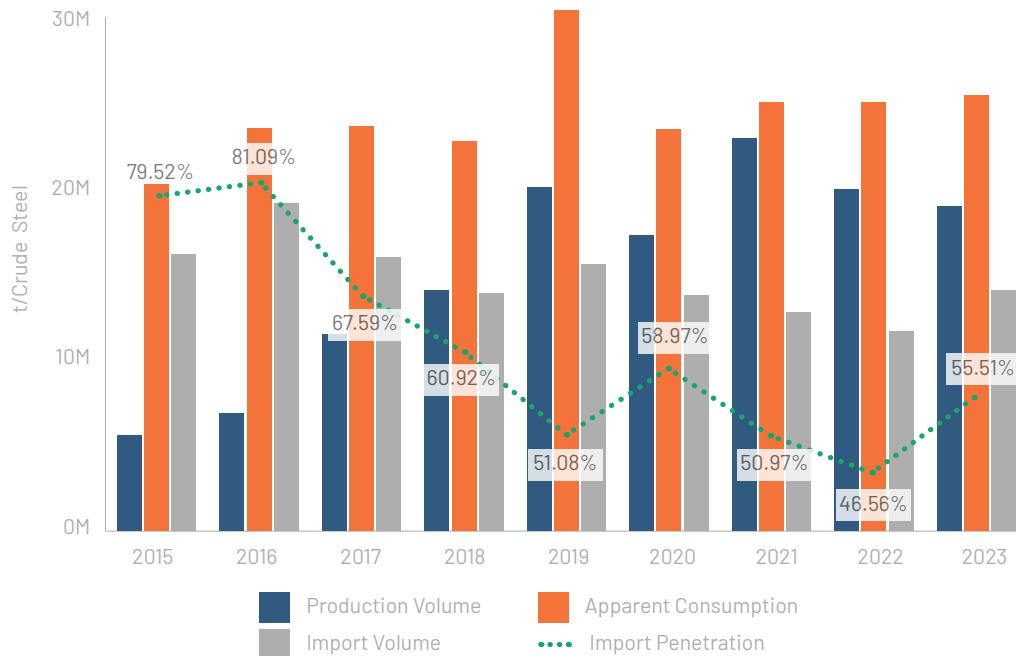
In 2023, the country imported approximately 14.1 million metric tonnes of steel—a 20% increase from the previous year—sourced from 24 countries. A substantial share of these imports consisted of flat steel products, particularly hot-rolled coil and coated steel, which are essential for Vietnam's construction, manufacturing and export-oriented sectors.⁶ Major trading partners include China, accounting for nearly 10 million of the 14.1 million tonnes in 2023, South Korea and Japan. Despite notable domestic production capacity for the region, Vietnam continues to rely heavily on imports to meet demand for higher-grade or specialised steel products, highlighting persistent gaps in its industrial capabilities.

⁴ <https://vbpl.vn/TW/Pages/vbpqen-toanyan.aspx?ItemID=3341>

⁵ <https://www.vnsteel.vn/en/general-news/viet-nam-targets-developing-green-steel-products-77.html>

⁶ <https://www.trade.gov/data-visualization/vietnam-steel-imports-report>

Figure 1. Crude Steel Production and Import Penetration of Steel in Vietnam



Source: [International Trade Administration](#)

Many Vietnamese downstream steel producers, some of which are affiliated with Chinese companies, depend on imported steel inputs from China.⁷ In 2023, Vietnam imported 9.249 million tonnes of Chinese steel products worth \$6.08 billion USD, marking a 69.5% increase from 2022.^{8 9 10} The sudden surge made Vietnam the top destination of Chinese steel exports for the first time. Despite imposing anti-dumping duties on galvanised steel from China and South Korea in 2025, Chinese steel imports continue to enter the Vietnamese market at below-market prices, harming local market competitiveness.¹¹

ROLE OF THE STEEL INDUSTRY IN NATIONAL INDUSTRIAL STRATEGIES

As of 2022, 37.4 million people, or 37.55% of Vietnam's total population, lived in urban areas.¹² Despite recent growth, Vietnam still lags behind other ASEAN nations, such as Thailand, Malaysia, Indonesia and the Philippines, in terms of urban population percentage. By the end of 2025, urbanisation is expected to reach 45%, and is forecasted to increase to 50% by 2030.¹³

7 China has historically been taking advantage of Vietnamese steel producers to evade American duties and transshipped Chinese products to the US.

8 Vietnam imported a total of [13.3 million tonnes worth 10.4 billion USD](#) in 2023. Chinese steel products accounted for 69.5% of total imports and 58.5% of total value.

9 <https://www.seaisi.org/details/24233?type=news-rooms#:~:text=In%202023%2C%20Vietnam%20surpassed%20South,by%202%25%20year%20on%20year>

10 <https://www.fdiintelligence.com/content/data-trends/chinas-steel-overcapacity-foments-dumping-concerns-83748>

11 <https://www.reuters.com/markets/commodities/vietnam-impose-temporary-anti-dumping-tariffs-galvanised-steel-china-south-korea-2025-04-04/>

12 <https://vietnam.opendevelopmentmekong.net/topics/urbanization-in-vietnam/#:~:text=Urbanization%20levels,other%20neighboring%20countries%20in%20Asia>

13 <https://en.vietnamplus.vn/urbanisation-rate-to-reach-at-least-45-by-2025-post243936.vnp>

Urbanisation strategies include the expansion of existing metropolitan cities, the creation of new urban centres and the development of smart cities. The construction required to support these initiatives—ranging from residential buildings to commercial spaces, transportation networks and facilities, and utilities—will significantly boost steel consumption.

GOVERNMENT POLICIES AND STRATEGY

Vietnam is poised to strengthen its steel industry through a newly drafted strategy aimed at developing “green” and “energy-saving” steel products while increasing the market share of domestically produced steel to reduce reliance on imports. Developed by MoIT, the Steel Industry Development Strategy is set to outline plans for the industry’s growth through 2030, with a vision extending to 2050. The strategy will likely highlight the need for state agencies to create supportive policies and mechanisms that align business development with advancements in production technology and raw material sourcing. Additionally, the strategy will aim to address current limitations in technology and production capacity, focusing on the establishment of new large-scale steel complexes that can produce a diverse range of high-quality steel products, particularly for the processing and manufacturing sectors.

The draft strategy highlights the necessity for significant investment in modernising the steel industry, which currently relies heavily on outdated technologies and small-scale operations. By 2030, the domestic market is projected to require substantial steel supplies, particularly high-quality fabricated and alloy steel, to meet the forecasted demands of Vietnam’s manufacturing sector. Other major policies include the Infrastructure Master Plan and the Public Private Partnership Law.

SECTORS OF IMPORTANCE

REAL ESTATE

The real estate sector is the largest consumer of steel in Vietnam, with construction steel accounting for most domestic steel demand. Notably, civil construction steel constitutes 66% of total construction steel demand. After experiencing a “freeze” in 2022, the Vietnamese real estate market started to recover in late 2023, with the commercial residential segment leading the rebound.¹⁴ The recovery has been marked by strong buyer interest, with over 65% of newly available residential units taken up and around 30% of total listings successfully sold.¹⁵ This resurgence is expected to continue, with increasing investments in residential, commercial and industrial real estate. Additionally, since urbanisation has concentrated in Ha Noi and Ho Chi Minh City, the two economic centres have also seen an influx of domestic migration, putting high pressure on housing and other public services. As developers push forward with new projects to meet the ever-growing demand, steel consumption will rise correspondingly, especially in Ha Noi, Ho Chi Minh City and other emerging urban centres.

INFRASTRUCTURE

Civil construction steel constitutes 66% of total construction steel demand. Vietnam’s focus on expanding its transportation infrastructure has significantly contributed to the steel industry’s

¹⁴ The freeze was caused by a combination of government clampdown on questionable practices, developer defaults and legal complications.

¹⁵ <https://vjr.com.vn/domestic-steel-demand-expected-to-rebound-amid-warming-real-estate-market-110346.html#:~:text=According%20to%20the%20Vietnam%20Steel,of%20the%20steel%20industry's%20recovery>

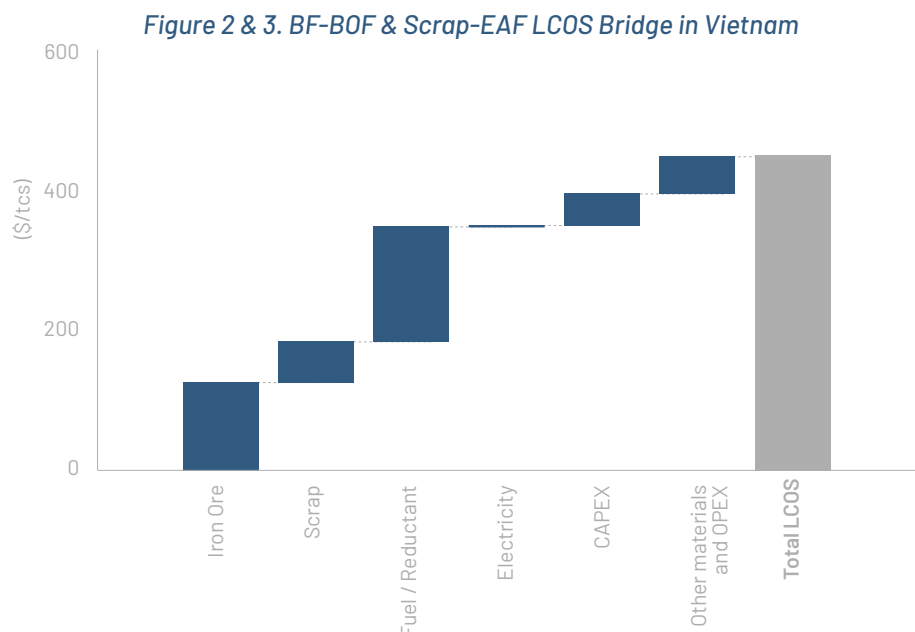
boom. In 2022, infrastructure spending accounted for 6% of Vietnam's GDP—a substantial increase from the 2.6% in 2016.¹⁶ This level of investment positioned Vietnam as the leading country in ASEAN for infrastructure spending and the second highest in Asia, following China (68% of GDP).¹⁷ The Vietnam Steel Association predicts that steel demand will increase by 8% in 2025 from 2024 due to the accelerated disbursement of public investment capital into transport infrastructure.¹⁸

AUTOMOTIVE

While other ASEAN countries have more established automotive manufacturing hubs, Vietnam is comparatively underdeveloped. The sector does not consume a significant proportion of steel in the country, but the sector's expected double digit growth toward the end of the decade could change this. A draft strategy for the automotive sector is currently under review by MoIT. This draft strategy currently includes ambitious production targets as well as targets for the domestic production of components and spare parts. The sector is largely made up of overseas brands; however the fast growing local brand VinFast is now the most popular brand in the country.

GREEN STEEL ECONOMICS

Understanding the economic feasibility of low-carbon steel production is crucial for informed decision-making. Detailed below is a techno-economic analysis comparing the costs associated with different steel production methods. This assessment evaluates the financial implications of green scrap-EAF, green H₂-HBI-EAF and green H₂-DRI-EAF processes relative to the traditional BF-BOF route.¹⁹

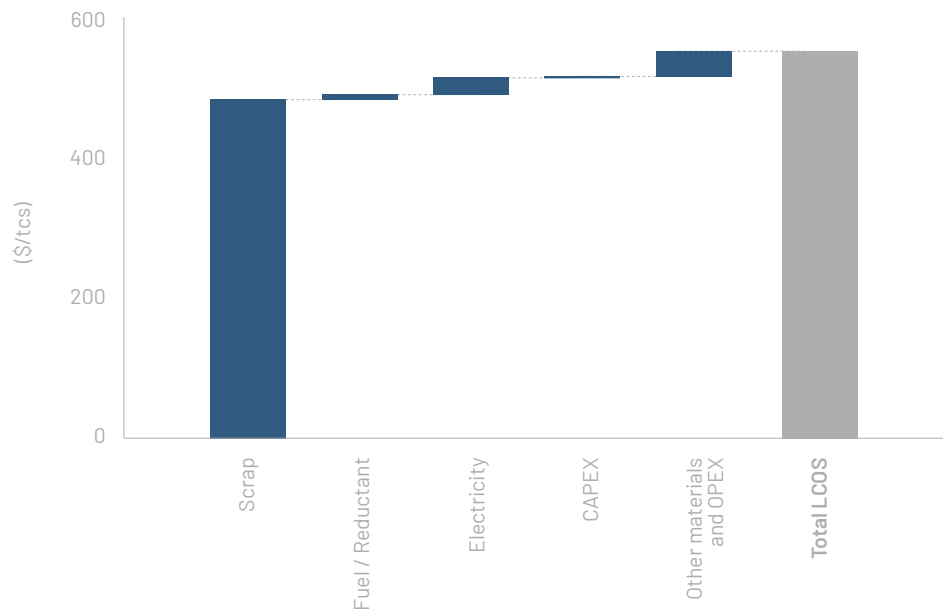


¹⁶ <https://www.vietnam-briefing.com/news/why-vietnams-infrastructure-crucial-for-economic-growth.html/#:~:text=Vietnam%20current-ly%20spends%206%20percent,in%20ASEAN%20for%20infrastructure%20investment>

¹⁷ <https://www.sourceofasia.com/vietnam-ambitious-plan-for-transportation-infrastructure-improvement/#:~:text=The%20country's%20public%20and%20private,and%2087th%20in%20utility%20infrastructure>

¹⁸ <https://asemconnectvietnam.gov.vn/default.aspx?ZID1=8&ID8=141040&ID1=2>

¹⁹ The detailed financial model considers a range of expenses including capital investments, raw materials like iron ore and H₂, fuel, labour and operational and maintenance costs, along with the costs of electricity from various sources. This model is designed to adjust for varying levels of scrap substitution, renewable electricity amongst others. The economic evaluation method applied in the study spreads the initial capital expenditures over the expected lifespan of the facility, utilising net present value (NPV) calculations to assess costs over time, bringing future costs to present value terms. It also projects annual operational costs throughout the plant's operational duration, factoring in different inflation rates for various inputs. The overall production costs are then aggregated annually over a 20-year period.

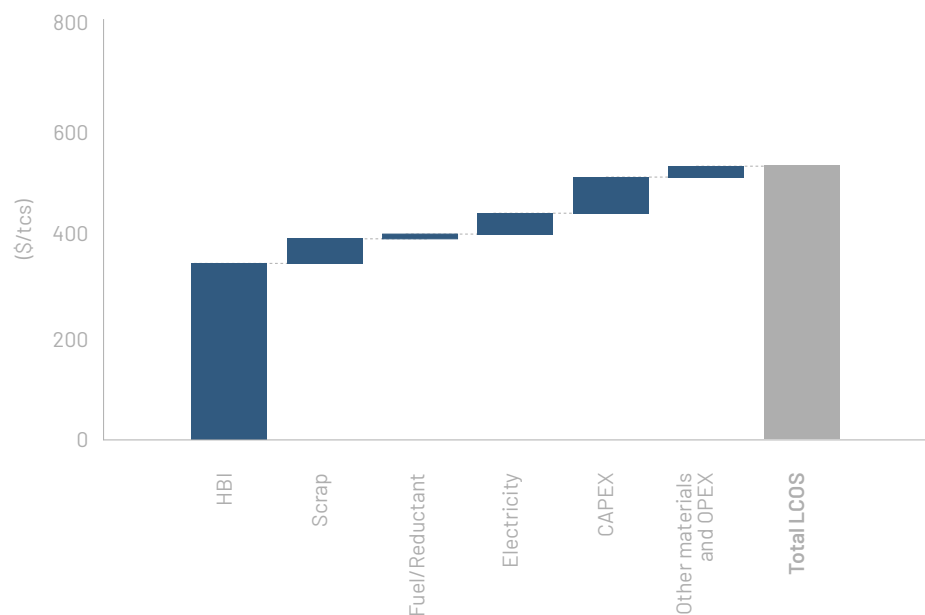


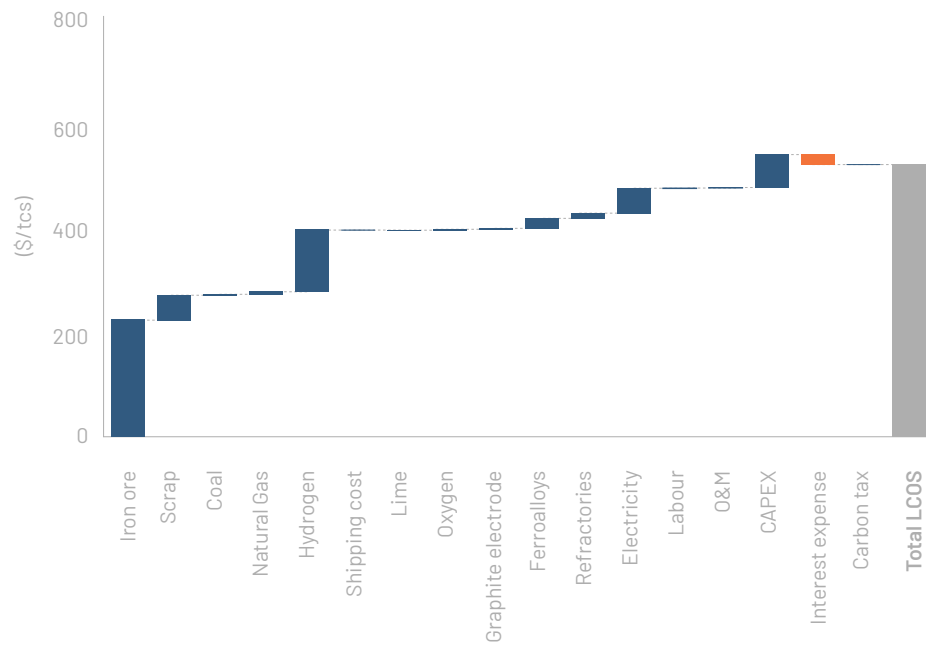
Source: TA analysis

In the BF-BOF steel production process, the cost of fuel and reductants, primarily coal and natural gas, constitutes the largest share at approximately 37% of total expenses. This is followed by expenditures on iron ore, which account for about 28% of the total cost. Other costs, including OPEX and labour, make up around 12%, while CAPEX represents only 10% of total costs. Additionally, the reliance on self-generated electricity in the BF-BOF process keeps the cost of purchased electricity relatively low, at around 0.4%.

In the 100% scrap-EAF model, the cost of scrap metal constitutes the largest share, reaching as high as 87% of total expenses. CAPEX is minimal, accounting for only 0.4% of costs. Additionally, with the complete reliance on renewable electricity (RE) the cost of electricity represents approximately 5% of the total steel making process.

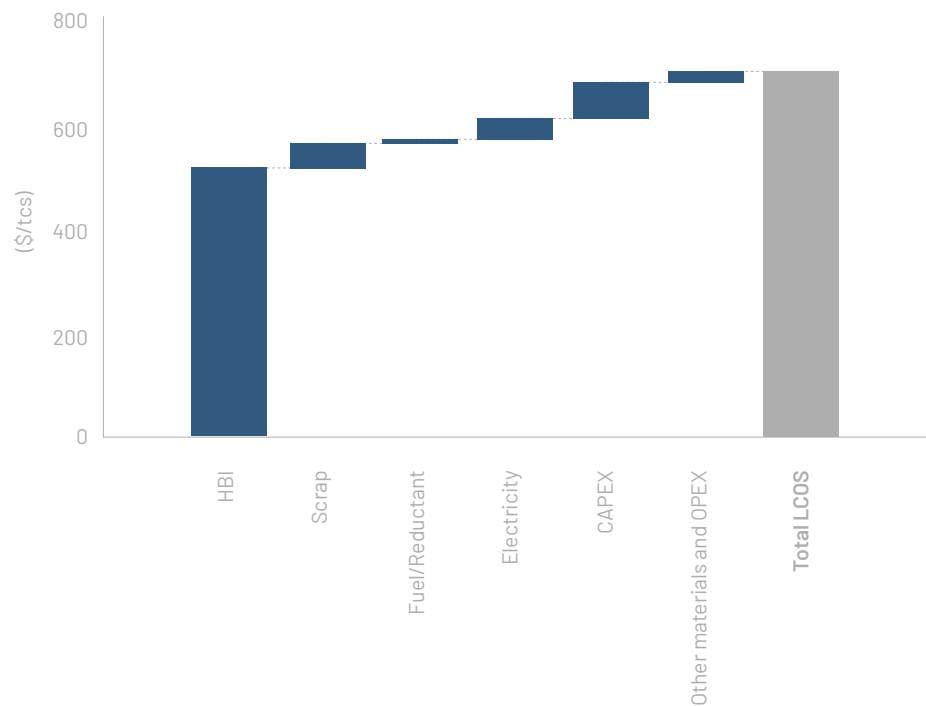
Figure 4 & 5. Low Cost Green HBI-EAF & H₂-DRI-EAFLCOS Bridge in Vietnam at \$2/kg H₂

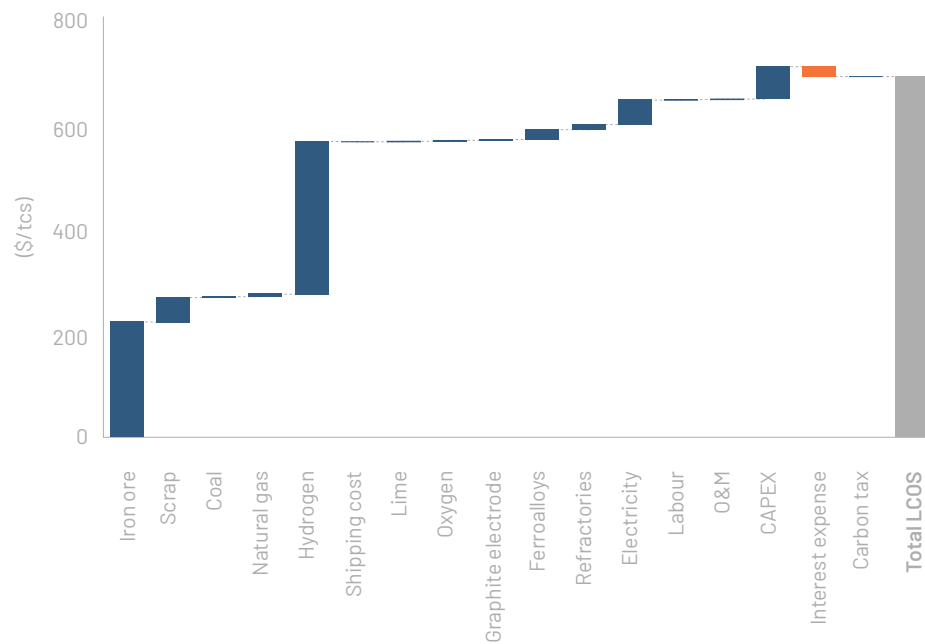




Source: TA analysis

Figure 6 & 7. High Cost Green HBI-EAF and H_2 -DRI-EAF LCOS Bridge in Vietnam at \$5/kg H_2



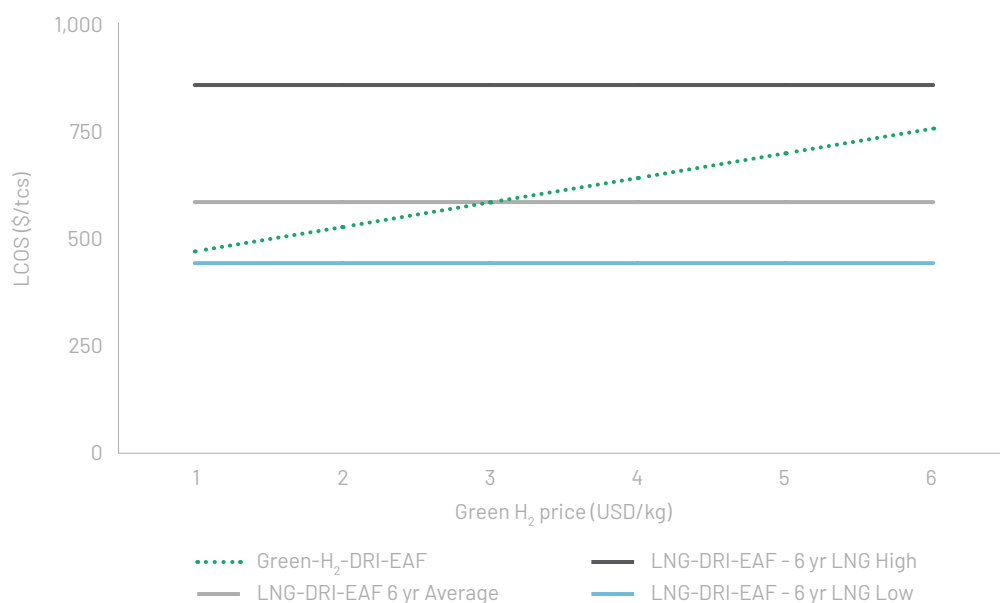


Source: TA analysis

The LCOS breakdown of green HBI-EAF is very similar to the scrap-EAF process, requiring only a marginal amount of extra electricity during the melting stage. At \$5/kg H_2 , HBI accounts for approximately 64% of total costs per tonne of steel, around \$511. At \$2/kg HBI, HBI accounts for approximately 73% of total costs per tonne of steel, around \$355.

For H_2 -DRI-EAF Vietnam, the cost of hydrogen is the dominant driver of overall production costs. As illustrated in the LCOS bridges, when hydrogen costs \$2/kg, it remains a significant component but allows H_2 -DRI to approach cost parity with other low-carbon steelmaking routes. However, at \$5/kg, hydrogen accounts for the majority of the cost increase, pushing total production costs substantially higher.

Figure 8. Green- H_2 -DRI-EAF at different cost points compared with LNG-DRI-EAF



Source: TA analysis

The range of LNG-DRI based steel varies greatly, solely driven by the high volatility of the international gas markets as modelled.²⁰ Average costs of steel using a 6-year average LNG price are approximately 590 USD. The highest costs of LNG-DRI occurred at the start of the war in Ukraine which ultimately led to an unprecedented increase in global gas prices. This, although relatively short lived, demonstrates the exposure steel makers using LNG could have to global commodity markets. To navigate the volatile and potentially damaging prices, steel makers would likely use instruments to hedge against unfavourable gas prices as are used to purchase coking coal, such as long term contracts and spot purchases.

COSTS AND KEY DRIVERS

BF-BOF steel drivers are mainly iron ore and coking coal. In Vietnam, iron ore is predominantly imported from Australia, as domestic ores are less price competitive, due to the scale at which Australia can extract. While Vietnam has the capabilities to produce coke domestically, it is primarily sourced from overseas. Despite relying heavily on imports of key inputs to their steelmaking processes, Vietnam benefits from low labour costs and efficiently leverages numerous free trade agreements, capitalising on these frameworks to maintain some of the lowest hot steel production costs in the world.

Scrap-based EAF production costs are primarily driven by the price of scrap. These prices follow a “hot metal substitution” logic: when scrap becomes cheaper than producing hot metal from iron ore, EAF steel production tends to increase. Conversely, when hot metal becomes more cost-effective, demand for scrap declines.²¹ Vietnam’s domestic steel production was once dominated by scrap-based EAF processes, but a shift toward BF-BOF production—driven by rising demand and limited scrap availability—has gradually displaced and undermined many EAF mills.

Green HBI costs are primarily driven by the costs of iron ore and RE, and the extent to which this electricity is supplied consistently throughout the day. The higher the variability in energy production, the higher the requirement of electricity storage or hydrogen storage, and relatedly, CAPEX.

Electricity prices typically account for 5-10% for EAF and HBI based steel production. In Vietnam, RE prices are cheaper than grid tariffs if using islanded energy systems as modelled. A nascent power purchase agreement (PPA) market is being developed, and should this mature, the steel industry should seek to leverage this for low-carbon steel production.

For H₂-DRI-EAF, cost pressures again ultimately arise from the electricity required for hydrogen production, especially when sourcing from RE, which may introduce further CAPEX needs for electricity generation and hydrogen storage. While iron ore and other inputs remain relevant, it is the price and consistency of green hydrogen supply that ultimately dictates the economic feasibility of the H₂-DRI-EAF route.

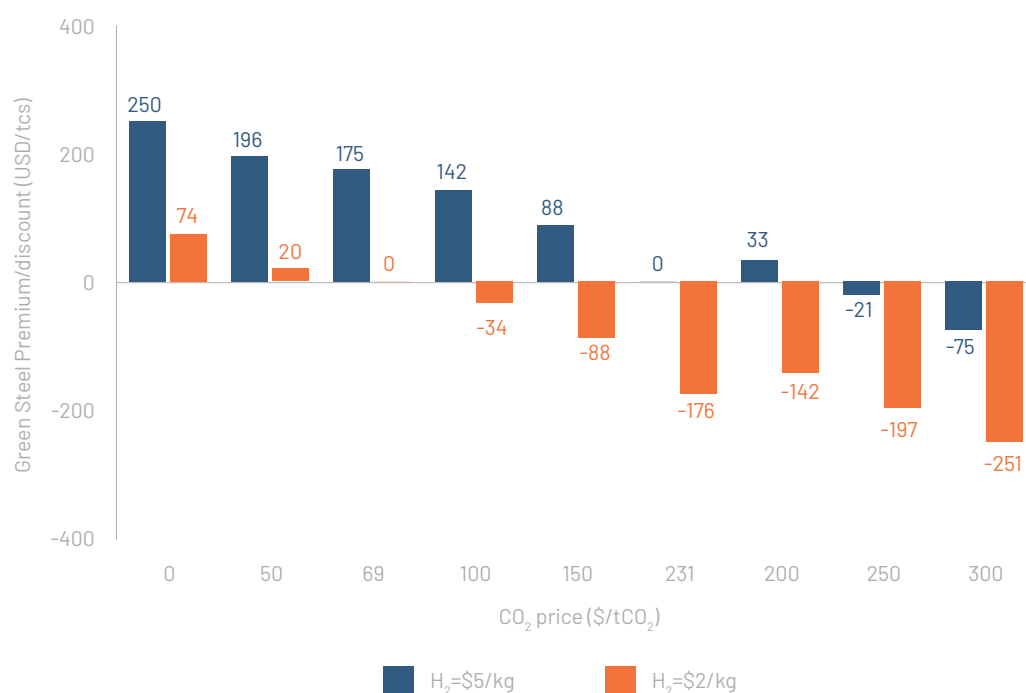
²⁰ LNG price range over the past 6 years – prices based on JKM index.

²¹ <https://transitionasia.org/wp-content/uploads/2023/08/TA-Scrap-Steel-Explainer2023-1.pdf>

SENSITIVITY TO CARBON PRICES

With the introduction of an ETS pilot scheme in August 2025, covering the iron and steel industry, carbon pricing will start to provide direct incentives for the sector to shift towards lower-carbon production methods. Whether producers will pay for every ton of CO₂ or there will be a gradual introduction is currently unknown. Additionally, substantial exposure to European markets is likely to indirectly drive the adoption of internal corporate carbon pricing, particularly when modelling new investments.

Figure 9. Sensitivity Analysis of CO₂ Prices in Vietnam:
Cost Delta of H₂-DRI-EAF Compared to BF-BOF Steel at Different Carbon Prices



Source: TA analysis

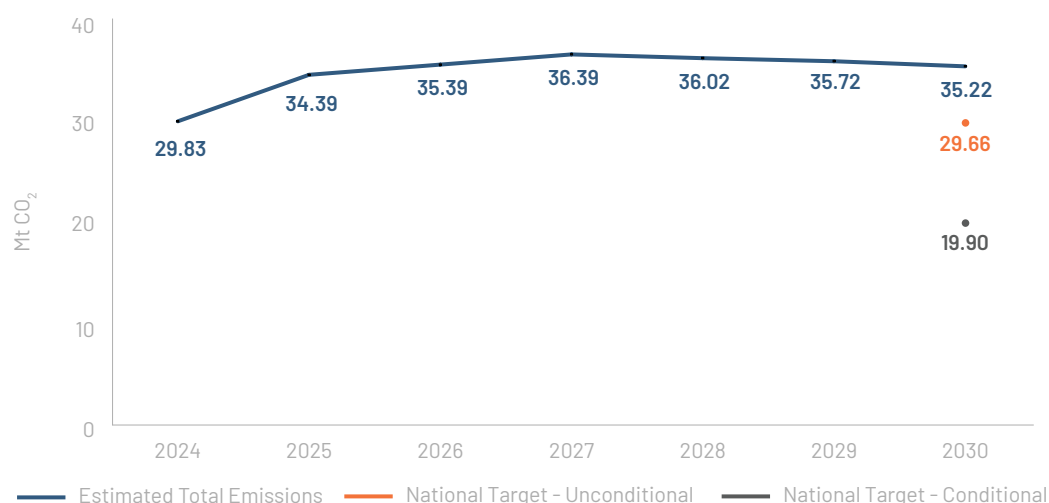
For the H₂-DRI-EAF route, cost parity with the BF-BOF pathway is achieved at a carbon price of \$69/tCO₂ when hydrogen costs \$2/kg, assuming that producers pay for every tonne of CO₂. By contrast, if hydrogen costs \$5/kg, parity is not reached until the carbon price rises to \$231/tCO₂. At \$300/tCO₂, the H₂-DRI-EAF route offers a substantial green steel discount of \$251/tcs at \$2/kg hydrogen, or \$75/tcs at \$5/kg.

CHALLENGES FOR VIETNAM'S IRON STEEL SECTOR

THE GROWING GAP BETWEEN EMISSIONS TRAJECTORY AND NATIONAL TARGETS

Vietnam Steel Association (VSA) has set a carbon neutrality target for 2030 where the sector aims to reduce national GHG emissions by 43.5% from business-as-usual levels, with the Vietnamese government targeting the limiting total industrial sector emissions to 86 million tonnes of CO₂e, peaking in 2035, with mandatory reductions for facilities emitting over 2,000 tonnes annually.²² A mid-term plan for the VSA highlights various initiatives and technologies for the sector. From 2025-2035, the plan states that it prioritises sustainable, “green growth by adopting RE, using green materials, transitioning to DRI-EAF with hydrogen readiness, limiting new blast furnace investments and engaging in carbon capture and metallurgical technology research”.

Figure 10. Steel Sector Emissions Forecasts and 2030 Targets



Source: TA analysis

Toward 2030, our forecast suggests that emissions are expected to increase, driven by the expansion of BF-BOF mills. Although a number of decarbonisation strategies are currently being promoted by the government and the VSA, none of these are likely to drive emissions down materially. Strategies largely orientate around utilisation of RE, energy efficiency and carbon capture, utilisation and storage (CCUS).

OVERCAPACITY AND MARKET CONCENTRATION

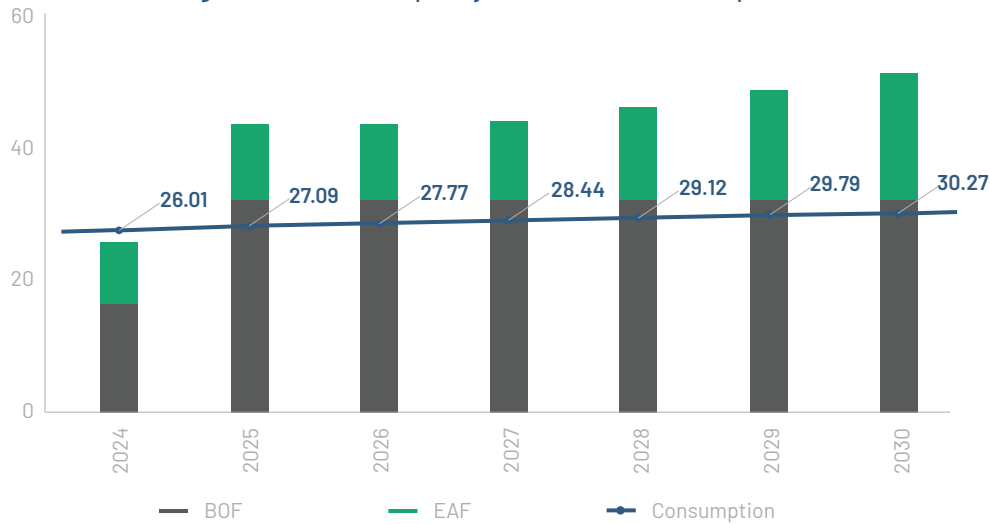
Vietnam is on paper set to have one of the most severe cases of steel overcapacity in the ASEAN region leading to heightened competition and a substantial rise in exports, which may result in trade disputes and legal repercussions, ultimately triggering trade restrictions that hurt the exporting country.²³ Reflecting current exposure to exports, Vietnam's largest steel producer, Hao Phat group, had exports accounting for 31% of its 2024 revenue.²⁴

²² <https://www.seaisi.org/details/24679?type=news-rooms>

²³ <https://www.seaisi.org/details/25196?type=news-rooms>

²⁴ <https://file.hoaphat.com.vn/hoaphat-com-vn/2025/04/hpg-annual-report-2024.pdf>

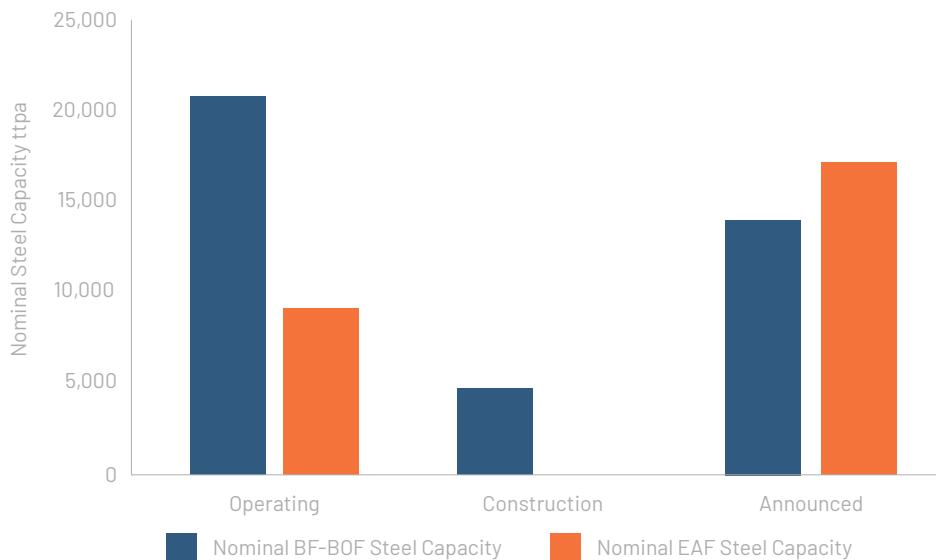
Figure 11. Vietnam Capacity and Forecast Consumption



Source: TA analysis

Vietnam's crude steelmaking capacity is dominated by two companies controlling 70% of market share, Hoa Phat and Formosa. Both companies have rapidly expanded in recent years with newly constructed projects. Hoa Phat and Formosa each operate the two steel mills in Vietnam capable of producing HRC.^{25 26}

Figure 12. Vietnam's Known Steel Production by Capacity and Status



Source: GEM, TA Analysis

Vietnam's recent steel production has been dominated by BF-BOF technology, with an additional mega mill, phase 2 of the Hoa Phat Dung Quat mill set to add to this capacity in the latter half of 2025. The Formosa Ha Tinh plant (Vung Ang) is the only planned BF-BOF project, however it would

²⁵ <https://en.vietnamplus.vn/positive-outlook-for-vietnams-steel-industry-in-2024-post287622.vnp>

²⁶ <https://www.vietdata.vn/post/vietnam-steel-market-which-enterprise-holds-the-largest-market-share>

account for 14mtpa if all phases of the project are built. Contrary to many other ASEAN economies, there is a material pipeline of EAF mills planning on providing a variety of grade and function steels.

Notably, the Xuan Thien Group has announced the construction of DRI produced with LNG initially, transitioning to hydrogen at a later date.²⁷ Allocating 4 billion USD to the project, the group plans on providing high grade, high function steel to the construction sector. Other new steel projects that are connecting their plans with environmental credentials is the Chan May Green Steel Plant (not included in figure 8), which, using unspecified technology, is seeking to provide high grade HRC to the automotive industry using sponge iron amongst others as inputs.²⁸

EFFECTS OF THE EU'S CARBON BORDER ADJUSTMENT MECHANISM (CBAM) ON VIETNAM'S STEEL INDUSTRY

Vietnam is the EU's largest trading partner in Southeast Asia, and the EU is Vietnam's second largest export destination for steel after ASEAN, accounting for 16% of total volume, or 1.3 million tonnes (18.37% of total export value).²⁹ CBAM is proving to be a persistent challenge for Vietnamese steel companies, creating anxiety among Vietnamese steel mills exposed to these markets. This has trickled down to standalone downstream processors who are taking active steps to diversify their supply chains internationally to source low-carbon steel.

By actively complying with CBAM guidelines, Vietnam can make its exports more attractive to the EU market, encouraging the development of high-grade steel products and green steel domestically. It is crucial for Vietnam to closely monitor any ongoing development of CBAM, as there are still uncertainties regarding its implementations and evolving guidelines.

THE GAS-DRI DILEMMA IN LOW-CARBON STEELMAKING

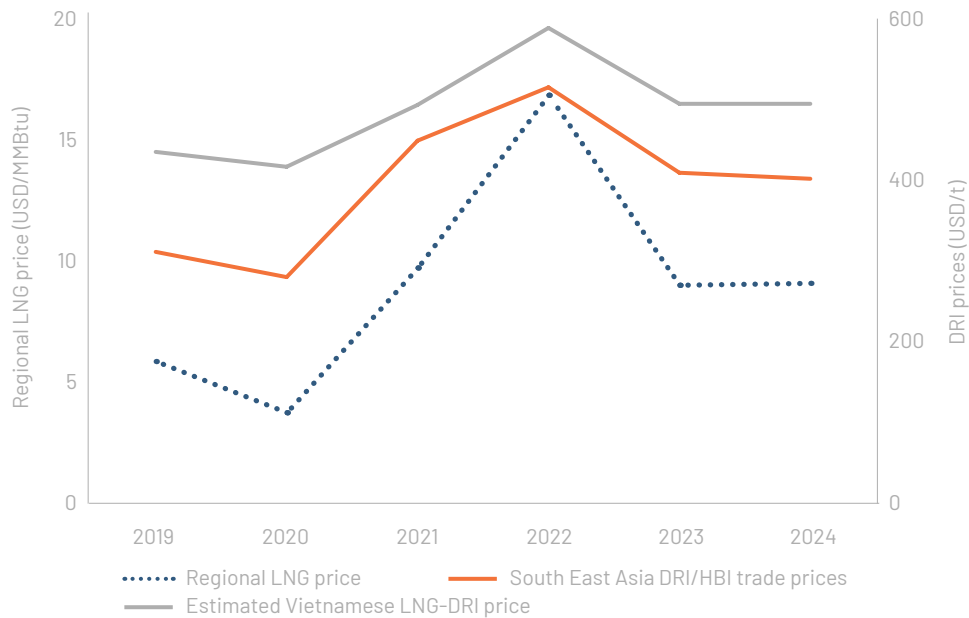
A pivot to gas is unlikely to fulfill the needs to decarbonise the sector, exposing steel manufacturers to global LNG prices as Vietnam has no exploitable domestic reserves. Whilst low LNG prices are likely to provide a cost benefit, compared to utilising green hydrogen, LNG prices are volatile whereas the cost of production of green hydrogen is likely to be much more stable because it would be produced on site. Moreover, there is uncertainty as to whether natural gas-based DRI is able to command a green premium and may only be traded alongside global or regional DRI prices.

²⁷ <https://xuanthiengroup.vn/en/fields/construction-materials-green-steel/>

²⁸ http://www.steel-jw.com/News/Vietnam_may_build_environmentally_friendly_steel.html

²⁹ <https://vir.com.vn/vietnams-steel-producers-embracing-cbam-transition-107208.html>

Figure 13. Comparison of Estimated Vietnamese LNG-DRI Costs Compared with Regional HBI Trade Information



Source: UN Comtrade, Bloomberg, TA Analysis

Methane emissions from natural gas-based DRI production are also a significant climate concern. Research indicates that gas extraction operations can have leakage rates of up to 7.9%—far exceeding official estimates—meaning much of that gas, mainly methane, escapes unburned.³⁰ The majority of which are realised during upstream processing. Given methane's ~84× global warming potential over 20 years, these leakages have the potential to undermine climate abatement advantage natural gas has over coal, and questions the legitimacy of it being a part of low-carbon steel production.^{31 32}

When DRI uses LNG instead of domestic pipeline gas, the problem escalates. Using LNG for DRI production amplifies total lifecycle emissions—including methane leaks during extraction, liquefaction, shipping, regasification, and transport.³³ These additional phases introduce new leakage points and energy use, further inflating the carbon footprint.

30 https://www.researchgate.net/profile/Robert-Howarth-3/publication/225756201_Methane_and_the_Greenhouse-Gas_Footprint_of_Natural_Gas_from_Shale_Formations/links/

31 https://energy.ec.europa.eu/topics/carbon-management-and-fossil-fuels/methane-emissions_en

32 <https://news.cornell.edu/stories/2024/10/liquefied-natural-gas-carbon-footprint-worse-coal>

33 <https://scijournals.onlinelibrary.wiley.com/doi/10.1002/ese3.1934>

KEY TAKEAWAYS

FINANCIAL SIGNALS ARE NEEDED TO DRIVE DECARBONISATION

Meaningful progress towards decarbonisation in the steel sector remains unlikely without substantial policy support or foreign direct investment (FDI). The financial and operational challenges of transitioning to low-carbon technologies requires significant external drivers to overcome inertia and ensure long-term commitment from industry stakeholders.

At present, the two major steel companies are not prioritising climate-related initiatives, particularly in transitioning away from the traditional BF-BOF methods. These legacy processes dominate the sector and present significant barriers to adopting cleaner alternatives due to their entrenched infrastructure and costs compared to newer technologies.

A shift in corporate priorities could occur if FDI is directed toward sustainability-focused projects, providing the necessary capital for low-carbon projects. However, for this to be effective, the impetus must also come from within the corporations themselves. Internal commitment to emissions reductions, supported by external funding and policy frameworks, will be essential to achieving meaningful progress.

One area of focus that Vietnamese corporations can explore is leveraging Vietnam's appetite for trade and developing strategic partnerships for the import of low-carbon iron (DRI/HBI). This avenue is recommended as a key decarbonisation route by the VSA, although international supply chains for low-carbon iron remain in their nascency, and would likely develop through long offtake agreements with international DRI producers.

TECHNOLOGY PATHS FOR LOW-CARBON STEEL UNCLEAR AMID SCRAP CONSTRAINTS, AGING EAFS AND HYDROGEN UNCERTAINTY

Scrap-EAF remains the likely low-carbon technology and process towards 2030. Scrap availability is becoming increasingly constrained, driving costs and premiums to BF-BOF steel. Supply chain diversification towards low-carbon iron to be charged domestically is an option that should be explored. Downstream processes are already exploring this avenue with low-carbon steel imports.

EAF upgrades are needed in the country, with the domestic fleet being at a high operational age. Ensuring that EAF mills upgrade their production capabilities to supply domestic markets with low-carbon steel is essential. In particular, downstream capabilities should focus on addressing domestic demand and forward-looking growth aligned with state-led industrial strategies.

RE growth raises the potential for cheaply produced hydrogen; however, the current hydrogen strategy does not currently address the steel industry in detail.³⁴ The Xuan Thien Group DRI project is a promising shift away from blast furnace iron production, planning to introduce Hydrogen gradually. The rate at which this plan is implemented will depend heavily on the availability of low-cost renewable electricity, the development of hydrogen infrastructure and the creation of supportive market incentives or policies that make hydrogen-based ironmaking economically viable at scale.

³⁴ https://vepg.vn/wp-content/uploads/2024/05/1_EN_MOIT-Presentation-on-LNG-and-Hydrogen_23-May_KE2.pdf

RENEWABLE ELECTRICITY AND CARBON MARKETS AS POLICY PRIORITIES IN VIETNAM'S STEEL TRANSITION

Expanding RE access for the steel sector is a key policy focus, with initiatives like the pilot Virtual Power Purchase Agreement (VPPA) project offering a model for industry transition. These mechanisms can help steelmakers secure long-term RE supply contracts, reducing reliance on fossil fuels. However, while RE will play a crucial role in the steel industry's decarbonisation, its immediate impact on the sector's emission reductions may be limited by existing infrastructure and energy demands. The full benefits will likely be more significant in the long term.

Vietnam's emerging carbon market also presents a promising avenue for incentivising emission reductions. By creating a financial value for carbon savings, the market has the potential to drive investments in low-carbon technologies. However, for this to succeed, robust implementation and monitoring frameworks are needed, along with regulatory policies that encourage industry participation and compliance.

DATA AND DISCLAIMER

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ABOUT TRANSITION ASIA

Founded in 2021, Transition Asia is a non-profit think tank dedicated to accelerating decarbonisation in Asia's materials and heavy industries to achieve the 1.5°C climate goal. Our multidisciplinary team combines diverse perspectives, experience and expertise, underpinned by a strong research foundation in Asia and a nuanced understanding of the region. Using analytical models and in-depth assessments, we evaluate and monitor corporations' decarbonisation efforts and actions. By engaging with stakeholders across sectors—including corporates, investors, policymakers and civil society organisations—we facilitate informed and impactful discussions that drive sustainable, low-carbon transitions aligned with a 1.5°C future.

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