



# Navigating the green steel market: challenges and opportunities for steel producers in Europe and beyond

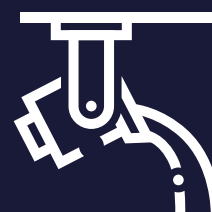
Article

**dss<sup>+</sup>**

Protect. Transform. Sustain.

**Article.**  
Metals.  
Europe, global.

The global green steel market is expected to experience rapid growth, with a **projected market size of around USD 624.414 billion by 2032<sup>1</sup>**, registering a **Compound Annual Growth Rate (CAGR) of 123.94% from 2023 to 2032.**



Green steel, largely defined as the production of steel through zero-carbon energy, thus presents an exciting opportunity for the steel industry. However, the industry still faces considerable challenges in the transition towards green steel, including uncertainties in demand, financing, policy, and an absence of coherent standards and terminologies that could have an impact on key business decisions.

This article details three recommendations to players in the steel market to navigate the main industry challenges and grasp business opportunities relating to greener production:

- 1. Participation and cooperation to influence the growing regulatory landscape**
- 2. Demand stimulation within the right customer base**
- 3. Building operational transformation capabilities for early mover advantage**

By staying on top of the evolving regulatory landscape, steel companies can establish themselves as leaders in the green steel market. Through actively taking part and influencing policy, standards, and regulatory developments at both regional and global levels, companies can help shape the direction of the industry and position themselves for success. Moreover, activating demand through the right channels and fostering collaboration and partnerships with downstream customers, companies can grow the value of their decarbonised steel portfolios.

Lastly, focusing on high impact downstream industries facing the most pressure to decarbonise (such as construction and energy) is necessary, and building operational transformation capabilities from the start will ensure preparedness and create competitive advantage when decarbonised steel becomes the norm, and significantly more companies compete for green energy sources.

<sup>1</sup> <https://www.globenewswire.com/en/news-release/2023/03/16/2628558/0/en/Green-Steel-Market-Size-to-Reach-Around-USD-6-24-4-Bn-by-2032.html#:~:text=The%20global%20green%20steel%20market,new%20study%20by%20Precedence%20Research>

## The steel industry and imperative for change

Globally, the steel industry accounts for over 7% of global CO<sub>2</sub> emissions, with the bulk of steel production still enabled through carbon feedstocks. However, initiatives like the race to net zero have propelled businesses globally to start to adopt more emissions-friendly solutions. Green steel, the production of steel through zero-carbon energy such as green hydrogen, is viewed as a solution by the industry. The global green steel market is projected to grow at a rapid pace and reach a market size of around USD 624.414 billion by 2032, registering a Compound Annual Growth Rate (CAGR) of 123.94% from 2023 to 2032.

With the imperative to rapidly reduce emissions at a global scale and the potential growth in the green steel sector, it makes sense for the industry to adopt green steel business models. The industry offers several promising opportunities, including producing low-carbon and circular products to replace those with higher environmental impacts, the implementation of green hydrogen, and partnering with downstream firms. Early adoption of green steel provides a savvy and strategic advantage, given the current allocation of funds for the energy transition. However, there are a few impediments to the uptake of greener practices in the steel production market, including lack of standards, uncertainties in financing, regulation, and policy, and a market demand that is still nascent.



### Moving beyond emissions-reduction: definitions of green steel

Today, there is still no unified definition of "green steel" or "responsible steel". While some definitions of green steel focus primarily on decarbonised steel productions, other bodies advocate notions of equity, human rights, diversity, and a wider set of environmental indicators, including water, waste and biodiversity impacts to be included in the definition.

Adopting a proactive position in leading the definition of green steel regulation, as well as in setting industry-specific product carbon footprint standards, are key areas of possible influence for companies wishing to be front runners.

## The emerging regulatory landscape for green steel in Europe

The implementation of robust metric-driven sustainability reporting is relatively new, and thus the policy environment in specific industries is rapidly emerging and shifting. To make the most of this nascent landscape, steel makers should keep close track of regional and global policy developments and actively take part in their creation.

Although industrial ambition has until now tended to outpace policy developments, the regulatory landscape has started shifting. The EU (European Union) Green deal is already supporting the transformation of the industry towards zero-carbon steel-making processes by 2050. In 2023, a new Research Fund for Coal and Steel has been set up to support this transformation, with a total of EUR 104 million available for steel research, and new regulatory discussions to enable the decarbonisation of steel are being pushed in different countries. Policy poised to affect the green steel value chain – from production inputs to demand drivers in key industries – is also to be watched carefully, as each year's proximity to climate change target deadlines are bound to further accelerate developments in the competitive landscape.



### Recommendation

# 1

## Participate and influence regulations and definitions

Staying on top of the rapidly evolving regulatory landscape is crucial for steel companies looking to establish themselves as leaders in the green steel market. By tracking and influencing policy developments at both regional and global levels, companies can help shape the industry's direction and position themselves for success. Participating in the standardisation of key terms such as "green steel" and developing industry-specific footprint standards can create clarity and coherence for investors and consumers alike. Overall, being proactive and collaborative in these areas can help companies show their leadership and commitment to sustainability, while opening new opportunities for growth and innovation.

## The growing business case for green steel

The steel industry is a critical driver for decarbonisation across various sectors, and it is on the cusp of an industrial revolution. However, players investing in decarbonised steel are still concerned about modest demand and insufficient customer awareness. Despite this, research suggests that the demand for decarbonised steel is expected to continue increasing. Around 40 million tonnes of new green steel projects are slated for completion by 2030 since 2021,<sup>2</sup> and the EU Commission's initiative also projects that about 30% of primary steel production in the EU will be decarbonised with renewable hydrogen by 2030.

Success stories of new entrants, such as H2 Green Steel, are also showing that the demand is ripe for decarbonised steel: the company has pre-sold over 1.5 million tonnes of green steel to customers before even building its dedicated circular low-carbon plant in Sweden.

Despite a positive outlook, consumer awareness around green steel appears to be lagging forecasted demand: customer research from Kloeckner & Co revealed that 43% of their European respondents were unaware of green steel or CO<sub>2</sub>-reduced steel, and in the US (United States), the number shoots up to 75%. In addition, 67% of European customers that know about green steel expect to gain commercial advantages from buying or selling green steel products.<sup>3</sup> These figures highlight the common challenge faced by producers that are starting to integrate different grades of decarbonised steel into their product portfolio.

Importantly, it is unlikely that steel companies that are undergoing a transformation will immediately see the business returns for investing in green steel with current market demands. For example, whilst it is estimated that hydrogen will account for over 12% of energy demand in 2050, retrofitting plants and greening processes are still a significant investment.

However, the cost of slow action is a bigger risk, especially in the face of the growing competition and scarcity of the resources that are essential to produce green steel, such as sustainable hydrogen. The competitive advantage of investment now will likely come as the emerging climate and regulatory changes – especially in carbon emitting (or green) industries that depend on steel, such as energy, construction and automotive industries – become widely adopted in the future.



### Recommendation

# 2

## Focus on the right markets to increase demand

To stimulate demand, steel companies should start by focusing on clients for whom the stakes of not decarbonising are high. Companies in a host of industries – from automotive, energy, appliances, to construction – will increasingly respond to requirements from public and private procurement processes that require decarbonised products and will feel the pressure of low-carbon or other environmental standards. Communicating the tangible benefits of green steel adoption to these markets with comparable and material metrics will progress the market demand more quickly.

Partnerships with downstream firms to create flagship sustainable products ahead of market demand can also yield results by supplying a proof-of-concept to the market and spreading awareness. For example, pairing with an automotive manufacturer to produce low-carbon steel car parts could create a unique selling point to increase sales of the final product whilst stimulating the demand for green steel.

<sup>2</sup> H2 Green Steel, "Building the World's first large scale green steel plant". 2023, Green Steel World Expo and Conference, 4th April 2023

<sup>3</sup> Kloeckner & Co, "Green Steel from the customer's point of view – technology, new business models, new markets", Green Steel World Expo and Conference, 5th of April 2023.

## The need to transform operations for sustainable impact

Foundational sustainability elements such as adopting decarbonisation roadmaps and committing to the Science Based Targets Initiative (SBTI) goals are important, but real value for the sector will only become clear after transforming their operations to meet these objectives.

New green steel startups that are building plants from scratch to produce decarbonised steel make them more agile and able to better respond to changing market demands. Legacy steel producers, by contrast, will need to invest in operational transformation quickly and effectively to ensure sustained competitiveness in the green steel market.

In addition, the supply of green hydrogen and cheap renewable electricity will be a long-lasting challenge, and companies that get ahead of the curve will secure a competitive advantage and ensure long-term success as demand for green steel grows.

The first steps of operational transformation towards greener steel are primarily driven by replacing sinter with pellets, promoting greater circularity, and efficiency in resource use. Later stages of maturity in the process include incorporating low-carbon production technologies, such as electric arc furnaces (EAFs), direct reduced iron (DRI), and hydrogen reduction.



### Recommendation

# 3

## Move beyond reporting and build operational transformation capabilities

Relying purely on goals and targets for green steel credentials is a farse – moving from intent to impact is imperative to maximise the upside potential of green steel. As such, companies must develop a technology readiness and innovation portfolio management strategy that focuses on the operational changes necessary to facilitate change. Such a process can offset cost and performance uncertainties associated with innovative technologies.

Concurrently, large capital projects are exposed to a wide range of uncertainties and risks that need to be accounted for. Scaling projects like green hydrogen must involve planning and executing a range of different projects under an overarching programme management umbrella.

The full integration of renewables and hydrogen will also significantly change the business and operational risk profile of a steel facility, and this should be accounted for when moving toward operationalising green steel production. Risk reduction will rely on effective design, material selection and engineering controls whose integrity and functionality need to be assured over time with an elevated level of operational discipline.

Adoption of innovative technologies also require adaptation and transformation of organisational capabilities and organisational culture, which cannot be understated and should be a top priority when deploying operational transformation.



## Metrics for momentum

The importance of supplying credible metrics to clients who are serious about decarbonising cannot be overstated. Whilst measuring carbon footprint is a useful tool for internal targeting and optimisation of emissions hotspots, it is derived from a model and does not allow for comparability between companies. As such, it may be more effective to begin by measuring direct, comparable metrics, such as those relating to the processes involved in downstream production. These metrics could include total energy use, water use, waste produced, and quantity of recycled materials used per tonne of steel produced.

Additionally, showing the percentage of the product price that goes towards paying for emissions can prove the feasibility of green steel for clients. By targeting and tailoring reporting to clients who are following specific standards or regulations, steel companies can show their commitment to sustainability while also meeting their clients' needs. Ultimately, supplying credible metrics is essential for companies that want to stay ahead of the curve in the transition to a low-carbon economy, but metrics need to provide tangible and comparable value.

## Investing in sustainability now for competitive advantage

In conclusion, companies in the green steel market must think beyond the product carbon footprint and invest in operational transformation to ensure sustained competitiveness. Companies need to educate and convince customers, train the salesforce, and secure competitive ESG (Environmental, Social, Governance) financing for the transition.

Despite the challenges, investing in low-carbon production technologies and more circular processes is critical for companies looking to establish themselves as leaders in the green steel market. Companies that invest in low-carbon production technologies and invest in mastering new processes will be better positioned to meet future demand for decarbonised steel products.



## Contributors



**Caroline Steinfeld**  
Manager  
[caroline.steinfeld@consultdss.com](mailto:caroline.steinfeld@consultdss.com)



**Helder Santos**  
Industry director, Mining and Metals EMEA  
[Helder.Santos@consultdss.com](mailto:Helder.Santos@consultdss.com)



## Global Mining and Metals Team



**Johan Coetzee**  
Global Head of Mining  
and Metals



**Wes Austerberry**  
Mining and Metals Director,  
Australia and New Zealand



**Jaco Pieterse**  
Mining and Metals Director,  
Middle East and Africa



**Guerau Malvesi**  
Mining and Metals Director,  
United States and Canada

### About dss+

dss+ is a leading provider of operations management consulting services with a purpose of saving lives and creating a sustainable future. dss+ enables companies to build organisational and human capabilities, manage risk, improve operations, achieve sustainability goals and operate more responsibly.

Find out more at [www.consultdss.com](http://www.consultdss.com)



Protect. Transform. Sustain.

[linkedin.com/company/consultdss](https://www.linkedin.com/company/consultdss)

[twitter.com/consultdss](https://twitter.com/consultdss)

[youtube.com/consultdss](https://www.youtube.com/consultdss)

[www.consultdss.com](http://www.consultdss.com)