CRU

Data, Insight, Strategy & Communities

US steelmaking industry report

Public summary

CRU. Independent *expert* intelligence

September 3, 2026

Introduction to CRU

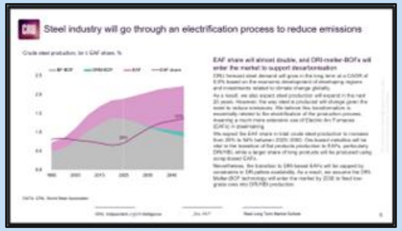
CRU Consulting has completed an assessment of the steel industry in the US, covering drivers of scope 1, 2, & 3 emissions and a forward-looking view of how the US is currently expected to, and could further solidify, its role in the low emissions steel market.

CRU Consulting is the management consultancy division of CRU International, a global analysis and consulting services firm focused on the metals, mining and fertilizers industries.

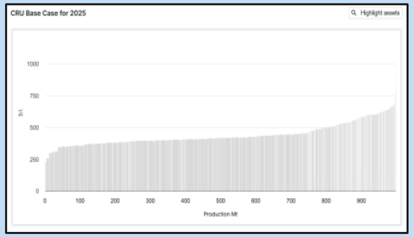
CRU was commissioned to provide an independent assessment of the long-term US steel industry. The full report includes a neutral analysis of the domestic steel industry's future, including with respect to overall production capacity and process mix, carbon-emissions-related performance, and associated market drivers.

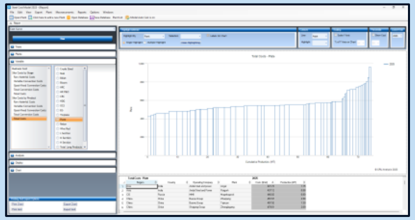
The following slides are a public-facing executive summary of key findings, which is intended for a general audience and may be put into the public domain.

Long-term steel market outlook



Steel cost and emissions models





CRU's Market Outlooks: Market outlooks offer detailed, commodity-specific analysis covering both historical performance and future projections. They include pricing data, supply and demand trends, and factors influencing these dynamics. With forecasts extending to 2050, these outlooks help stakeholders anticipate market changes and make informed decisions for the years ahead.

CRU's Cost & Emissions Models: Cost models help market participants across the full value chain, from mining companies and producers to traders, consumers and financial institutions, with their assessment of individual assets, producers, regions and the wider sector. CRU's extensive cost models allows tailored benchmarking for new and existing projects across the steel value chain.

DATA: CRU
Visit https://www.crugroup.com for additional info

Key conclusions

CRU expects the US to expand EAF production through 2050 to meet growing steel demand and will likely require additional capacity to come online. With its current role in the industry, BOF production is forecast to remain relatively stable in the base case forecast, with most blast furnaces requiring a relining investment at some point in the next twenty years.

The type and quality of steel products able to be produced by a steel mill is inherently dependent on raw material inputs much more than the steelmaking technology used. Although a higher portion of flat products in the US are currently produced by BOFs, compared to long products, EAFs do have the technical capability of producing higher-quality products, with stricter residual requirements, but have to use a much higher rate of virgin iron ore inputs, such as DRI, rather than scrap.

In order to decarbonize the steel industry, the US will continue to shift towards EAF-based production. DRI will be the key enabler for this technology to produce the same types of products as a BOF, while avoiding high emissions from pig iron made at the blast furnace stage. Current US DRI projects will not produce enough to meet domestic demand by 2045. Additional investment in new projects or increased imports of DRI will be required to enable further decarbonization.

Steelmaking emissions in the US are already much lower than most other key regions at ~1.1 t CO_2/t crude steel due to the country's high proportion of scrap-EAF capacity. However, this emissions intensity is forecast to increase through 2050 in CRU's base case, as expanded DRI consumption will grow scope 1 and scope 3 emissions without additional emissions mitigators, such as green hydrogen.

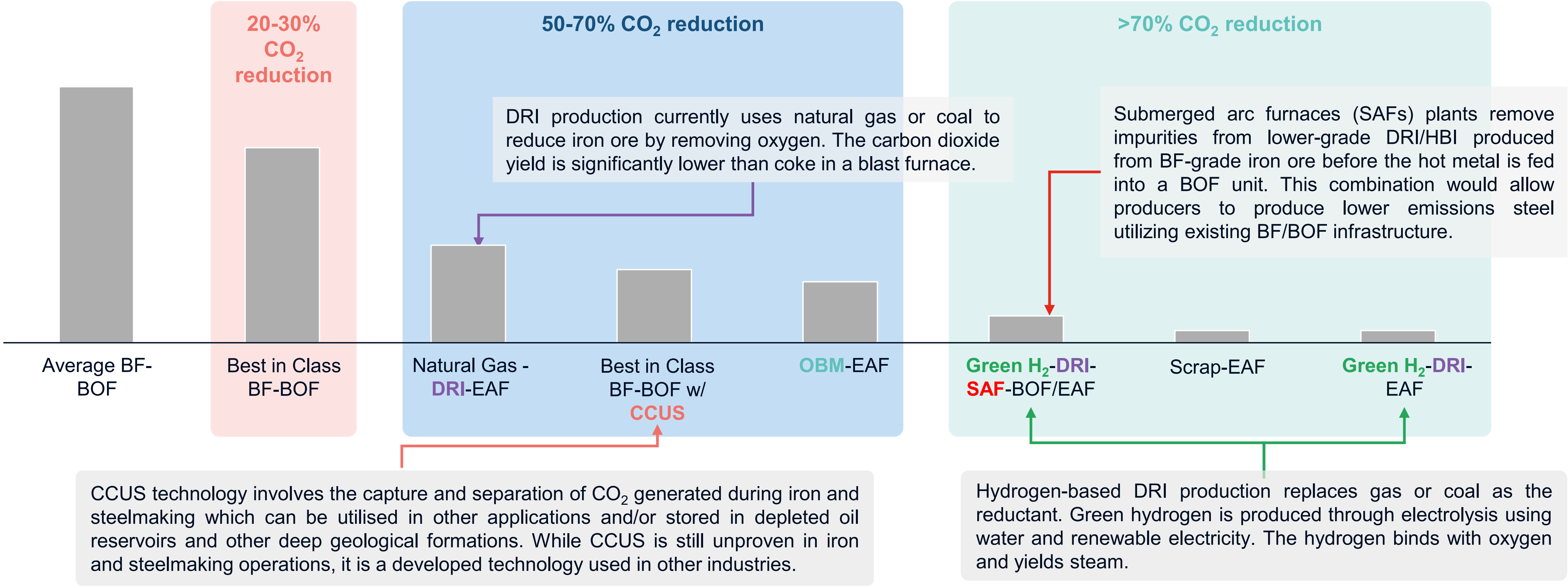
Although the US is relatively self-sufficient in crude steel production, the region imports a significant volume of downstream steel goods. This creates a situation where, though domestic steelmaking is low on the global emissions curve, steel that is consumed in the US often carries much higher emissions. There is enough demand base in the country for expanded manufacturing to replace some imported volumes. Additionally, growing demand for DRI provides a key opportunity for new investments in US capacity, strengthening the domestic steel industry.

To further decarbonize the US steel industry, additional steps across all parts of the steel value chain will need to take place in tandem in order to sustain a strong domestic industry. Expanded availability of renewable energy will support green hydrogen advancements, while investments into new supply of DR pellet and DRI production will ensure EAF production can produce volumes that are currently coming from BOFs. Carbon capture technology, though not a long-term solution, can be a mitigator in the medium-term as natural gas usage and BF-BOF production continues.

DATA: CRU

Traditional BF-BOF steelmaking carries the highest emissions out of established and developing technologies, but higher usage of scrap and DRI in EAF capacity can theoretically decrease emissions by +70%

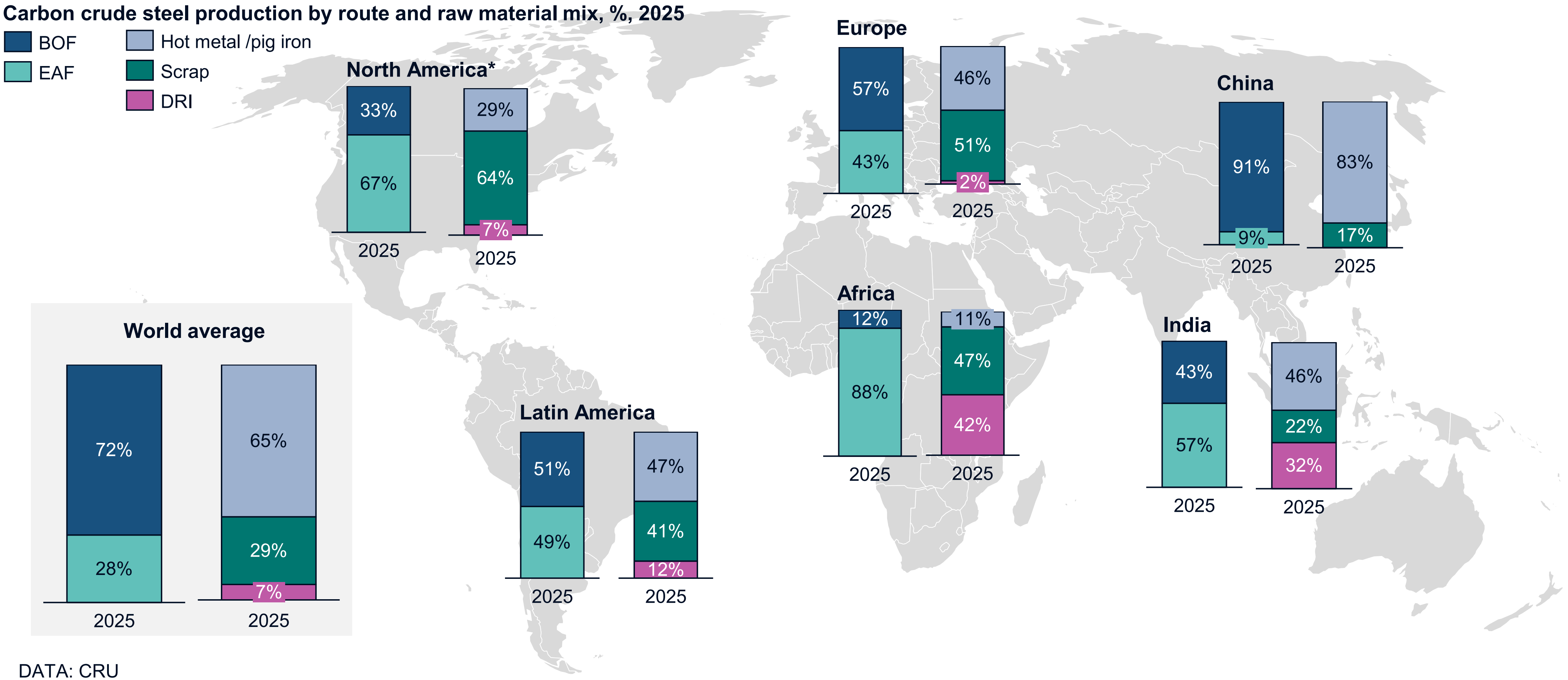
CO_2 emissions by steel process and raw material choice, Scope 1 + 2*, t CO_2 / tonne of steel produced



DATA: CRU

*Emissions from producing coke are included in scope 1 emissions in the chart to represent emissions from the entire value chain.

Steelmaking in the US is currently 67% EAF-based, while the global average is only 28%, as other regions work to shift BOF production towards EAF production over time

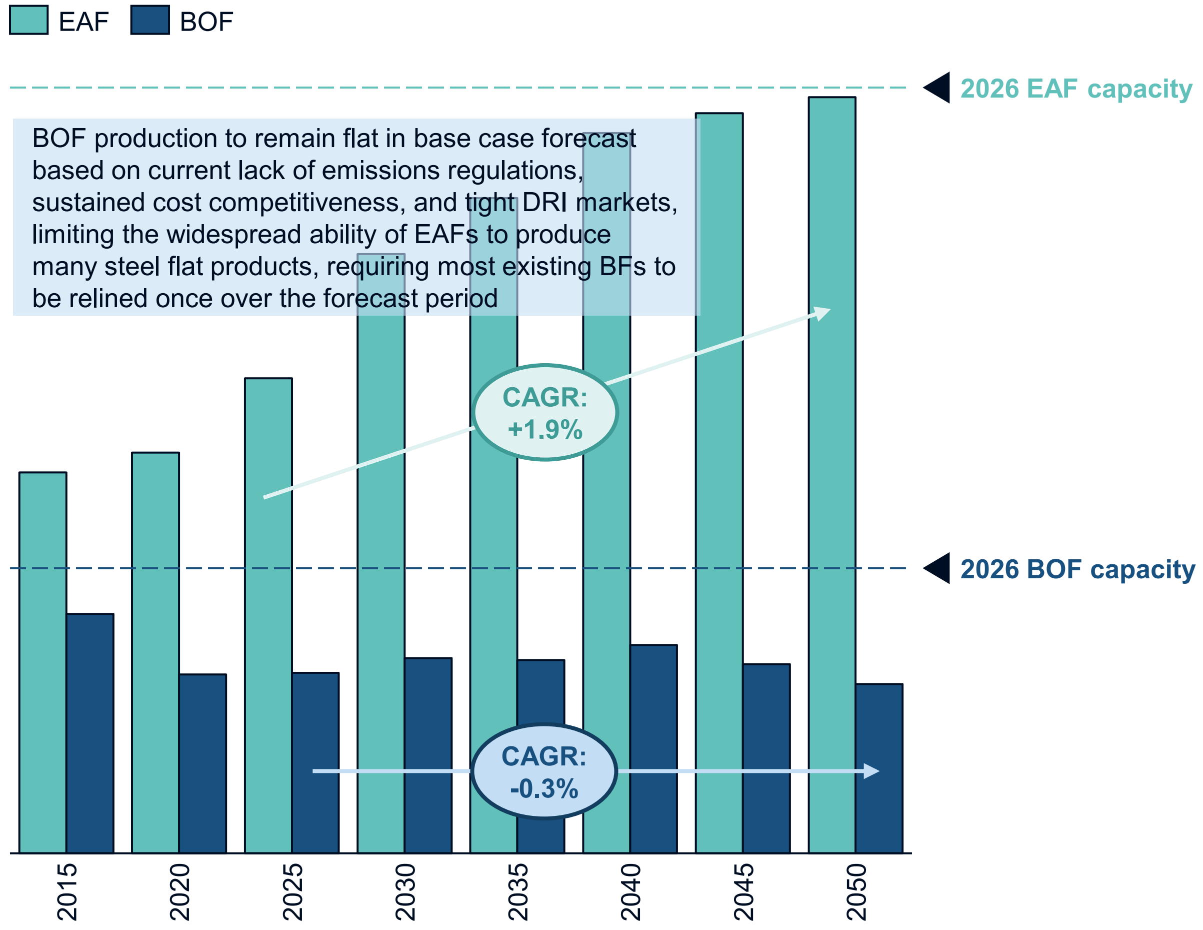


DATA: CRU

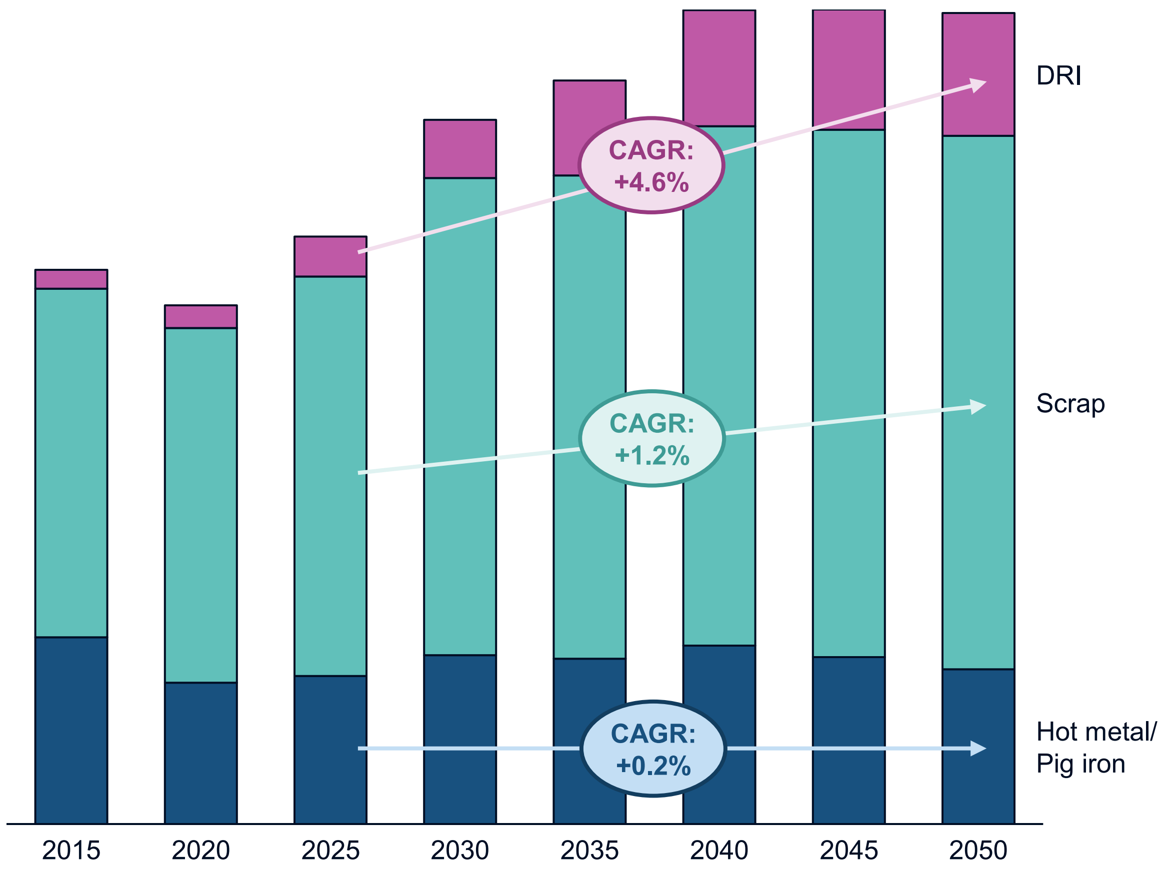
*Despite North America's higher relative share of EAF production, several other regions such as Europe and India, produce close to the same or more EAF steel than North America due to their higher total steel production.

EAF production will continue to grow in the US, while BOF production remains relatively stable, with no new capacity additions, driving stable growth in scrap demand and significant increases in DRI consumption by 2050

US crude steel production by route, Mt



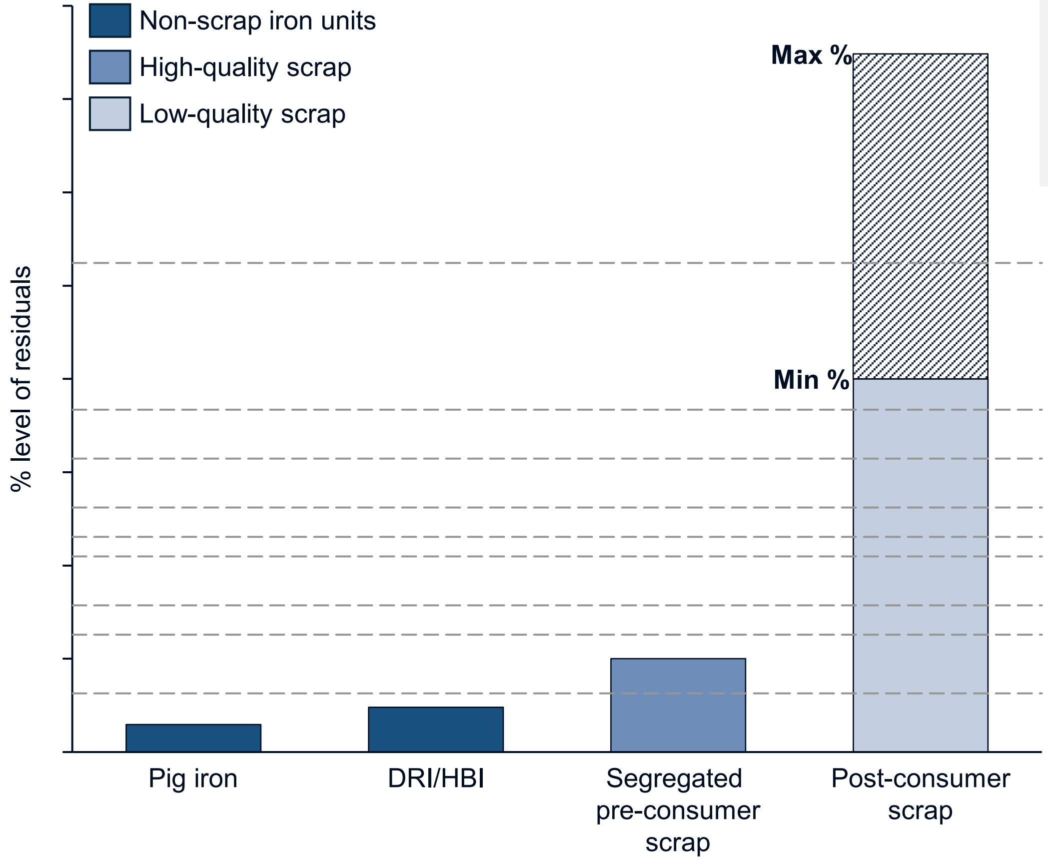
US metallics demand in crude steel production, Mt



DATA: CRU

Residual limits in most common finished steel products limits the steel industry from completely switching over to scrap-EAF capacity, but expanded EAF capabilities are possible with virgin iron ore inputs

Specified maximum residual limits on the most common finished steel products vs raw materials (% of steel melt chemistry)



Currently, a majority of flat products, or similar finished steel products with low residual limits, are produced by BOFs rather than EAFs in the US. However, this is a signifier of the current makeup of steelmaking technologies in the US, rather than what is technically possible.

Most EAF capacity in the US is currently scrap-based, which carries inherently higher residual levels, as shown in the chart on the left, and it is therefore difficult to produce higher-quality steel products. This is because of the raw materials used, scrap rather than virgin iron ore such as pig iron or DRI, not because of the inherent capabilities of EAF vs BOF facilities.

Rebar & merchant bar — *Produced mostly by EAFs*

SBQ
Plate & structurals — *Produced by BOFs and standard EAFs*

Wire rod
Flat products - general
Rail
Flat products - auto structural — *Produced mostly by BOFs*

Flat products - tinplate
Flat products - auto exposed & electrical steel — *Produced exclusively by BOFs or specialty EAFs*

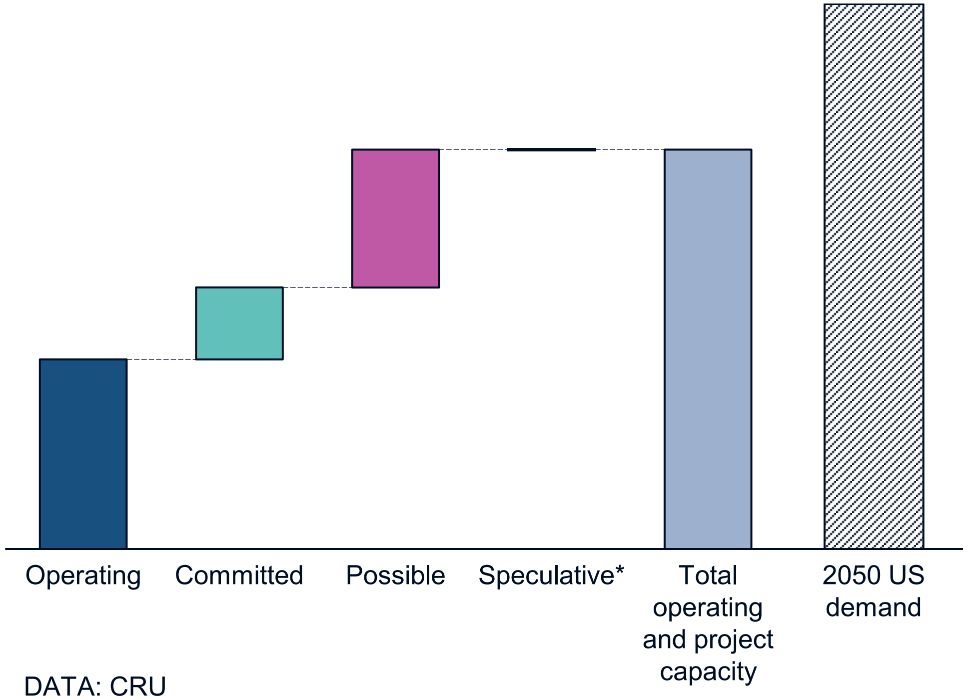
Products can only be produced using metallics with lower residuals than the dotted line shown, unless higher purity inputs are used to “sweeten” the metallics mix

DATA: CRU

US metallics mix will increase its DRI rate for EAF steelmaking, providing opportunity for new US investments to limit a currently projected domestic deficit

US DRI project capacity will fall short of expected demand levels by 2035 even if all project capacity is built, requiring additional investments to support the domestic industry.

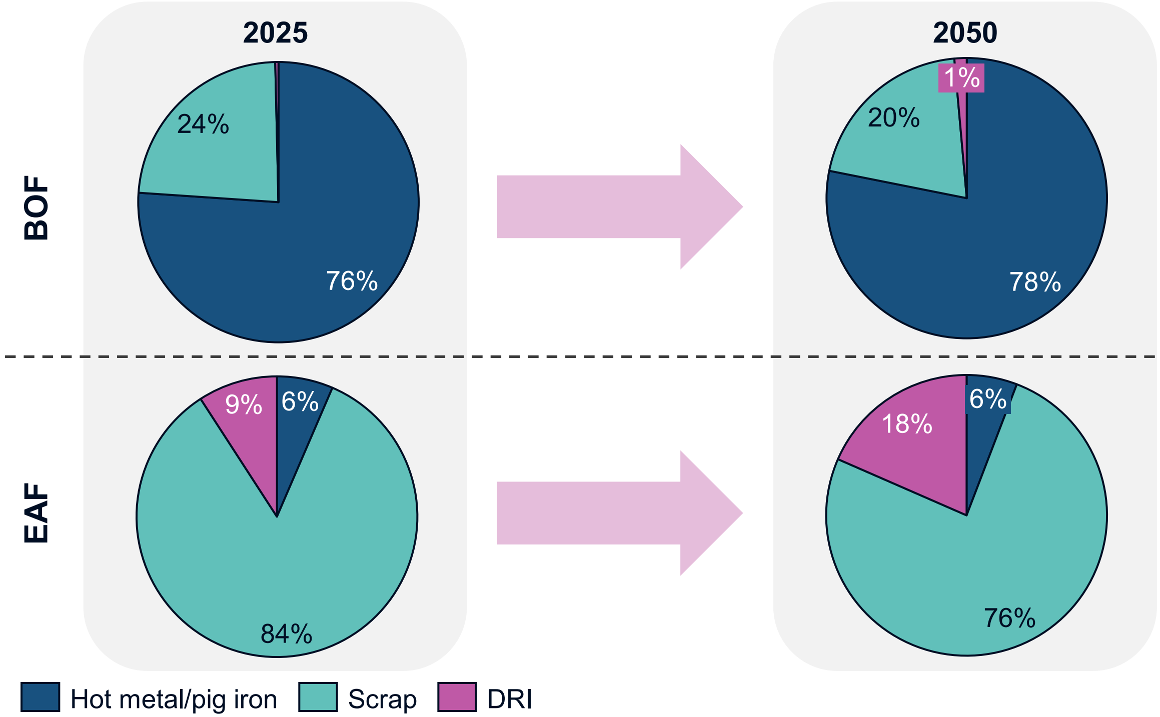
US DRI operating and project capacity vs DRI demand, Mt



DATA: CRU
*Projects currently rated as speculative have no officially announced capacity figures.

US metallics mix will shift as DRI use rises, primarily in EAFs. This is driven by the need for high-quality feedstock to produce higher-grade and specialty steels with EAF capacity.

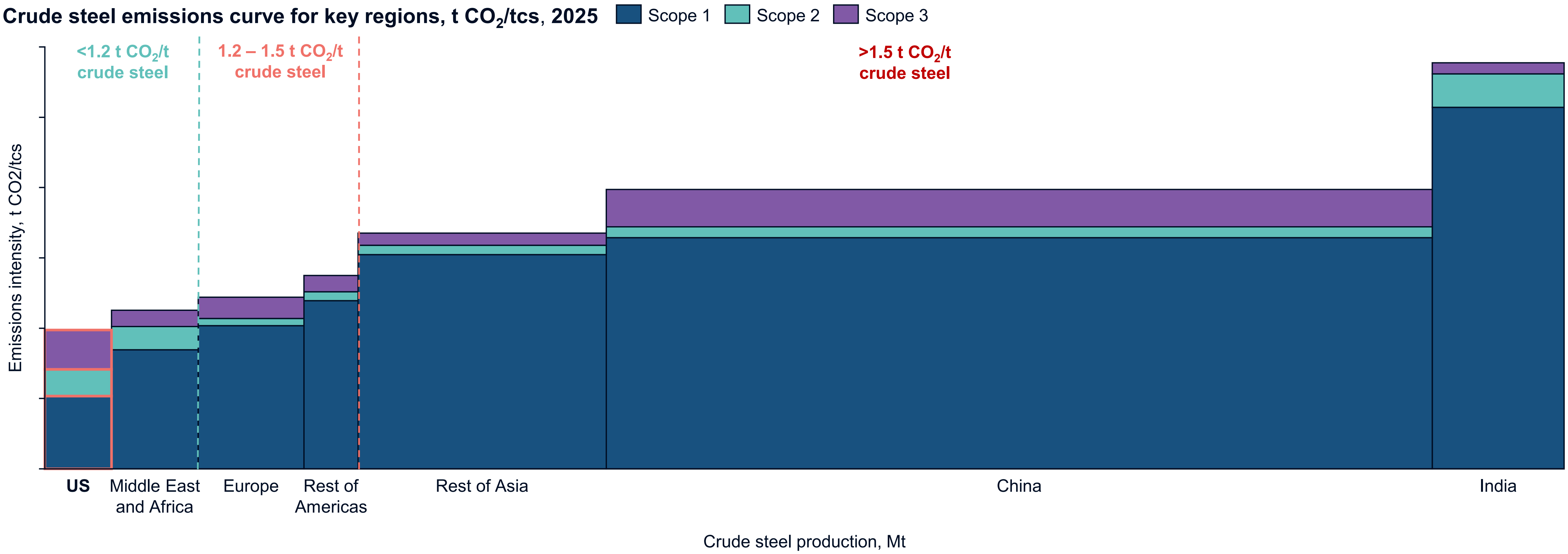
US metallics mix in crude steel production by production process, %



The US has the lowest overall emissions intensity compared to other major steel producers such as Europe, China and the rest of Asia

The US already has some of the lowest emissions intensity for crude steel compared to other key producers due to a high share of EAF capacity. However, as other regions shift more towards EAF production, this curve will become more competitive. Additionally, the US is forecast to utilize a higher portion of DRI going forward, rather than primarily relying on scrap, which will carry a higher degree of emissions unless renewable electricity and hydrogen become more available.

Crude steel emissions curve for key regions, t CO_2/tcs, 2025



DATA: CRU

Further transition into green steelmaking from both the BOF and EAF pathways in the US would require several enablers in order to become a larger part of the market

	Current & future limitations	Enablers for decarbonization
Existing BF-BOF capacity	• Inherently high emissions in the ironmaking stage • Many facilities will require a capital-intensive relining in the next few years to continue operating	• Carbon capture, utilization, & storage installation • Replacement of aging blast furnaces with DRI-SAF production, which allows the operators to leverage existing configurations
Growing EAF production	• Scrap supply will remain tight • Inadequate domestic renewable energy supply • EAFs likely can not produce every type of steel needed with scrap alone and will continue to rely on DRI or pig iron • Inadequate domestic DRI capacity & tight availability of DR pellet supply	• Renewable energy projects, especially in the Midwest and South • New domestic DRI capacity, either merchant or integrated with EAF production • Domestic blue & green hydrogen capacity that could eventually replace natural gas for DRI production • Current DR pellet projects come online in the US & Canada
Emerging new green steel technologies	• Current technologies are still at pilot stage or in development and would need to be scalable to make an impact • Costs are currently too high to be competitive in the existing steel market	• New green steel technologies are not likely to make a significant impact on the US steel market through 2050 • However, further R&D over time could help bring some investments online

DATA: CRU

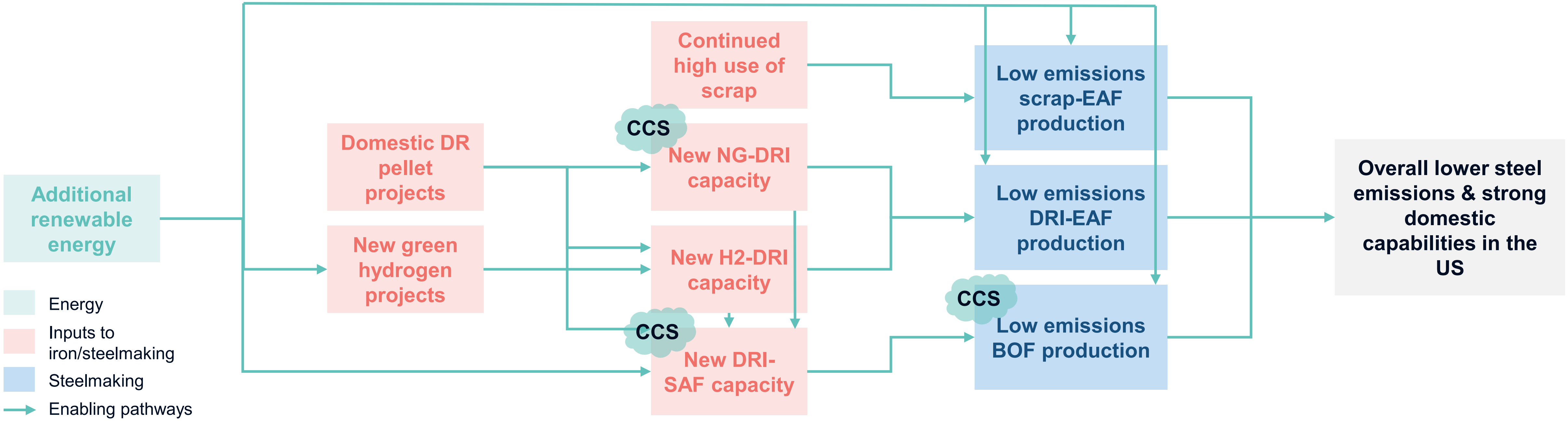
Increased availability for renewable energy, green hydrogen and DRI could enable widespread green steel production in the US utilizing existing technology

There are several different areas in the US steel value chain that can limit emissions to bring the overall market towards green steel. Electricity is a large emissions factor for any type of EAF facility. Converting the electricity source from majority fossil fuels, as it currently is now, to renewable energy could bring scope 2 emissions for any of the facilities below to zero.

DRI will be the main additional raw material required for the transition to green steel, due to its ability to produce high-grade steel products, traditionally made by BF-BOFs, through the EAF route. DRI carries its own emissions challenges with it, but the transition from using natural gas to hydrogen, and then green hydrogen would allow the US to produce all types of required steel products at the same emissions level as a scrap-EAF.

While this transition takes time to develop, with new capacity and supply of renewable energy, hydrogen, and DR pellet/DRI to come online, BF-BOFs will likely continue to operate in the US to meet domestic demand. Utilization of carbon capture technology can mitigate emissions during this transition but will still require carbon storage hubs to be built and costs of installation to be economical.

Long-term pathway to low emissions steel in the US & its requirements/enablers



DATA: CRU

Utilizing tax incentives or direct funding for domestic producers that invest in raw materials or technology supporting green steel would enable a widespread market shift in the US

1 Consistent definitions & targets for green steel & emissions across regulations

The US should establish standard definitions for green steel thresholds, renewable energy targets and emissions goals in the domestic steel market by specific years. This should include a timeline where there are different green steel thresholds based on primary iron vs scrap content that eventually converges to the same emissions threshold by 2050.

Emissions targets should be set for the short-, medium- and long-term forecasts, with the first being in 2035 to kickstart early capacity or technology transition plans. These targets should be tied to financial support over the short and medium term, rather than penalties, to incentivize adoption and to support a stronger domestic industry rather than a weaker one.

2 Pursue practical trade agreements to source raw materials as US capacity develops

There is an existing cycle in the US steel industry where green steel enablers are not invested in because downstream green steel production is not yet available at a large enough volume. The US should utilize its role in the global trade market to benefit from regions where enablers, such as available DRI supply, could support the first steps towards the green steel transition such as DRI-EAF or DRI-SAF capacity buildout.

While existing tariffs are in place, the US should award tariff exclusions for products such as DRI or DR pellet, especially from regions where future trade partnerships would benefit domestic manufacturing, to ease raw material sourcing concerns from green steelmaking capacity investments as domestic metallics manufacturing comes online.

3 Mitigate cost inhibitors for new domestic green steel capacity, especially early adopters

Legislation involving tax credits or direct funding, such as the IRA, greatly incentivized plans and investments into capacity that would bring the US closer to a national green steel industry. After this legislation was amended, almost all of these plans were pulled back in some way by individual companies. The transition towards green steel generally involves higher capital and operating costs, especially for early movers, limiting the willingness of companies to invest, especially when other costs are so high already.

The US should introduce new legislation that awards tax incentives or direct funding for investing in any of the enablers mentioned in this report that would enable a wider industry green steel transition. These financial incentives would be in line with the standards defined in the left of this slide and would have a short, medium, and long-term timeline – awarding the highest financial support to early movers.

2025 2030 2035 2040 2045 2050

2025–2035: Domestic DRI, renewable energy, & hydrogen capacity begins to develop along with DRI-EAF capacity as CCS starts to subsidize BF-BOF emissions.

2035–2040: US steel production is largely scrap or DRI-EAF based, supported by domestic DRI production or DRI imports.

2040–2050: Domestic renewable energy availability enables competitive green hydrogen capacity, and the US is able to produce a majority of flat and long products with scrap/DRI-EAF capacity at ~0.2 t CO_2/tcs. Remaining BF-BOFs have transitioned to green H_2-DRI-SAF-BOF with CCS.

DATA: CRU

Glossary of terms

Term	Definition or context
BF hot metal	The standard hot metal produced in a traditional coke-based blast furnace. Hot metal is not a traded product and is used internally/immediately within an integrated steelmakers' BOF, along with other metallics, to produce liquid steel
BOF	Basic oxygen furnace
BF	Blast furnace
CAGR	Compound annual growth rate
CCUS	Carbon capture utilization and storage
DRI	Direct reduced iron
EAF	Electric arc furnace
HBI	Hot briquetted iron
Kt	Thousand tonnes
Mt	Million tonnes
"North America"	Unless noted otherwise, all volume figures for North America include both US and Canada combined.
Pig Iron	Hot metal produced in a traditional blast furnace process, which is subsequently cast and cooled, generally for internal use.
Standard DRI/HBI	Gas-based and/or hydrogen-based direct reduced iron, which is 1) produced from DR-grade iron ore pellets and 2) is ready to use as either cold DRI or HBI in standard EAF furnaces for liquid steel production
SAF	Submerged arc furnace; also references to other similar technologies that can electrically melt and refine high-gangue, direct-reduced iron units
Scope 1	Direct GHG emissions occur from sources that are owned or controlled by the facility
Scope 2	Indirect GHG emissions occur from the generation of purchased electricity consumed by the facility
Scope 3	Occurs from upstream sources not owned or controlled by the specific facility/site
tcs	Tonne crude steel

DATA: CRU