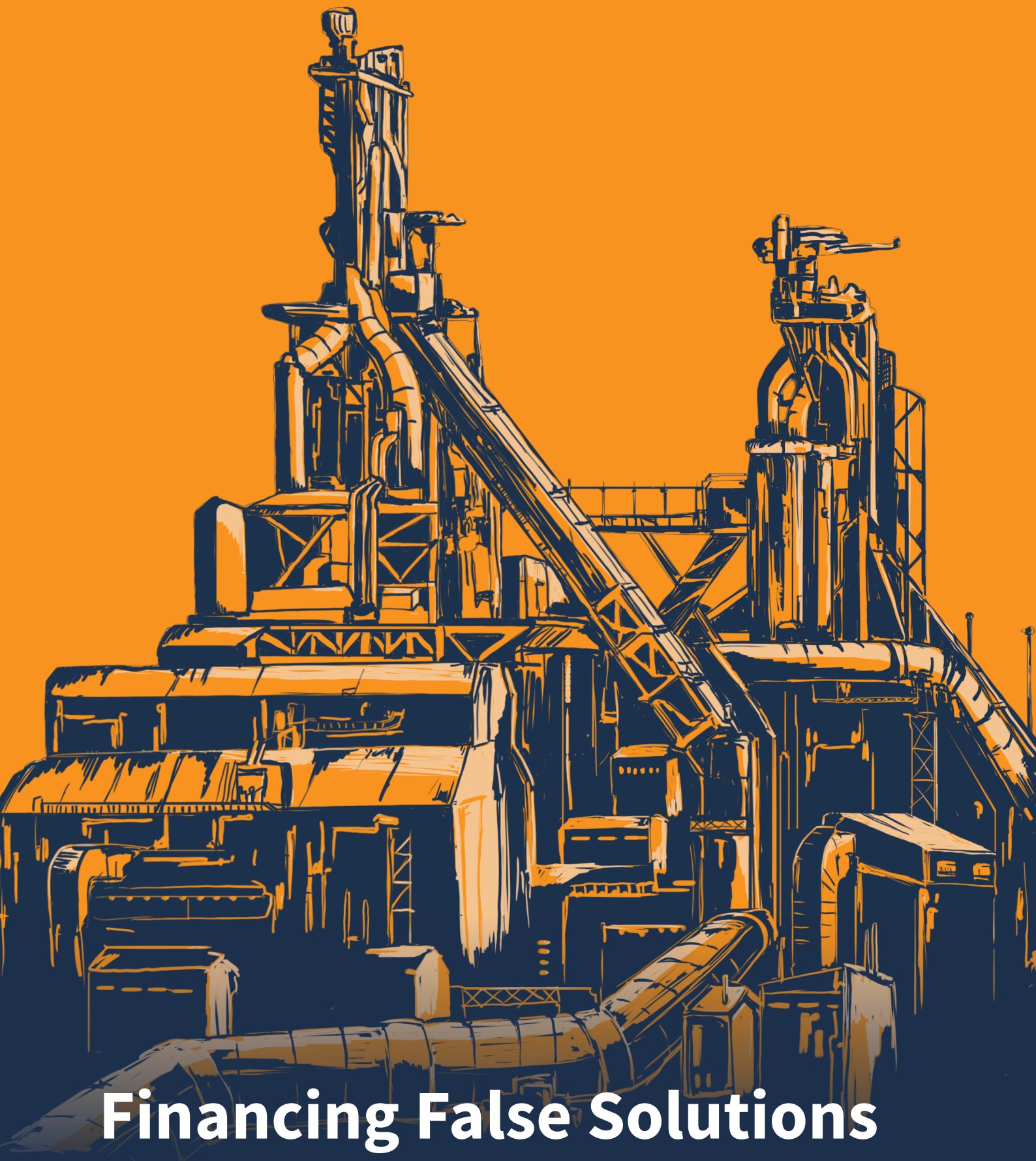

Financing False Solutions in Steel Decarbonisation

How global banks define green steel and why it matters

BANKTRACK

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Key findings:

- **Real vs false solutions:** Steel companies are increasingly pursuing "solutions" that risk contributing to GHG emissions, fossil fuel lock-in, deforestation, biodiversity loss, air pollution, and fresh water scarcity. Solutions for steel decarbonisation come with major trade-offs, some more manageable than others. BankTrack has categorised "real solutions" in steel decarbonisation to be: renewables-based Electric Arc Furnaces, green-hydrogen based Direct Reduced Iron (DRI), Molten Oxide Electrolysis (MOE), and demand reduction / material efficiency. False solutions include gas-based DRI, biomass, hydrogen injections in blast furnaces, and offsetting.

- **Key banks lack clear steel frameworks:** There is also significant variability in bank disclosure and clarity: just seven out of the 20 banks assessed explicitly address steel decarbonisation in their sustainable finance frameworks. Concerningly, out of the top 10 financiers of steel globally, just two – Bank of China and China Construction Bank – have publicly available sustainable finance frameworks for the steel industry.

- **Real solutions are widely accepted, but still lack clarity and essential conditions:** Real solutions are widely accepted by banks, like EAFs (included in the sustainable finance frameworks of 18 out of 20 banks) Green Hydrogen-based DRI (14 out of 20). However almost no banks specify that these solutions must be powered with renewable energy, or fully-green hydrogen. Less conventional & technologically ready solutions like MOE (10 out of 20), and demand reduction (8 out of 20) are less widely included. Some banks, like Commerzbank and BNP Paribas, have embraced circularity in steel decarbonisation.

- **Wide scale inclusion of unproven technologies:** There is also wide inclusion of false solutions within banks' sustainable finance frameworks. CCUS, despite being unproven at scale, is the most widely included (16 out of 20), followed by gas-based DRI (11 out of 20), and biomass (11 out of 20).

- **First movers on excluding false solutions:** Deutsche Bank and Barclays have excluded biomass from their sustainable finance frameworks. Additionally ING and Lloyds have explicit exclusions for offsetting projects in steel, showing other banks can follow suit.

- **Banks are already exposed to false solutions:** Out of the 20 banks examined in this report, 19 are known to be financing companies or projects pursuing false solutions, with Lloyds Banking Group being the only bank that has no identified exposure.

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Introduction

Due to its reliance on coal, the steel industry is responsible for 11% of global CO2 emissions.[1] Both through its direct production, and its supply chain of iron, metals, and coal mining, steel is currently made in a way that threatens planetary boundaries including climate change, biosphere integrity, and freshwater change.[2] Numerous pathways to align the steel sector with the Paris Agreement call for emissions cuts ranging from 24-37% of direct emissions from 2019 to 2030, and up to 49 percent if emissions from electricity use is included.[3]

This means that in order to maintain a liveable planet, the steel industry must undergo a massive material transformation, where many old fossil-based assets are phased out, and new fossil-free assets are built in their place. Additionally, supply chains and sites of production must be radically reconstituted.

Cost estimates for this transformation range from US$235–335 billion by 2050.[4] Yet, between 2016 and June 2023, 354 banks provided US$429 billion to the 100 biggest steel producers.[5] This suggests that, as major creditors and underwriters, banks hold significant leverage over the industry, but are massively under-utilising it. Just 7% of total debt to the steel sector between 2019 and June 2024 was earmarked for "green" or "transition" activities.[6] Increasing both the volume and the *quality* of transition finance for the steel industry is essential.

Not all steel decarbonisation solutions are equal. Some have the potential to further exacerbate planetary and social crises, and delay a global transition away from fossil fuels. Others, if done in meaningful consultation with workers and communities to navigate the trade-offs, could deliver a massive decrease in not only greenhouse gas (GHG) emissions, but also global air, water and soil pollution, and create better working and living conditions for communities affected by the industry across the globe. But only if finance for the transition is meaningfully conditional upon these principles.

Given the scarce volume of global climate finance, it is essential that money flows to real solutions that will deliver a just transition to fossil-free steel. This briefing will examine how 20 banks across the world are defining "green steel", i.e. which steel decarbonisation solutions are considered eligible for green financing under each bank's respective sustainable finance framework.

What is a sustainable finance framework?

Sustainable finance frameworks (sometimes called green deposit frameworks, or issuance frameworks) are frameworks adopted by banks that set out which assets/projects/technologies are eligible for green/sustainability/transition/ESG finance (often with favourable rates or conditions), and which are not. **In essence, they are powerful tools that determine how a bank defines "green steel".** Banks' sustainable finance frameworks typically align with their host country's Sustainable Finance Taxonomy, which are similar frameworks adopted by governments to direct investment/finance into specific assets to implement national climate policy.[7]

Real vs false solutions for the steel sector

BankTrack has developed a tracker to monitor which solutions for steel decarbonisation are included in 20 banks' sustainable finance frameworks. While the tracker will be continuously updated on the BankTrack website, this report presents the results as of August 2025. The tracker (Table 2) lists 10 solutions that steel companies are commonly pursuing to achieve decarbonisation. The solutions include:

- Material assets that steel companies can invest in (e.g. Electric Arc Furnaces, Direct Reduction Iron plants, direct electrification plants, and Carbon Capture Storage and Utilisation systems)
- New feedstocks for already existing steel/ironmaking assets (e.g. biomass, hydrogen injections, and fossil gas)
- Corporate-level decarbonisation strategies (e.g. material efficiency & offsetting)

BankTrack has begun to examine the nine solutions based on their risk of contributing to: GHG emissions, fossil fuel lock-in, deforestation, biodiversity loss, fresh water scarcity, and air pollution. This was a non-exhaustive exercise, which provides a starting point for understanding potential risks of solutions in steel decarbonisation.

While some solutions are much more likely to deliver a just transition to fossil free steel than others, all solutions for transforming the steel sector come with trade-offs that must be navigated carefully by banks, steel companies, and governments through meaningful consultation with stakeholders, especially workers and frontline communities. Table 1, together with Annex 2 provide a starting point for these discussions.

Real solutions

- **Renewable-powered Electric Arc Furnaces (RES-based EAFs)** – A furnace used in the steelmaking phase of production that uses renewable energy sources (RES) to melt scrap and/or green-hydrogen based Direct Reduced Iron (DRI).
- **Green Hydrogen Direct Reduced Iron (Green H2-DRI)** – "Direct Reduction" furnaces make it possible to process iron ore with green hydrogen (i.e. hydrogen produced by electrolysis powered by renewable-energy) instead of coal. The resulting green iron can then be melted in EAF to produce steel.
- **Direct electrification** – A new electrochemical process that uses renewable electricity to convert all grades of iron ore to pure molten iron, without fossil fuels. There are two main variants of this solution, namely: Molten Oxide Electrolysis (MOE) & Low Temperature Electrolysis (LTE). Unlike Green H2-DRI, this method can work with low-quality iron ore.
- **Demand reduction / Material efficiency** – The reduction of overall steel demand, and thereby production, through better recycling, better/leaner product design, extended product lifespans, and the substitution of steel with lower-impact materials.

False solutions

- **Gas-based DRI** – DRI furnaces can turn iron ore into iron using fossil gas as a reducing agent. Therefore, unlike blast furnaces, DRI furnaces can run without coal. However, there are also steel producers (primarily in India) who use coal as the energy source in a DRI furnace.
- **Biomass** – A feedstock made from plant-based material (like charcoal) that can be used as a replacement for coal in blast furnaces.
- **Hydrogen injection into blast furnaces** – Injecting hydrogen-rich gas into existing blast furnaces, partially replacing coke or other coal-based materials.
- **Carbon Capture, Utilisation & Storage (CCUS)** – Captures a portion of emissions from a steel facility, and either utilises it elsewhere by turning it into a new product (utilisation), or stores it underground (capture and storage). CCUS is most commonly proposed on blast furnaces, but there are also pilots to use the technology on gas-based DRI facilities.[8]
- **Offsetting** – Carbon offsetting involves purchasing credits from others through emissions reductions projects, or carbon trading schemes. In the steel industry, it is used to compensate for steel production emissions by investing in external projects that theoretically reduce or remove CO2, such as reforestation or renewable energy projects.

Table 1: Classifying Real vs. False Solutions risks

Real Solutions				
Risk of contributing to:	**RES-based EAFs**	**Green H2-DRI**	**Direct electrification**	**Demand reduction / Material efficiency**
GHG emissions	Low	Low	Low	Low
Fossil fuel lock in	Low	Medium	Low	Medium
Deforestation	Medium	Medium	Unknown	High
Biodiversity loss	Medium	Medium	Low	Medium
Fresh water scarcity	Low	Medium	Unknown	Medium
Air pollution	Low	Medium	Unknown	Low

False Solutions					
Risk of contributing to:	**Gas-based DRI**	**Biomass**	**Hydrogen injection into BFs**	**CCUS on BFs**	**Offsetting**
GHG emissions	High	High	High	High	High
Fossil fuel lock in	High	Medium	High	High	High
Deforestation	Low	High	Low	Low	High
Biodiversity loss	Medium	High	Medium	High	High
Fresh water scarcity	Medium	High	Medium	High	High
Air pollution	High	High	High	High	High

See Annex 2 for an explanation of our classification of real vs. false solutions.

Which steel solutions do banks consider green?

Our analysis of 20 banks' frameworks found significant variability in how banks finance green steel. There is also major uncertainty, as 13 banks have not published specific sustainable finance frameworks for the steel sector yet. Out of the 10 largest financiers of the steel industry globally, just two – Banks of China and China Construction Bank – have specific sustainable finance frameworks for the steel industry.[9] As shown in Table 3, the five banks who are the most aligned with BankTrack's definition of real solutions for steel decarbonisation are European: Barclays, Lloyds, Société Générale, Deutsche Bank, and Standard Chartered. However, no bank includes all real solutions while excluding false solutions.

Additionally, some banks - including BNP Paribas and JPMorgan Chase, informed us that they have detailed internal frameworks that are not publicly available. For the sake of transparency and accountability, it's important for banks to disclose which technologies are eligible for green finance on a sector-by-sector basis.

Table 2: False Solutions Tracker

			Are real solutions INCLUDED in the SFF?				Are false solutions EXCLUDED in the SFF?				
Bank	**Finance from 2016 - June 2023 (US$ billion)**	**Steel in SFF?**	**EAF**	**H2 DRI**	**MOE**	**Demand Reduction**	**Gas-based DRI**	**Biomass**	**Hydrogen injection into BFs**	**CCUS**	**Offsetting**
Bank of China	23	✓	✓*	✓*	✓*	?	⊖*	⊖	?	⊖*	?
China Construction Bank	20.4	✓	✓	?	?	?	⊖	⊖	?	⊖	?
Bank of America	15	⊖	✓?	✓?	?	✓?	?	?	?	⊖?	⊖?
JPMorgan Chase	11.8	⊖	✓?	✓?	✓?	✓?	?	⊖?	?	⊖?	⊖?
Goldman Sachs	11.5	⊖	✓?	?	?	?	⊖?	?	⊖?	⊖?	⊖?
CITIC	11	⊖	?	?	?	?	?	?	?	?	?
Citigroup	9.9	⊖	✓?	✓?	✓?	?	?	⊖?	?	⊖?	?
Mizuho Financial	9.8	⊖	✓?	✓?	?	?	?	?	?	⊖?	⊖?
BNP Paribas	9.3	⊖	✓*	✓	?	✓*	?	?	?	?	?
Agricultural Bank of China	8.9	⊖	?	?	?	?	?	?	?	?	?
SMBC Group	6.7	⊖	✓	✓	✓	✓	⊖	⊖*	⊖	⊖	⊖
ING Group	6.6	⊖	✓?	✓?	✓*	?	⊖*	⊖*	?	⊖?	✓
UniCredit	6.6	✓	✓	✓	?	?	⊖	?	?	?	?
Commerzbank	6	✓	✓	?	?	✓	⊖	⊖	?	⊖	?
Société Générale	5.9	⊖	✓	✓	✓	✓	⊖*	⊖*	✓	⊖	✓
Standard Chartered	4.6	✓	✓	✓	✓	✓	⊖	⊖*	⊖	⊖	✓
Deutsche Bank	4.1	✓	✓	✓	?	?	⊖	✓	✓	⊖	✓
HSBC	4	⊖	✓?	?	✓?	?	?	⊖?	⊖?	⊖?	?
Barclays	3.2	✓	✓	✓	✓	✓	⊖*	✓	⊖*	⊖*	✓
Lloyds	?	⊖	✓	✓	?	✓	✓	⊖*	✓	⊖*	✓

✓*/⊖* In the bank's sustainable finance framework under certain conditions.

✓?/⊖? Not explicitly included/excluded in the bank's sustainable finance framework; but other bank documents suggest the bank has already supported this project using green finance, or would do so in the future.

? It is unclear whether the bank includes or excludes this solution in its sustainable finance framework, either because there is no mention of it, or the wording is too vague.

Note: Omissions of technologies from SSFs do not count as exclusions.

Table 3: Overall alignment of banks with False Solutions Tracker criteria

Bank	Country	Region	Real solution inclusion rate	False Solution Exclusion rate	Total alignment Score [10]
Barclays	UK	Europe	4 / 4	2 / 5	6 / 9
Lloyds	UK	Europe	3 / 4	3 / 5	6 / 9
Société Générale	France	Europe	4 / 4	2 / 5	6 / 9
Deutsche Bank	Germany	Europe	2 / 4	3 / 5	5 / 9
Standard Chartered	UK	Europe	4 / 4	1 / 5	5 / 9
SMBC Group	Japan	Asia	4 / 4	0 / 5	4 / 9
ING Group	Netherlands	Europe	3 / 4	1 / 5	4 / 9
Bank of China	China	Asia	3 / 4	0 / 5	3 / 9
Citigroup	US	America	3 / 4	0 / 5	3 / 9
BNP Paribas	France	Europe	3 / 4	0 / 5	3 / 9
JPMorgan Chase	US	America	3 / 4	0 / 5	3 / 9
Commerzbank	Germany	Europe	2 / 4	0 / 5	2 / 9
HSBC	UK	Europe	2 / 4	0 / 5	2 / 9
UniCredit	Italy	Europe	2 / 4	0 / 5	2 / 9
China Construction Bank	China	Asia	1 / 4	0 / 5	1 / 9
Goldman Sachs	US	America	1 / 4	0 / 5	1 / 9
Mizuho Financial	Japan	Asia	1 / 4	0 / 5	1 / 9
Agricultural Bank of China	China	Asia	0 / 4	0 / 5	0 / 9
Bank of America	US	America	0 / 4	0 / 5	0 / 9
CITIC	China	Asia	0 / 4	0 / 5	0 / 9

Results by solution: real solutions

Renewable-powered Electric Arc Furnaces (RES-based EAFs): 18 out of 20 banks assessed have included EAFs in their sustainable finance frameworks. We've chosen to include general references to electrification of steel manufacturing and investments that increase metals recycling. However, no bank is explicit that the EAFs must be renewable energy based, and just one bank – BNP Paribas – is explicit about the need for the EAF to consume a certain percentage of scrap as feedstock. Banks must be more explicit about EAF feedstock (strictly scrap and green hydrogen-based DRI), and renewable electricity sourcing, as these two factors have a dramatic impact on the effectiveness of the solution.

Green hydrogen-based DRI: 14 of the banks assessed consider green hydrogen-based DRI eligible for green finance. The remaining 6 banks have included the *production and transportation* of green hydrogen in their frameworks, but do not specify its use in the steel sector. More often in these sustainable finance frameworks, green hydrogen is included as a solution for air travel, car fuel, and power system decarbonisation. This is concerning given growing and ample evidence that green hydrogen is inefficient in these sectors.[11] Green hydrogen has very limited uses outside of steel production, and given its massive land requirements and water consumption, it is essential that it is prioritised for sectors where it is effective, like steel.[12] Banks must be explicit about which end uses of hydrogen are acceptable.

Molten Oxide Electrolysis (MOE) & Low Temperature Electrolysis (LTE): Half of the banks assessed would consider MOE projects eligible for green finance at this time. The other half either make no reference to it at all; or cited a lack of technological readiness, indicating they would reconsider in the future if MOE proves to be commercially scalable. However, it is worth noting that 10 banks already explicitly include MOE, which sends a positive signal to steelmakers that they should be investing in potentially transformative solutions.

Demand reduction / Material efficiency: Despite being one of the most effective ways to minimise the impact of the steel sector on people and planet, just eight of the banks assessed make explicit inclusion of reduction/material efficiency projects in their sustainable finance frameworks. However, how banks define these projects can vary in commitment and quality. Commerzbank had the most comprehensive definition (see below). The remaining 12 banks should make explicit their commitment to pushing material efficiency across their entire financing portfolios.

Quote from Commerzbank Sustainable Finance Framework:

"Use of lighter but equivalent materials to reduce material consumption while maintaining performance | Design of products that are more environmentally friendly | Industrial symbiosis: collaboration between different industries so that waste products from one industry are used as raw materials for another | Projects to integrate the circular economy into industry"[13]

Results by solution: false solutions

Gas-based DRI: 11 banks include gas-based DRI in their sustainable finance framework. This is deeply concerning, as it allows banks to label finance for fossil-fuel consumption as "green". JPMorgan even says it will only exclude "Consumption of fossil fuels for the purpose of power generation", leaving the door wide open for consumption of fossil fuels for steelmaking. Barclays has a condition that the gas-DRI plant "must be in line with 1.5°C scenarios", implying its use as a transition fuel. While gas-based DRI is frequently justified as a transition measure, there is a severe risk of new long term gas infrastructure being built for steel plants. The fact that Lloyds has explicitly excluded it shows that other banks can too.[14]

Biomass: Biomass as a feedstock is included in 11 of the assessed banks sustainable finance frameworks, however at least five of these have conditions. The conditions require the biomass to have a third-party sustainable forestry certification, or have a lifecycle emissions intensity below a certain threshold. This raises concerns as forest certification schemes have repeatedly been proven to be lenient with non-compliant companies, inadequate in monitoring and verification, and misaligned with international policy and regulation.[15] Two banks – Barclays, and Deutsche Bank – explicitly exclude biomass for steelmaking from their sustainable finance frameworks.

Hydrogen injection into blast furnaces: 12 banks do not have a clear position on the use of hydrogen as a feedstock in blast furnaces, while five include it and four exclude it. Barclays has a condition that replacing some coal with hydrogen must be "in line with 1.5 scenarios, including regional variation between OECD and non-OECD countries where relevant". Hydrogen injection is particularly popular where blast furnaces are newer, like in India, hence Barclays' comment on "regional variation". But regardless, hydrogen injection is a false solution as green finance must not go towards fossil-based solutions. Other banks must follow the examples of Société Générale, Deutsche Bank and Lloyds.

Carbon Capture, Utilisation & Storage (CCUS): Despite its poor track record, CCUS is the most included false solution of the banks assessed, with 16 banks including it in their frameworks. Lloyds is the only bank to heavily condition it, requiring CCUS projects to capture and permanently store at least 90% of CO2 emissions. Not only has CCUS not been proven at commercial scale, but it also severely risks global fossil lock-in, and does nothing to address the air pollution from existing steel plants. Banks must take a clear stance against the use of CCUS in the steel sector.

Offsetting: Offsetting is the most excluded solution, with six banks stating that offsetting projects or programmes are ineligible for sustainable finance. This is positive, given that offsetting does not reduce real emissions coming from steel production. However, half of the banks assessed do not have a clear position, and five banks indicating inclusion in their frameworks.

Banks are already exposed to false solutions in steel

Adopting clear and strict sustainable finance frameworks is urgent. Steel clients of major banks are well underway with implementing climate action strategies that rely heavily on false solutions. Table 4 gives an overview of the climate solutions five major bank-financed steel companies are pursuing. While all have adopted real solutions as part of their decarbonisation strategy, equally all have embraced at least some false solutions.

POSCO is pursuing the fewest false solutions, with only 3 out of 6 included in its Climate Action Plan. However, it should be noted that POSCO would have previously scored 4 out of 5, but recently abandoned its mass balance product line after being sanctioned by the Korean Fair Trade Commission for greenwashing.[16] (See the box on page 13 for more on mass balance accounting.) Baosteel and Nippon are the most misaligned. Nippon Steel has been receiving pushback from civil society for its lack of ambition and credibility in its climate action plan.[17]

Table 4: Major steel companies and false solutions

Are real solutions INCLUDED in this steel company's climate plan?				
Steel Company	**Renewable-powered EAF**	**Green H2-DRI**	**MOE**	**Demand reduction**
POSCO	✓	✓	⊖	✓
Nippon Steel	✓	✓	⊖	✓
ArcelorMittal	✓	✓	✓	✓
Baosteel	✓	✓	⊖	✓
JSW Steel	✓	✓	⊖	✓

Are false solutions OMITTED from this steel company's climate plan?						
Steel Company	**Gas-based DRI**	**Biomass**	**Hydrogen injection into BFs**	**CCUS on BFs**	**Offsetting**	**Mass balance**
POSCO	⊖	✓	✓	⊖	⊖	✓
Nippon Steel	⊖	⊖	⊖	⊖	⊖	⊖
ArcelorMittal	⊖	⊖	✓	⊖	⊖	⊖
Baosteel	⊖	⊖	⊖	⊖	⊖	⊖
JSW Steel	⊖	⊖	⊖	⊖	✓	⊖

Out of the 20 banks examined in this report, 19 are exposed to false solutions. Table 5 gives an overview of which banks are most exposed to companies pursuing false solutions. The most exposed are Japanese banks Mizuho and SMBC, who also include the most false solutions in their sustainable finance frameworks. Lloyds, which has the second-strongest alignment, has no exposure to the listed companies above.

Table 5: Bank exposure to companies pursuing false solutions

	Steel companies exposed to				
Banks	**Baosteel**	**Nippon**	**JSW Steel**	**POSCO**	**Arcelor Mittal**
Mizuho Financial		$	$	$	$
SMBC Group		$	$	$	$
BNP Paribas			$	$	$
HSBC			$	$	$
JPMorgan Chase			$	$	$
Société Générale			$	$	$
Standard Chartered			$	$	$
Bank of America		$		$	$
Goldman Sachs		$		$	$
Barclays			$		$
Deutsche Bank			$		$
ING Group			$		$
Agricultural Bank of China	$			$	
Citigroup				$	$
Bank of China	$				
China Construction Bank	$				
CITIC	$				
Commerzbank					$
UniCredit					$
Lloyds					

$ *Bank is exposed to this company*

"Mass balance accounting" is helping steel companies greenwash false solutions

Banks should be wary of an approach increasingly being taken by steelmakers: mass balance. In general mass balance is an accounting methodology that allows steelmakers to pool GHG emissions reductions occurring anywhere within a company's steelmaking operations, and then issue equivalent reduction certificates to a particular product. For example, a steel company could label steel slabs made in a blast furnace as "green", using the emissions saved from it's use of EAFs.

Compared to offsetting, which has been widely scrutinised as a corporate-level decarbonisation strategy, mass balance is not yet as well known and understood by the financial sector. Increasingly, civil society and steel certification schemes like SteelZero are taking a strong position against mass balance, and calling on investors and financiers to do the same.[18] As a first step, banks must exclude mass balance product lines from their sustainable finance taxonomies, and scrutinise steelmaking clients who include it in their transition plans.

Recommendations

Sustainable finance frameworks are a powerful tool that play a significant role in the steel sector's transformation. Ensuring that real solutions are included, while false solutions are excluded is the first step. Banks cannot only look at steel decarbonisation through the lens of CO_2 emissions reduction. Transforming the steel industry will come with trade-offs that must be navigated with workers and communities.

To start the process of financing this transition, we call on banks to:

- Adopt a target to rapidly increase transition finance for real solutions in the steel sector, like renewable-based EAFs, green-hydrogen based DRI, MOE, and material efficiency in steel buying sectors, by 2030.
- Make their sustainable finance frameworks publicly available.
- Adopt a sustainable finance framework explicitly developed for the steel sector, that excludes: gas-based DRI, biomass, hydrogen injection into blast furnaces, CCUS, and offsetting approaches.
- Strengthen due diligence, transparency and accountability mechanisms to prevent harm when financing real solutions in the steel sector.
- Engage meaningfully with critical stakeholders such as labor unions and fenceline communities to navigate trade-offs in transition finance.

Annex 1: Methodology

This analysis features 20 global banks. We made the selection to ensure coverage of two categories: 1) Banks that need strong sustainable finance frameworks for the steel sector due to their significant exposure. 2) Banks that were likely to already have a sustainable finance framework for the steel sector due to existing targets and commitments. For category one, we selected the top 10 financiers of the steel sector according to research by Reclaim Finance.[19] For category two, we selected banks that have a sustainable finance target by 2030 or 2050 that explicitly includes the steel sector, according to research by ShareAction.[20] This resulted in the following banks being included: Agricultural Bank of China, Bank of America, Bank of China, Barclays, BNP Paribas, China Construction Bank, CITIC, Citigroup, Commerzbank, Deutsche Bank, Goldman Sachs, HSBC, ING Group, JPMorgan Chase, Lloyds, Mizuho Financial, SMBC Group, Société Générale, Standard Chartered, UniCredit.

We collected data from banks' public disclosures, including annual reports, sustainability reports, non-financial reports, sustainable finance frameworks, and transition plans. We then shared our initial analysis with banks, which were given one month to review, and provide comments. 13 out of the 20 banks responded (JPMorgan Chase, Bank of America, Goldman Sachs, Lloyds, BNP Paribas, Mizuho Financial, Standard Chartered, Deutsche Bank, Société Générale, Barclays, Citigroup, SMBC Group, ING Group). Where publicly available information on classification was not provided, but the bank told us a solution would be included or excluded, we reflected their answer in the tracker.

Annex 2: Real & False Solution Classifications

Electric Arc Furnaces

- **GHG Emissions:** Low If using scrap as the feedstock (as is most commonly the case with EAFs globally today), emissions could be as low as 0.01 tCO2/t of crude steel. However, if the feedstock is fossil gas-based direct reduced iron (DRI) the intensity rises to 1.4 t CO2/t steel.

- **Fossil fuel lock in:** Low If powered by renewable energy, and charged with scrap, EAFs do not need fossil-fuels to operate. Fossil fuels may still be used in iron ore mining (I.e. diesel for trucks), or for the direct reduction of iron ore using gray/blue hydrogen.

- **Deforestation:** Medium Some steelmakers are using biomass in EAFs as a source of carbon.[21] Depending on the sourcing of the biomass, and the volume of biomass used, this could facilitate deforestation (see biomass section for more detail).

- **Biodiversity loss:** Medium The build out of renewable energy requires significant land use. The steel sector consumes 5.5% of electricity, mostly for EAFs.[22] By 2050 this is projected to double according to the IEAs Sustainable Development Scenario. Building out the renewable energy supply to meet this demand can be massively land intensive, and some impacts on local flora, fauna and biodiversity are highly likely.[23]

- **Water consumption/pollution:** Low If unmanaged, EAFs can cause water pollution through slag and waste water discharge, which can release heavy metals into water sources.[24]

- **Air pollution:** Low The majority of air pollution emissions in steelmaking today come from sintering, coking, and BF processes. EAFs eliminate the need for all three of these processes, thereby drastically reducing air pollution. Additionally, since EAFs run on electricity, NOx and SO2 emissions are extremely low as no fuel is being combusted.[25] However, EAFs can still release a significant amount of dust if not managed appropriately.[26]

Green H2 DRI

- **GHG emissions:** Low Theoretically could be as low as 0.01 tCO2/t steel.[27] Stegra, which is likely to be the world's first industrial scale green H2 DRI plant, estimates that its first batch will be 0.195 tCO2/t steel.[28]

- **Fossil fuel lock in:** Medium Many steel companies are building DRI furnaces to operate initially on gas-based hydrogen, and transition to green hydrogen when it's more cost-effective. However, this creates demand for new fossil-gas infrastructure globally, which is being built with permitting and depreciation periods extending until 2050. DRI plants that initially operate on fossil-gas must have a 1.5C aligned time-bound transition plan to switch to green hydrogen.

- **Deforestation:** Medium This process requires high grade iron ore (i.e. typically containing > 67% Fe). Mines with high-grade iron ore deposits often overlap with areas of high biodiversity and forests.[29]

- **Biodiversity loss:** Medium See above.

- **Fresh water scarcity:** Medium The production of green hydrogen requires significant volumes of fresh water, due to cooling water usage for electrolysers. In part because it's most efficiently produced in areas where renewable energy potentially is the highest in the world, which overlaps with areas that are water stressed.[30]

- **Air pollution:** Medium The combustion of hydrogen can emit Nitrogen Oxides, which are linked to smog, acid rain and damaging respiratory health impacts.[31]

Molten Oxide Electrolysis

- **GHG emissions:** Low Capable of producing steel with 0 CO2 emissions if renewable-generated electricity is used.[32]

- **Fossil fuel lock in:** Low If produced at scale, MOE will require large amounts of electricity, (4 MWh/ton of steel).[33] The potential for fossil fuel lock-in will depend on the source of electricity used for electrolysis.

- **Deforestation:** N/A Because this technology is new, there is little known about how it will impact forests at commercial scale.

- **Biodiversity loss:** Low MOE does not inherently pose new risks to biodiversity loss, but continues the existing risks of iron ore mining. Because it can operate with lower-grade iron ore, it will likely not require the construction of new iron ore mines.

- **Fresh water scarcity:** N/A Because this technology is new, there is little known about how it will impact air pollution emissions at commercial scale.

- **Air pollution:** N/A Because this technology is new, there is little known about how it will impact air pollution emissions at commercial scale.

Demand Reduction

- **GHG emissions:** Low Decreasing steel production, or at least curbing its growth, is the most effective way to decrease absolute emissions. Mission Possible Partnership, and Agora Industry have both found that demand reduction pathways are the most credible and ambitious pathways to align with the Paris Agreement.[34]

- **Fossil fuel lock in:** Medium If a decrease in steel production is not planned well, curbing demand for steel has the potential to increase demand for other fossil-fuel based materials, like plastics, cement, and aluminium.

- **Deforestation:** High About half of global steel is sold to the buildings and infrastructure sector.[35] Proponents of decarbonising the built environment are looking to replace steel in construction with timber, which has raised serious concerns about land use change for timber plantations. If a truly "mass" timber industry were to be built up by 2050 to replace the steel sector, 800 million hectares of forests would have to be harvested for wood, an area of land the size of the continental United States.[36]

- **Biodiversity loss:** Medium If steel is replaced by mass timber plantations, biodiversity would severely degrade as a result. Timber plantations typically have a significantly lower variation in plant and animal species, although research shows that variation does appear to grow as the plantation ages.[37]

- **Fresh water scarcity:** Medium If steel is replaced by mass timber plantations, there is a significant risk of increased water consumption. However, the water intensity of timber harvest can be mitigated by recycling wood, and choosing plantation locations in (sub)tropical forests.[38]

- **Air pollution:** Low Curbing the growth of the steel industry is essential to mitigating global air pollution. Even countries with stricter regulatory frameworks for pollution control, like the United States, have seen rates of cancer for communities living next to steel plants be 12% higher than the national average.[39]

Gas-based DRI

- **GHG emissions:** High While gas-based DRI is lower-emissions compared to coal-based, it still emits 1.0 t CO2 in direct emissions.[40]

- **Fossil fuel lock in:** High DRI is very gas-intensive. DRI is being used as a justification for the exploitation of new gas deposits, and the construction of new gas infrastructure in Australia.[41]

- **Deforestation:** Low Beyond the typical risk of deforestation for industrial development, there are no specific forest/product risks in gas-DRI production.

- **Biodiversity loss:** Medium Expanding gas production will further exacerbate the biodiversity crisis. Both directly through large scale industrial development, and indirectly through causing pollution, and contributing to climate change, which is soon poised to the number one contributing factor to biodiversity loss.[42]

- **Fresh water scarcity:** Medium If the best available technologies for water treatment are not installed, gas-based DRI plants can discharge heavy metals, acids, and phenolic compounds into bodies of water, as was the case in the AM/NS DRI plant in India.[43]

- **Air pollution:** High Gas-DRI production contributes high amounts of dust and PM pollution, which has been linked to health problems for local populations. Voestalpine/ArcelorMittal gas-based DRI plant in Texas violated the clean air act, and had to pay out 88 million in a class action lawsuit to citizens.[44]

Biomass

- **GHG emissions:** High Compared to tradition BF-BOF pathways, biomass could reduce CO2 emissions by 31–57% (depending on the rate of substitution).[45] A study found that Brazil's steel industry saw total CO2 emissions double between 2000 and 2007, despite reduced coal use, due to increased reliance on charcoal from native forests, which can emit up to nine times more CO2 per tonne of steel than coal.[46]

- **Fossil fuel lock in:** Medium Biomass cannot fully replace coal in a large-scale blast furnace due to its lower calorific value, and high moisture content. Considering it would not entirely phase out the use of coal in steelmaking, it's possible that biomass fed facilities could be used to justify the expansion of metallurgical coal mines.

- **Deforestation:** High The most common type of biomass steelmakers are looking into is charcoal. Charcoal can either be produced through native forests, which requires mass exploitation and deforestation, or through plantations, which also leads to land clearing and monoculture in forests. A study found that native charcoal use in steel production in Brazil caused extensive deforestation in Brazil between 2000-2007.[46]

- **Biodiversity loss:** High Sustainability certification schemes tend to require the harvesting of biomass from plantations over native forests to avoid deforestation. However, industrial tree plantations lead to significant losses in native species and soil quality, and plant biodiversity through monoculture forestry.[47]

- **Fresh water scarcity:** High Biomass plantations are causing global water stress.[48] In Minas Gerais, Brazil, where eucalyptus is being grown for steel production, the groundwater level has sunk 4.5 meters in the past 45 years.[49] This leads to a loss in local livelihoods and food scarcity, as farmers are unable to water their crops.

- **Air pollution:** High There is a slight reduction in air pollution compared to coal-based steelmaking. However, since biomass is only a partial substitution, there is still significant air pollution from all the other processes of integrated steel production.

Hydrogen Injection into Blast Furnaces

- **GHG emissions:** High Theoretically, under optimal conditions (which are often not achieved), emissions reduction can be reduced by 21.4%.[50] Methane emissions from coal mining would not be mitigated.[51]

- **Fossil fuel lock in:** High Less than 1% of hydrogen produced in the world is "green".[52] Most steelmakers are exploring injecting fossil-gas, or coal-based hydrogen into their blast furnaces. This would increase demand for fossil-based infrastructure and extraction, and keep blast furnaces in operation, which will always mostly rely on coal. Additionally, the most successful hydrogen injection project thus far has only been able to replace ~15% of the total coal.[53] This means that this solution will not meaningfully reduce global demand for coal in the near future.

- **Deforestation:** Low Beyond the typical risk of deforestation for industrial development, there are no specific forest/product risks found for hydrogen-injection in BFs.

- **Biodiversity loss:** Medium Expanding fossil-fuel production for hydrogen will further exacerbate the biodiversity crisis. Both directly through large scale industrial development, and indirectly through causing pollution, and contributing to climate change, which is soon poised to be the number one contributing factor to biodiversity loss.[54]

- **Fresh water scarcity:** Medium Hydrogen production is highly water intensive. Particularly in China and the Gulf states where steelmakers are pursuing this solution.

- **Air pollution:** High Recent studies suggest that burning hydrogen-enriched fossil gas—even if we assume that hydrogen is produced from renewable sources—could increase NOx emissions up to six times that of directly burning natural gas.[56]

CCUS

- **GHG emissions:** High The world's only operational commercial-scale CCUS plant for steelmaking captured just 26.6% of emissions in 2023.[57] Additionally, methane emissions from coal mining would not be mitigated.

- **Fossil fuel lock in:** High Maintains demand for metallurgical coal, and justification to continue operating coal mines.

- **Deforestation:** Low Beyond the typical risk of deforestation for industrial development, there are no specific forest risks identified.

- **Biodiversity loss:** Medium Once captured, the CO2 must be transported and stored underground (onshore or offshore). According to the IPCC, building out the infrastructure for CC will require two to four times larger by 2050 than the infrastructure currently used by the oil industry, resulting in a massive new network of pipelines, which will require significant land use change.[55]

- **Fresh water scarcity:** Medium Depending on the scale at which it's deployed, CCUS could dramatically increase the steel industry's water consumption.[58]

- **Air pollution:** High Because CCUS would only capture CO2 emissions, air pollutants like SO2, NOX, and PM from the steel industry could still remain at levels dangerous to public health.[59] CCUS would also keep the most air-pollution intensive assets of steel plants open (i.e sintering plants, and coke ovens).

Offsetting

- **GHG emissions:** High Offsetting does not reduce real emissions coming from steel production.[60]

- **Fossil fuel lock in:** High Because it does nothing to curb the use of fossil-fuels in steel production, it maintains demand for coal mines, and justifications to continue operating coal mines without a phase out date.

- **Deforestation:** High Not a material solution, thereby it does nothing to address the steel industry's current impact. In many cases, offsetting projects have been worse for forest preservation than doing nothing.[61]

- **Biodiversity loss:** High Not a material solution, thereby does nothing to address the steel industry's current impact.

- **Fresh water scarcity:** High Not a material solution, thereby does nothing to address the steel industry's current impact.

- **Air pollution:** High Not a material solution, thereby does nothing to address the steel industry's current impact.

Annex 3: Referenced bank Sustainable Finance Frameworks

Agricultural Bank of China
- GREEN FINANCE DEVELOPMENT (ENVIRONMENTAL INFORMATION DISCLOSURE) REPORT, 2024
- Sustainable Financing Framework for Agricultural Bank of China Limited, Singapore Branch, December 2021

Bank of America
- Bank of America does not make it's 'Sustainable Finance Taxonomy" publicly accessible, but a snippet of it can be found here: Bank of America Sustainable Issuance Framework, September 2024 (page 69)
- 2024 Sustainability at Bank of America (page 41) describes steel decarbonisation levers

Bank of China
- Sustainability-Linked Loan Funding Framework, October 2023
- Annual Report on Bank of China's 2023 Transition Bond (pages 11-12)

Barclays
- Barclays Transition Finance Framework, February 2024 (page 15)

BNP Paribas
- BNP Paribas does not make it's whole 'ESG Classification Principles' publicly available, but a snippet of it can be found here: BNP Paribas Green Bond Framework, May 2025

China Construction Bank
- China Construction Bank Transition Bond Framework, April 2024 (page 17-18)

CITIC
- Green Financing Framework, July 2024

Citigroup
- Citi Green Bond Framework, January 2019

Commerzbank
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Deutsche Bank
- Sustainable Finance Framework, January 2024

Goldman Sachs
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HSBC
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ING Group
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JPMorgan Chase
- Sustainable Bond Framework, October 2022
- Steel decarbonisation levers defined here: 2024 Climate Report, April 2025 (page 7, 10, 20)

Lloyds
- Lloyds Sustainable Financing Framework 2024

Mizuho Financial
- GREEN DEPOSIT FRAMEWORK (November 2024)
- Mizuho Climate and Nature Report (pages 65, 80)

SMBC Group
- SMBC Green Deposit Framework (July 2025)

Société Générale
- Sustainable and Positive Impact Bond Framework, November 2021
- Climate Alignment report, December 2023
- Standard Chartered
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UniCredit
- UniCredit ESG Guidelines Product Summary (March 2025)
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8. See the Al Reyadah project CCS in the UAE
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10. Total score is derived by adding together the number of included real solutions, and the number of excluded false solutions.
11. Hydrogen Ladder Version 5.0, Liebreich Associates, November 2023
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13. Commerzbank ESG Framework, August 2025
14. Lloyds Bank 2024 Sustainable Finance Framework, page 16;
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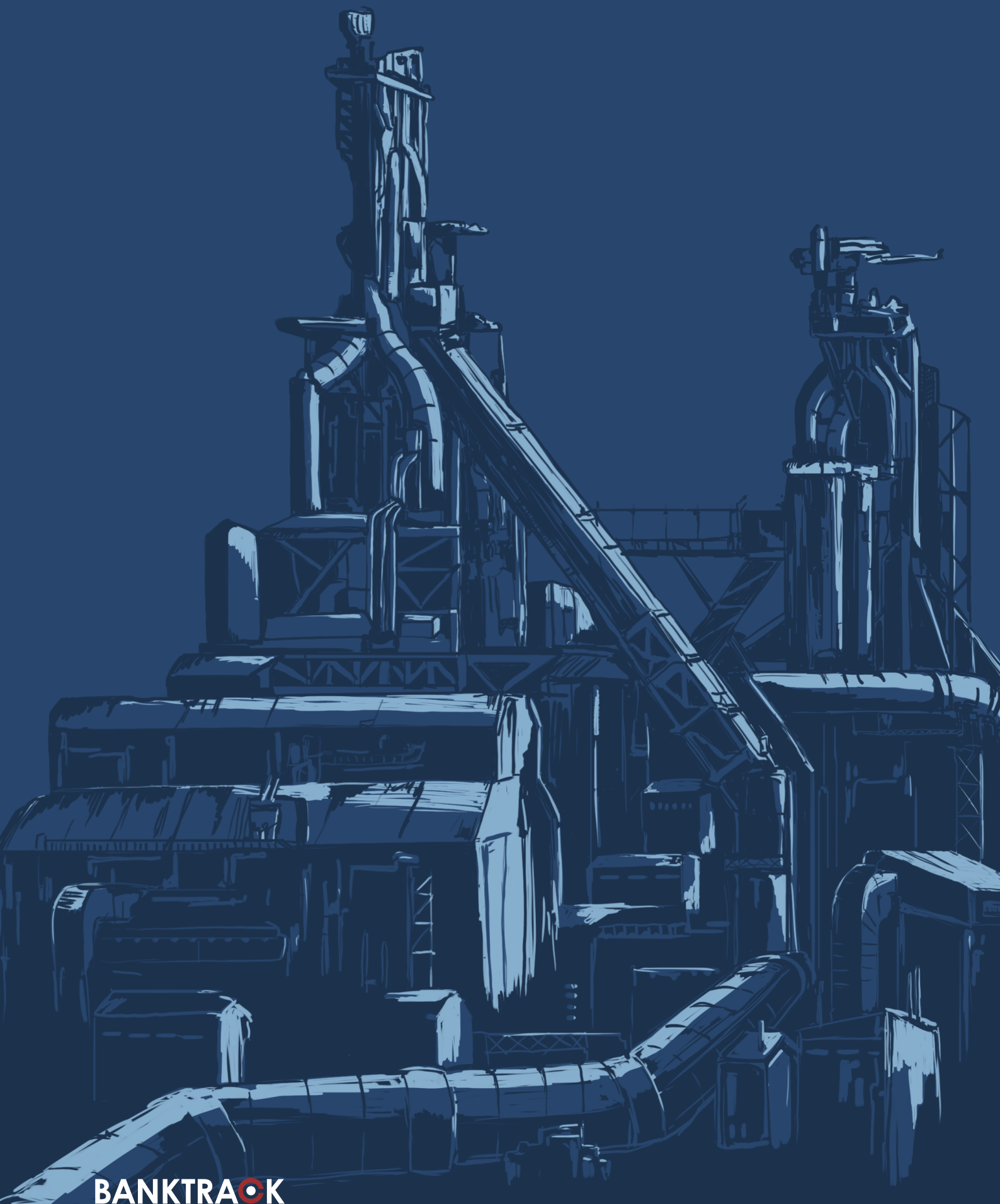

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