

Metals & mining decarbonisation and sector disclosure

Success in reducing carbon emissions will be a crucial element of corporate reporting in the metals and mining sector. In this article, we look at the universe of carbon emissions reporting, the current state of disclosure in the sector and corporates' carbon emission targets



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Decarbonisation and sector disclosures

The metals and mining sector is in the very early stages of a 30-year transition to carbon neutral production. The road to net zero carbon emissions, or carbon neutrality, will have a crucial impact on corporates in the sector through at least two channels: (a) through the growth in demand for various metals needed to build a green economy, and (b) through the decarbonisation of operating and business processes.

While the metals and mining sector is one of the biggest producers of carbon dioxide, emitting around 4.5Gt of CO₂ equivalent per year, many of the world's largest miners have set net-zero carbon targets, announcing projects to 'green' the production of aluminium, copper, steel, etc. Large-scale net-zero carbon projects remain elusive but the first steps to decarbonise have at least been taken. In June, for example, the Swedish consortium SSAB, LKAB & Vattenfall, produced the

first hydrogen-reduced sponge iron (i.e. steel) on a small scale. Meanwhile, a large number of public corporates in the sector have begun to report their carbon footprint by disclosing Scope 1, Scope 2 and in some cases, even Scope 3 emissions, although these disclosures are mostly voluntary and require improvement in the quality, frequency and credibility.

In the highly energy-intensive aluminium industry, the most advanced companies are trying to maximise the use of renewable energy but are still far from producing 'green' aluminium across the supply chain. Projects to produce 'green' nickel and copper have been announced over the last couple of years but are still far from completion. Decarbonisation will require a huge amount of investment into new technologies, such as green hydrogen production, carbon capture, storage and transportation. Technological transformation will trigger significant investment, which will be reflected in new green debt and equity supply.

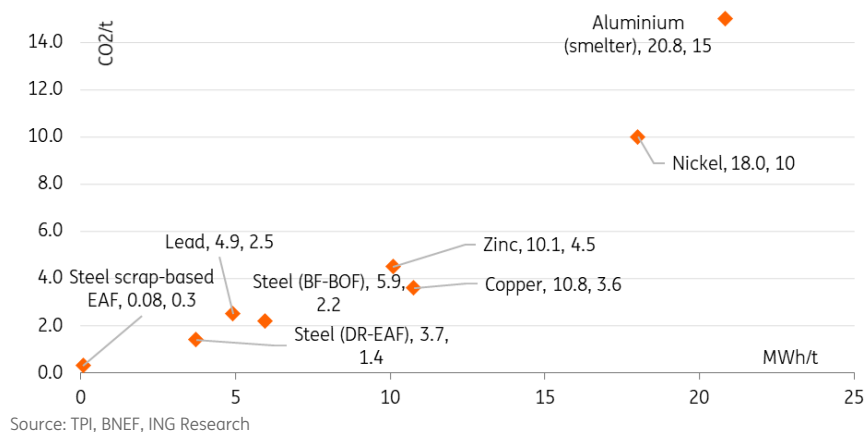
In this article, we discuss how the metals and mining sector is shifting towards carbon neutrality. We look at the emissions produced, the sector's current stance, the level of reporting from corporates and the targets they have set. We also examine the sector's share in the supply of 'green' and sustainable debt in the total green finance supply, the potential amount of investment required, and what it all means for investors.

Carbon emissions: the more energy-intensive technology, the more significant the carbon footprint

The metals and mining sector currently produces a significant portion of global CO₂ emissions. If we take 1.83t of average carbon intensity per tonne of steel produced (according to the World Steel Association) and multiply this number by the total annual steel production of 1,878mt, steel sector emissions alone lead to 3.436Mt of CO₂ equivalent, which is around 10% of the combined global 33.9Gt of CO₂ emissions in 2020. The International Aluminium Institute estimates the combined carbon footprint from the aluminium sector at around 1,050Mt of CO₂ in 2019, or 3.0% of total global emissions. Altogether, we estimate the total carbon footprint from steel, aluminium, copper, nickel, cobalt output at around 4.5GT of CO₂ equivalent in 2020, or 13.5% of global CO₂ emissions.

Overall carbon emissions depend on the total output, particular product, technology and on energy efficiency in this technology. The share of scrap used to cast primary metal may have an impact on global CO₂ emissions. Carbon intensity varies significantly not only among metal types, but also within each metal group depending on the amount of energy consumed and the type of fuel used in the technology process (energy consumed - hydro, gas, coal or renewables). The global average carbon intensity in aluminium is around 15t of CO₂/t of metals produced but declines to around 4.0t if hydropower becomes the primary energy source. In the steel sector, where 70% of the energy consumption is derived from coal, carbon intensity from an old Basic Oxygen Furnace (BOF) is around 2.2t of CO₂/t while the global average is 1.83t. Steel produced from the direct reduction - electric arc furnace (DR-EAF) method leaves 1.4t, while steel produced from scrap leaves only 0.3t of CO₂.

Carbon and energy intensity of tonne of metal produced



According to the International Energy Agency, energy intensity needs to decline by 1.2% annually in steel production and by 1.5% annually to 2030 in aluminium production to be on track with [Sustainable Development Goals](#) and to reach carbon neutrality. Carbon emissions disclosures and the setting and reaching of targets will be crucial for large public players in the sector. Investors and banks will look more closely at companies' decarbonisation track record and their achievements in increasing energy efficiency, and lowering overall carbon emissions and carbon intensity.

The universe of carbon governing rules, standards, disclosure & tracing initiatives and agencies

ESG and climate reporting is a very complicated universe. The reporting and accounting of carbon emissions, as well as the verification and audit process, imply significant investment, which assumes a certain minimum scale of business and publicity. So far, climate disclosure is not mandatory in most jurisdictions, but we believe it could be in five to 10 years' time. A large number of global initiatives on the tracing of corporate carbon emissions have emerged over the last decade. Global carbon governing rules, principles, standards and disclosure & tracing initiatives are already sophisticated and expanding further, requiring additional skills, expertise and knowledge. Most market- and voluntary-driven initiatives are aimed at forcing corporates to set up reporting systems, become transparent in terms of carbon emissions and set up targets on carbon emissions reductions. As a result, numerous disclosure standards, data sets, ESG and climate ratings and rankings, carbon disclosure ratings, green finance processes and principles have emerged. Below is a simplified map with some of the key players in this Sustainable Development universe.

Scope of carbon governing rules, principles, standards, disclosure & tracing initiatives

<p>Principles & foundations</p> <ul style="list-style-type: none"> • SDG - UN Sustainable Development Goals • COP21 - Conference of the Parties & Paris Agreement on CO2 reduction in 2015 • UN Global Compact / WEF - World Economic Forum • IPCC - The Intergovernmental Panel on Climate Change 	<p>Carbon disclosure and targets tracing initiatives</p> <ul style="list-style-type: none"> • CDP - Carbon Disclosure Project • TPI - Transition Pathway Initiative • STBI - Science Based Targets initiative • Climate Action 100+ • Carbon Tracker Initiative
<p>Sustainability reporting frameworks</p> <ul style="list-style-type: none"> • GRI - Global Reporting Initiative Standards • TCFD - Task Force on Climate-related financial disclosures • GSSB - Global Sustainability Standards Board • SASB - Sustainability Accounting Standards Board (including standards for each sector) • IIRC - The International Integrated Reporting Council • CDSB - The Climate Disclosure Standards Board • ICMM - International Council on Mining & Metals - Industry Principles 	<p>Corporate ESG ratings agencies / external reviewers</p> <ul style="list-style-type: none"> • Sustainalytics (acquired Morningstar) • MSCI ESG / FTSE Russel / ISS ESG / DNV GL / Dow Jones Sustainability Index / EcoVadis, Responsible Mining Index • S&P Global (acquired SAM Corporate Sustainability Assessment) • Moody's ESG Solutions (acquired Vigeo Eiris) • Fitch ESG Relevance <p>Auditors/ consultants:</p> <ul style="list-style-type: none"> • Accenture, BCG, McKinsey, Wood Mackenzie, PWC, KPMG, EY, Deloitte
<p>Carbon reporting standards</p> <ul style="list-style-type: none"> • GHP: Greenhouse Gas Protocol: Corporate Standards & emissions calculation tool • ISO: ISO 14064-1-2006 / ISO 14064-1:2018. Greenhouse gases reporting 	<p>Fundamental research, energy transition outlooks</p> <ul style="list-style-type: none"> • IPCC 2014/ IPCC 2021 • IEA, BP • BloombergNEF
<p>Data aggregators on carbon / ESG/ green markets data</p> <ul style="list-style-type: none"> • Bloomberg, BloombergNEF, MSCI ESG Indices, S&P Global, Refinitiv, Factset ESG <p>Fundamental initiative, sector-related associations:</p> <ul style="list-style-type: none"> • World Steel Association • International Aluminium Institute • International Gas Union • Global CCS Institute 	<p>Sustainable investments & finance framework</p> <ul style="list-style-type: none"> • PRI (Principles for Responsible investment) • SDFR: EU Sustainable Finance Disclosure Regulation • ICMA: Green/ Social / Sustainability-linked bonds principles • LMA - Loan Market Association: Green Loan Principles • CBI - Climate Bonds Initiative • Environmental Finance Bond Database • MSCI ESG / S&P Global ESG bonds and equity Indices

Source: ING Research

Side-effects of such a sophisticated universe

For investors: Excessive information from various sources (corporate reporting, ESG rating agencies data, various carbon tracing initiatives) might distract from key performance indicators such as carbon targets, the reduction of overall emissions and carbon intensity. Even if the data is protected by a paywall, this does not guarantee its credibility or offer protection from poor data quality, data checking and verification. The emergence of different reporting standards, and the large amount of reporting sources may lead to data discrepancies and in some cases, the available databases may have limited use. In the end, this could erode the value of very large databases.

For corporates: Numerous standards, initiatives, ratings and rankings may be confusing. The costs and barriers to entry in the green disclosure era may be high. Only large corporates may be able to absorb additional reporting & disclosure costs, the costs to participate in various initiatives and, in some cases, the fees for verification and green audits, etc. Larger companies are also more likely to have a market-driven motivation to invest in sustainable operating infrastructure, and sustainable/ green projects as well as conduct costly green R&D.

Current level of carbon emissions disclosure is good for sector champions, but still far from ideal across the sector and in comparison with other sectors

Despite the fact that a lot of corporates have started to publish sustainability reports and disclose various ESG data, the absence of unified reporting and the large and varied set of disclosed data mean that it is difficult to get good and credible cross-region and cross sector analysis. Tracing

carbon emissions and other environmental data is therefore quite problematic.

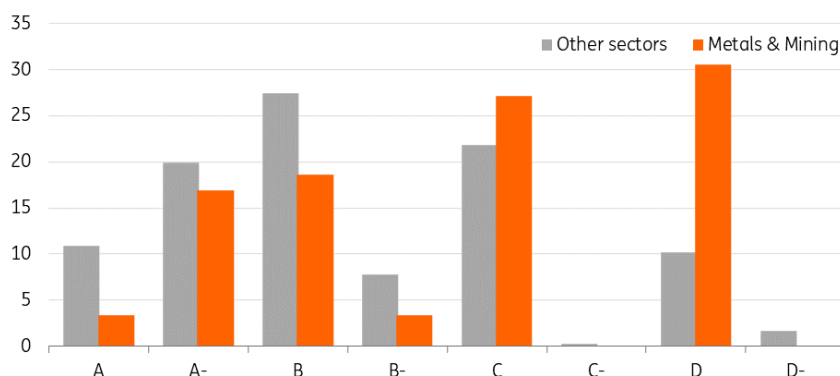
To help with this, various non-profit initiatives have emerged to help society, corporates and regulators with carbon tracing, carbon reporting, carbon emissions reductions, the setting and verifying of carbon targets, and empowering corporates to follow best market practices in carbon emissions disclosure. We have found very useful reports and data by CDP (Carbon Disclosure Project), TPI (Transition Pathway Initiative), STBI (Science Based Targets initiative) and Climate Action 100+. Sector Associations, such as the [World Steel Association](#), also provide useful aggregated numbers on carbon and energy intensity, and encourage members to become more transparent through sustainability rankings. Data gathered by these initiatives helps to gauge the current state of carbon emissions disclosure in the metals and mining sector.

Transition Pathway Initiative data (accessed in August 2021) provides information on the carbon emissions disclosure and performance of 103 companies from the metals and mining sector out of 425 participants: 21 from aluminium, 13 from diversified mining, 34 from steel sub-sectors and 35 from coal mining. According to TPI, the metals and mining sector slightly underperformed other sectors in terms of disclosure:

- **Scope 1 and Scope 2 emissions disclosure:** 66% (69 out of 103 in total) of metals and mining corporates report vs 82% (264 out of 322 in total) of other sectors
- **Scope 3 emissions disclosure:** 47% (48) reports in metals and mining vs 63% (203) of other sectors
- **Verification of Scope 1 & Scope 2 emissions:** 56% (58) corporates in sector vs 63% (204) of corporates in other sectors
- **Long-term carbon emissions reduction targets:** 36% (37 corporates) vs 65% (209) in other sectors
- **Incorporation of climate change performance into senior executives remuneration:** 28% (29 corporates) companies vs 43% (139) in other sectors

Science Based Targets Initiative (STBI) sets science-based standards and pathways for each sector based on the Energy Technology Perspectives report published by the IEA in 2014. STBI provides a step-by-step guide on how companies can reduce greenhouse gas emissions. The STBI progress report in 2020 highlights that target setting is working: the typical company with science-based targets has reduced its direct (scope 1 and 2) emissions by 6.4% per year, exceeding the 4.2% rate needed to limit warming to 1.5°C, according to pathways derived from climate scenarios. According to STBI, 338 companies with approved science-based targets found they have reduced their combined emissions by 25% since 2015 (a reduction of 302mt of CO2 equivalent) targets.

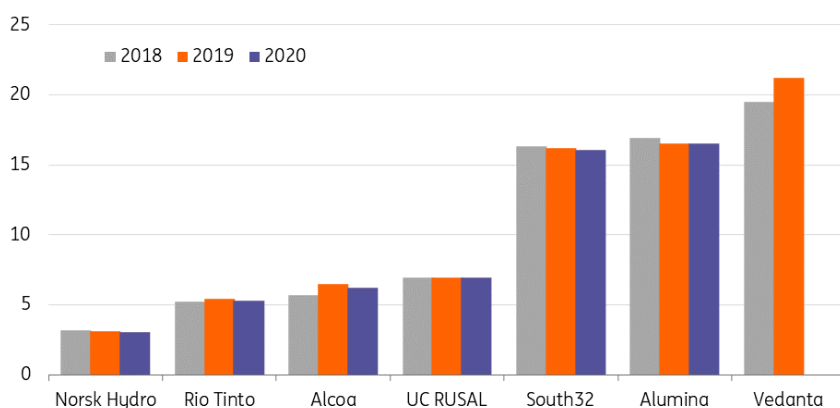
CDP 'A' – 'D' climate change ratings distribution



Source: CDP (data accessed Aug 2021)

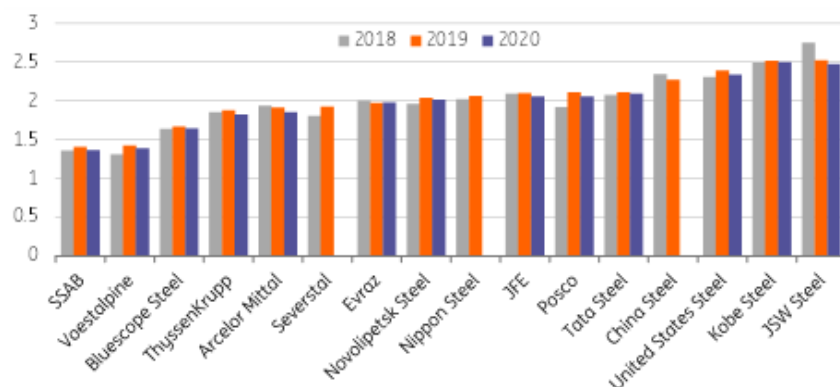
Sector champions are becoming much more transparent. More companies have started to report carbon emissions and have set long-term (2050+) and medium-term (2030) carbon emissions reduction targets. And many of the big names are reporting a massive amount of ESG-related data. As an example, Rio Tinto, which reports according to Global Reporting Initiative (GRI) Standards under the Sustainable Development Goals (SDGs), has been included in ESG indices and has received numerous ESG ratings (DJSI - 68; CDP - B, ISS OEKOM - 'C+', MSCI - 'A', Sustainalytics - 'High'). The company is also in the process of receiving ratings from FTSE4 Good, EcoVadis, RMI and Vigeo Eris. Below are the charts with carbon intensity for aluminium and steel producers, based on TPI data.

Carbon intensity: tCO2e per tonne of aluminium



Source: TPI, ING Research

Carbon intensity: tCO2e per tonne of steel



Source: TPI, ING Research

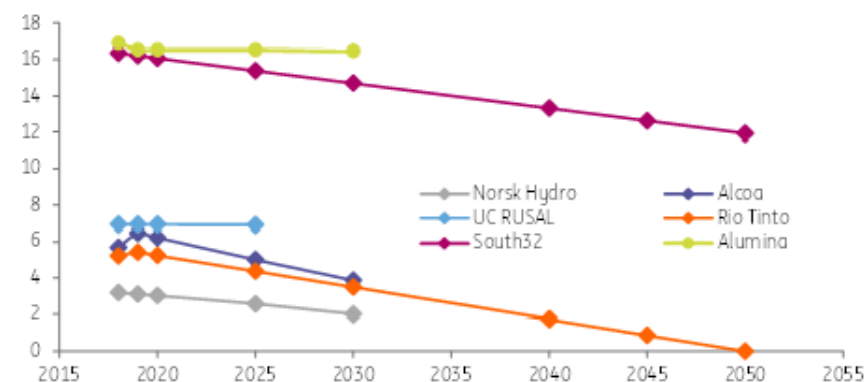
Each year, the number of corporates that set carbon emissions targets is growing. Below is the list of corporates from the aluminium, coal mining, diversified mining and steel subsectors which have already set long-term carbon emissions reduction targets.

Companies with long-term carbon emissions reduction targets

Aluminium	Coal mining	Diversified Mining	Steel
Alcoa	African Rainbow Minerals	Anglo American	Acerinox
Alumina	Anglo American (Coal Mining)	BHP	Arcelor Mittal
Arconic	BHP (Coal Mining)	Fortescue	Bluescope Steel
Chinalco	Banpu	Glencore	China Baowu Steel
EN+ Group (UC RUSAL)	Coal India	Newmont Corporation	EVRAZ
Glencore (Aluminium)	Eneos (Coal Mining)	Rio Tinto	HBIS
Nippon Light Metal	Exxaro Resources	Teck Resources	Hyundai Steel
Norsk Hydro	Glencore (Coal Mining)	Vale	JSW Steel
Rio Tinto (Aluminium)	Mitsubishi	Vedanta	JFE Holdings
Showa Denko	Sumitomo		Nippon Steel
Sumitomo Chemical	rces (Coal Mining)		Posco
Vedanta (Aluminium)	Vale (Coal Mining)		SSAB
			Otokumpu
			Sims Metal Management
			Tata Steel
			ThyssenKrupp
			United States Steel
			Voestalpine

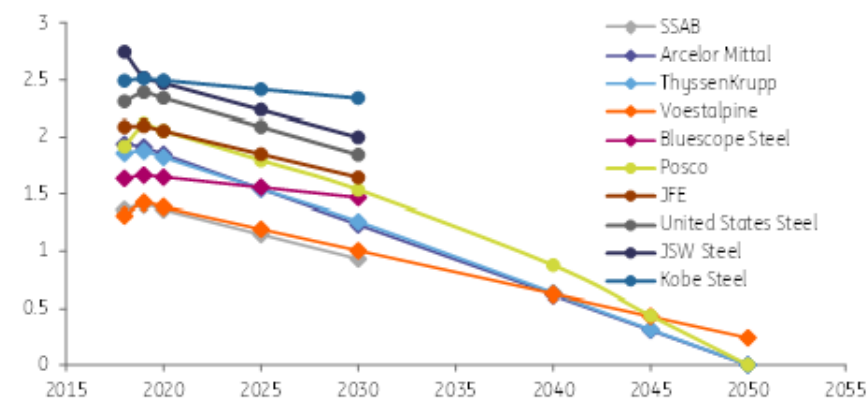
Source: TPI, BNEF

Carbon intensity targets of selected aluminium companies



Source: TPI, ING Research

Carbon intensity targets of selected steel companies



Source: TPI, ING Research

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