

Sustainable projects and investments in the metals & mining sector

Full decarbonisation of the metals and mining sector requires huge investment worth hundreds of billions of dollars. The first wide-scale, fully fledged green projects are set to be launched in a couple of years



Source: Shutterstock

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Given the lack of available data, calculating the direct environmental costs of corporate activity is not always straightforward. Investment in green and decarbonisation technologies is at a very early stage in the metals and mining sector. Companies are trying to cut their emissions, but at least at first, they are doing so without using expensive advanced technologies.

Despite setting long-term targets, the first projects are largely experimental, although more projects will be launched by 2024. The effectiveness of decarbonising technologies differs widely and new technologies need to be proven before they will be more widely adopted. That is why the level of disclosed investments is low and varies between just 5-10% as percentage of CAPEX among corporates, which have disclosed this data. However, the total investment eventually needed for long-term decarbonisation is huge, reaching hundreds of billions of dollars at least for

the metals and mining sector alone. That new investment will create additional supply in the debt capital markets as soon as mass transformation in the sector has started.

There are several general routes to decarbonising steel, aluminium and most base metals:

- **Produce fewer products**, which is unlikely to happen in the next few years, given the growing demand for metals from sectors impacted by the energy transition.
- **Use clean or CO2 neutral energy from green hydrogen derived from renewables** (wind, solar, hydro) or energy from sustainable biomass.
- **Material / Energy Efficiency** (ie, green hydrogen, direct reduced iron in steel, hybrid electric arc furnaces – already used for steel, and to be tested by aluminium producers. A transition from coal to low carbon-intensive energy sources.
- **Carbon capture and storage**. Relatively new, not widely adapted technology and not really popular given the announced projects which focus more on green energy and coal replacement.
- **Reuse & Recycle materials**. A larger share of recycled and re-used metals will also have a positive impact on carbon emissions reduction.
- **Replacement by materials produced in other sectors**. Potential substitution of some metals by plastics, for example, will also have a positive impact on carbon emissions reduction.
- **Offset carbon footprint by purchasing CO2 quotes from sectors capturing carbon emissions**.

In other words, in order to emit less greenhouse gas, the sector needs to (a) produce less, (b) use advanced technology with more energy-efficient (less-energy intensive) production, capture and store as much carbon as possible and use less carbon-intensive energy sources.

The amount of known investment in green projects varies depending on the technology used to reduce carbon emissions.

Metals & mining sector: selected key green projects to follow up in different sub-sectors

| Company/Project | Location | Investments | Project capacity (per annum) | Announce | Launch | Technologies |
|--|-----------------------|-------------|---|----------|----------------------------------|---|
| Green steel projects | | | | | | |
| ArcelorMittal SA | Gijón, Spain | EUR1.0bn | 2.3mt DRI 1.6mt steel | Jul-21 | 2025 | Green hydrogen direct reduced iron (DRI) hybrid electric arc furnace (EAF) renewable electricity, sustainable biomass |
| HYBRIT: SSAB, LKAB, Vattenfall | Gällivare, Sweden | SEK2.0bn | 1.3mt of fossil-free sponge expansion to 2.7mt steel | Jun-21 | 2026 (1st) 2030 (2nd) | Green hydrogen production: solar & wind; hydrogen plant; hydrogen storage; EAF |
| ThyssenKrupp | Germany | EUR5.0bn | 400kt by 2025 3.0mt by 2030 | Aug-20 | 2025-2030 | Green hydrogen, direct reduction |
| The H2 Green Steel | Boden-Luleå, Sweden | EUR2.5bn | 5mt by 2030 | Feb-21 | 2024-2030 | Green hydrogen |
| EVRAZ North America, Xcel Energy and Lightsource BP | Pueblo, United States | US\$250m | 240MW solar farm | Sep-21 | | Renewable electricity |
| Nickel projects | | | | | | |
| Green steel projects | | | | | | |
| Tsingshan Holding Group Co. | Indonesia | US\$2,900m | 2.0GW of solar & wind 5.6GW hydropower | Mar-21 | 2004-2026 | Refining battery-grade nickel by using own renewable energy sources |
| Copper projects | | | | | | |
| Anglo-American | Chile | | | Aug-21 | | Green hydrogen, solar energy, hydrogen powered vehicles |
| HjEx: Engie & Enaex | Antofagasta, Chile | | 2,000MW solar farm powering a 1,600MW hydrogen electrolysis to produce 124ktpa of green hydrogen to produce 700ktpa of ammonium nitrate | Jul-19 | 2024-2030 | Solar power, green hydrogen, green ammonia production which used as leaching agent in the copper industry and as a component of fertilisers |
| Hydra: Engie & Mining3 | Chile | | powertrain and refuelling system for mining vehicles | | | Mining vehicles powered by hydrogen |
| HIF (Highly Innovative Fuels project): Andes Mining and Energy, ENAP, Enel Green Power, Siemens, Parsche | Magallanes, Chile | | 250t of green methanol and 250t of carbon neutral fuel | Oct-20 | Pilot to be commissioned in 2022 | Production of carbon-neutral fuels through wind power, green hydrogen, CO2 capture |
| Aluminium projects | | | | | | |
| Elysis: Rio Tinto/Alcoa/ Québec/Apple | Québec, Canada | 188CADm | | May-18 | 2024 | Inert anode technology |
| Alcoa | Wagerup, Australia | AU\$28.2m | 3MW MVR | | 2023 | Renewal of energy for alumina refining (Mechanical Vapor Recompression) |

Source: Corporates, ING Research

Green finance is already booming, but not due to the metals & mining sector

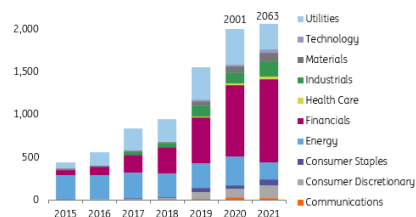
The green finance market is growing rapidly. The total number of new green debt transactions by the corporate sector in the first eight months of 2021 exceeded the total number of green debt transactions in FY2020: 2063 vs 2001, according to BloombergNEF data. The total amount of new debt placed reached US\$639bn, exceeding the US\$452b placed in 2020. This data excludes green asset-backed security transactions, government and supranational transactions and US municipal green bonds.

During the first eight months of 2021, metals and mining corporates placed 33 new bonds across the globe, worth US\$14.9b in total vs 10 new deals in 2020 worth a total of US\$2.9b. The share of green bond transactions from the metals and mining sector is around 2% of the total number of deals by all corporates across the globe.

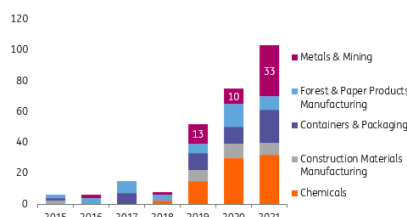
We believe the number of deals and the amount of debt placed by the metals and mining sector will grow rapidly, starting from 2023-2024, as a large number of corporates in the sector advance their carbon emissions reduction projects and as new technologies are adopted.

Green debt transactions

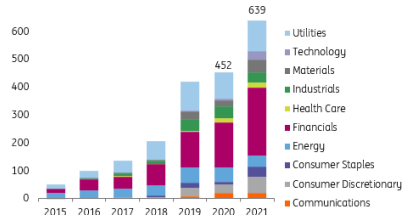
Number of new debt transactions by sector



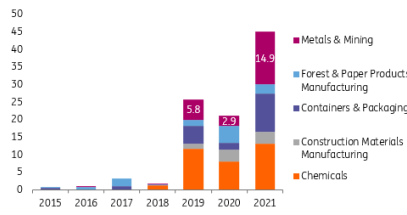
Number of new debt transactions in Materials sector



Amount of new debt transactions by sector (US\$bn)



Amount of new debt transactions in Materials sector (US\$bn)



Source: BNEF

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