

Metals and Mining

ESG Evaluation Key Sustainability Factors

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ANALYTICAL CONTACTS

Bertrand Jabouley
Singapore
+65-6239-6303
bertrand.jabouley
@spglobal.com

Bruno Bastit
Madrid
+34-682-67-2259
bruno.bastit
@spglobal.com

Simon Redmond
London
+44-20-7176-3683
simon.redmond
@spglobal.com



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Approach

Our key sustainability factors identify the most material environmental and social risks assessed in our ESG Evaluation. We assess the materiality¹ of those risks across the metals and mining value chain and reflect them in the weighting of our environmental and social factors. We also provide the quantitative indicators used to assess a company’s performance relative to its industry peers on each of those risks. For further information, please refer to our [“Environmental, Social, And Governance Evaluation: Analytical Approach.”](#)

Scope

The sector encompasses companies operating along the metals and mining value chain. This includes exploration, extraction, processing, smelting and refining, semi-fabrication and metal manufacturing. We distinguish between metal and mining organizations, depending on where they operate in the value chain. Mining companies extract, process, and refine minerals and provide mining services to produce metals like gold, iron, or copper; and coal. Metals companies produce a breadth of metal products including primary inputs, recycled materials, and advanced alloyed materials.

Material environmental risks



- **Pollution (air, water including groundwater, soil) and waste (including hazardous waste)** occurring in the extraction, processing, and transformation of minerals.
- **Land and biodiversity risks** due to the highly disruptive nature of mining, as well as the significant costs associated with remediation.
- The **greenhouse gas (GHG) emissions** stemming from the industry’s energy intensity and the use of minerals as raw materials in other industries. Coal mining is particularly exposed given the considerable scope 3 emissions associated with coal combustion.
- **Water**-intensive methods of extracting and processing minerals. **Flooding risk**, and high associated remediation costs.



Environmental factors: weighting and KPIs

We will analyze how a company endeavors to contain its operations’ footprint through its value chain, given the high environmental impact of the industry. In our ESG Evaluation, we use qualitative and quantitative indicators to inform our opinion of an entity’s management of its environmental effects relative to industry peers. An example of a qualitative indicator is the quality of site rehabilitation, given that mining companies usually have a legal obligation to restore mining assets as close as possible to pre-production conditions.

Mining





The industry is exposed to considerable environmental risks, among which it may be difficult to establish a hierarchy. Operations are water and energy intensive, translating into sizable direct GHG emissions. Mining can utilize and generate some dangerous substances, including mercury, sulfuric acid, arsenic or lead, and creates considerable waste: tailings. Minerals extraction is also disruptive to land and biodiversity.

Factor	Weight	Key performance indicators	Other performance indicators
 Greenhouse gas emissions	25%	<ul style="list-style-type: none"> – Scope 1 and 2 emissions intensity (in tons of carbon dioxide equivalent [tCo2e], per ton of output produced and/or US\$ million of revenue). 	<ul style="list-style-type: none"> – Energy use (in mega watthour [MWh] or gigajoule [GJ] per ton of output produced and/or US\$ million of revenue). – Renewable energy in energy mix (% total energy used). – Scope 3 emissions (in tCo2e), per ton of output produced and/or US\$ million of revenue).
 Waste and pollution	25%	<ul style="list-style-type: none"> – Tailings and waste per metric ton of output produced (in metric tons). – Waste recycled (% total waste). – Pollution incidents (number and associated cost of remediation). 	<ul style="list-style-type: none"> – Hazardous waste per ton of output produced (in metric tons). – Air pollution per metric ton of output produced (NOx, SOx, and particulate matter, all in metric tons). – Tailings impoundments (number). – Wastewater volumes (cubic meters [m3] per ton of output produced and/or US\$ million of revenue)

Factor	Weight	Key performance indicators	Other performance indicators
 Water	25%	<ul style="list-style-type: none"> – Total fresh water withdrawn (in m3 per ton of output produced and/or US\$ million of revenue). – Total fresh water consumed (in m3 per ton of output produced and/or US\$ million of revenue). 	<ul style="list-style-type: none"> – Water withdrawn from areas exposed to high and very high water stress (% water withdrawn). – Recycled water (% total water withdrawal).
 Land use and biodiversity	25%	<ul style="list-style-type: none"> – Proved and probable reserves in or near protected areas (% total). – Spending on site restoration (% recurring operating expenses). 	<ul style="list-style-type: none"> – Operating assets located in protected areas (% total).

Metal Production and Processing

The industry is energy intensive with high related GHG emissions, particularly resulting from the consumption of fossil fuels to operate equipment. In addition, the smelting, refining, and processing of metals and minerals often requires chemicals that create substantial pollutant emissions and waste residue. As a result, we believe waste and pollution are almost as significant as carbon emissions, while water and land use are not as relevant.

Factor	Weight	Key performance indicators	Other performance indicators
 Greenhouse gas emissions	40%	<ul style="list-style-type: none"> – Scope 1 and 2 emissions intensity (in tCo2e, per ton of output produced and/or US\$ million of revenue). 	<ul style="list-style-type: none"> – Energy use (in megawatt hour [MWh] per ton of output produced and/or US\$ million of revenue). – Renewable energy in energy mix (% total electricity used). – Total fuel consumed (in gigajoules) – Fuel mix between coal, natural gas, renewable sources (%).
 Waste and pollution	30%	<ul style="list-style-type: none"> – Total waste (slag, dusts, and sludges) per metric ton of output produced (in metric tons). – Waste recycled (% total). 	<ul style="list-style-type: none"> – Hazardous waste per ton of output produced (in metric tons). – Air pollution per metric ton of output produced (NOx, SOx and particulate matter, all in metric tons). – Wastewater volumes (cubic meters [m3]) per ton of output produced and/or US\$ million of revenue).
 Water	20%	<ul style="list-style-type: none"> – Total fresh water withdrawn (in m3 per ton of output produced and/or US\$ million of revenue). – Total fresh water consumed (in m3 per ton of output produced and/or US\$ million of revenue). 	<ul style="list-style-type: none"> – Water withdrawn from areas exposed to high and very high water stress (% water withdrawn). – Recycled water withdrawals (% total water withdrawal).
 Land use and biodiversity	10%	<ul style="list-style-type: none"> – Operating assets in areas with protection or conservation status (% total assets). 	<ul style="list-style-type: none"> – Operating assets in areas with threatened, vulnerable, endangered, and critically endangered species (% total assets).

Material social risks

- **Health and safety** of employees, contractors, and local communities, as according to the International Labor Organization, “*mining remains the most hazardous occupation when the number of people exposed to risk is taken into account*”. The exposure of mining companies to safety risks partly depends on the location and nature of their operations, e.g. underground mining is typically riskier than open pit operations. Likewise, the production of metals may present significant risks to employees and contractors, inter alia due to the high temperatures and heavy machinery involved.
- **Human rights** violations, and broadly speaking how companies in the industry manage relationships with neighboring communities, including indigenous groups, especially companies operating in remote areas, conflict zones, and jurisdictions with lower social or governance standards.





Social factors: weighting and KPIs

We will analyze how a company preserves the physical integrity and well-being of all its stakeholders, at the forefront of which we place people working on industrial sites and communities living nearby. Not all these variables are tracked or quantifiable, meaning our analysis may be more qualitative.

Examples of qualitative indicators include an entity’s engagement with its communities, i.e. its ability to preserve their way of life while ensuring they benefit economically from its activities.





Mining

As mining is a highly hazardous activity, we emphasize the safety of key stakeholders (including employees, contractors, and local communities) in our analysis. The second most important parameter is relationship management with local communities, given that there may be conflict when companies receive or exploit mineral concessions without the relevant and local individuals or communities agreeing (Free, Prior and Informed Consent) and/or receiving appropriate compensation.

Factor	Weight	Key Performance Indicators	Other performance indicators
 Safety management	40%	Lost time injury frequency rate (LTIFR) for employees and contractors. Near miss frequency rate (NMFR) for full-time employees and contract employees. Fatalities (number per 10,000 employees).	Total Recordable Injury Frequency Rate (TRIFR) for employees and contractors. Suppliers assessed and audited on their safety performance (% total). Record of safety incidents with communities (i.e. with people not working directly for the company).
 Communities	30%	Cash contributions, employee volunteering and in-kind giving converted into U.S. dollars. Project delays as a result of community opposition (number, duration in days and estimated cost [in US\$ million]).	Incidents with security providers (number). Proved and probable reserves or operating assets in or near areas of conflict and/or indigenous land (%). Economic opportunities benefitting local communities, such as procurement contracts, direct and indirect jobs.
 Workforce and diversity	20%	Voluntary and involuntary turnover rate (% total workforce). Training per employee (US\$ spent and number of hours). Strikes and lockouts (number and duration in days).	Full-time employees, temporary employees, and contractors (% total workforce). Labor covered under collective agreements (% total and by region).
 Customer engagement	10%	Offtake agreements in place: nature (take or pay), longevity (number of years), customer profile (trader, industrial buyer). Trend in regional/global market share (%).	Record of customer retention and satisfaction.

Metal Production and Processing

Production processes may be complex, necessitating the recruitment and retention of a skilled labor force and the maintenance of stringent safety procedures and checks to protect personnel and end-users' physical integrity. Customer engagement is more important in this value chain, which extends further downstream compared to mining and becomes less commoditized.

Factor	Weight	Key Performance Indicators	Other performance indicators
 Safety management	35%	<ul style="list-style-type: none"> – Lost time injury frequency rate (LTIFR) for employees and contractors. – Near miss frequency rate (NMFR) for full-time employees and contract employees. – Fatalities (number per 10,000 employees). 	<ul style="list-style-type: none"> – Total Recordable Injury Frequency Rate (TRIFR) for employees and contractors. – Suppliers assessed and audited on their safety performance (% total). – Record of safety incidents with communities (i.e. with people not working directly for the company).
 Workforce and diversity	30%	<ul style="list-style-type: none"> – Voluntary and involuntary turnover rate (% total workforce). – Training per employee (US\$ spent and number of hours). – Strikes and lockouts (number and duration in days). 	<ul style="list-style-type: none"> – Full-time employees, temporary employees, and contractors (% total workforce). – Labor covered under collective agreements (% total and by region).
 Communities	20%	<ul style="list-style-type: none"> – Cash contributions, employee volunteering and in-kind giving converted into U.S. dollars. – Project delays as a result of community opposition (number, duration in days and estimated cost [in US\$ million]). 	<ul style="list-style-type: none"> – Incidents with security providers (number). – Proved and probable reserves or operating assets in or near areas of conflict and/or indigenous land (%) – Economic opportunities benefitting local communities, such as procurement contracts, direct and indirect jobs.
 Customer engagement	15%	<ul style="list-style-type: none"> – Offtake agreements in place: nature (take or pay), longevity (number of years), customer profile (trader, industrial buyer). – Trend in regional/global market share (%). 	<ul style="list-style-type: none"> – Record of customer retention and satisfaction.

Submit Feedback

You can submit your feedback [online](#), or by [email](#).

Please specify which sector you are commenting on when submitting feedback.

We would particularly like to hear from you regarding:

1. Which Risks and Opportunities are missing or not relevant?
2. Which KPIs are missing, could be enhanced, or are not relevant?
3. What views do you have on the suggested factor weights for the environmental and social analysis?
4. Do you have additional feedback(s) on this document?

Related Research

- [“ESG Evaluation Newsletter.”](#) published Feb. 3, 2021
- [“The ESG Risk Atlas: Sector And Regional Rationales And Scores.”](#) published July 22, 2020
- [“Our Updated ESG Risk Atlas And Key Sustainability Factors: A Companion Guide.”](#) published July 22, 2020
- [“Environmental, Social, And Governance Evaluation: Analytical Approach.”](#) published Dec. 15, 2020
- [“How We Apply Our ESG Evaluation Analytical Approach: Part 2.”](#) published June 17, 2020

Analytical Contacts

Bertrand Jabouley
Sustainable Finance
Singapore
+65-6239-6303
bertrand.jabouley
@spglobal.com

Simon Redmond
Corporate Ratings
London
+44-20-7176-3683
simon.redmond
@spglobal.com

Donald Marleau
Corporate Ratings
Toronto
+1-416-507-2526
donald.marleau
@spglobal.com

Diego Ocampo
Corporate Ratings
Buenos Aires
+54-11-6573-6315
diego.ocampo
@spglobal.com

Bruno Bastit
Sustainable Finance
Madrid
+34-682-67-2259
bruno.bastit
@spglobal.com

Noemie de la Gorce
Sustainable Finance
London
+44-20-7176-9836
noemie.delagorce
@spglobal.com

Paul Munday
Sustainable Finance
London
+44-20-7176-0511
paul.munday
@spglobal.com

Lai Ly
Sustainable Finance
Paris
+33-1-4075-2597
lai.ly
@spglobal.com

Michael Ferguson
Sustainable Finance
New York
+1-212-438-7670
michael.ferguson
@spglobal.com

Florence Devevey
Sustainable Finance
Paris
+33-1-4075-2501
florence.devevey
@spglobal.com

Bernard de Longevialle
Sustainable Finance
Paris
+33-1-4075-2517
bernard.delongevialle
@spglobal.com

Hans Wright
Sustainable Finance
London
+44-20-7176-7015
hans.wright
@spglobal.com

Patrice Cochelin
Sustainable Finance
Paris
33-1-4420-7325
patrice.cochelin
@spglobal.com

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