Resources: Metals and Mining

Sustainable Development Analysis Framework

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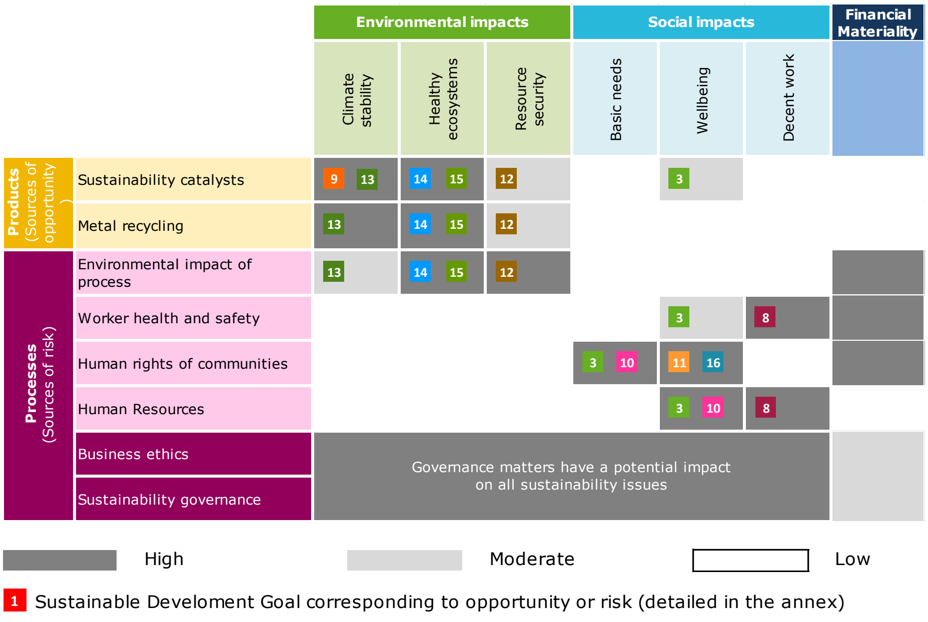
Sectors: Exploration & production of aluminium, diversified metals & mining, gold, precious metals & minerals, silver, and steel

This is a methodological document aimed at clarifying how Mirova takes into account sustainable development issues in the framework of the environmental, social and governance analysis of each sub-sector of activity.

Metals are crucial to the global economy through to their pervasive use in our daily lives: from industrial equipment and buildings, to cars and mobile phones, metals are used in a variety of modern applications. Yet their resources are finite and their recyclability rates remain low today. We will thus expect vertically-integrated companies to increase the share of metal recycling in their portfolio. In addition, while metals have no exclusive use, some are indispensable in sustainability applications that contribute to the transition to a low carbon economy, such as platinum used in catalytic converters to reduce pollution from traditional engines, and lithium in electric vehicle batteries. Because of their exposure to these metals, some mining companies will therefore be indirectly exposed to sustainability applications. From a sustainability perspective, the industry faces structural challenges related to working conditions and human rights and also engenders significant environmental impacts through to access to resources and waste disposal. Such spillovers are unlikely to decrease in light of falling iron grades globally and the consequent larger and deeper underground operations needed to attain them. Therefore, appropriate risk management will play a crucial role in our assessment of mining companies.

Major sustainability challenges for the sector



Source : Mirova, 2019

Table of contents

Opportunities for sustainable development

2.9 kg of lithium are needed on average in an electric vehicle (EV). Only 1.5 kg is needed in hybrid rechargeable vehicles (PHEV).

(Mirova, 2013)

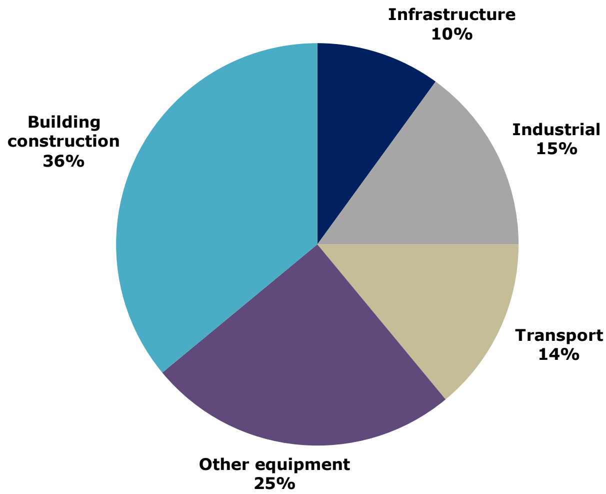
E/S Sustainability catalysts

Since the industrialisation, the way metals are used has evolved, with a number of new applications requiring the use of different types of metals, often in small quantities, such as IT, mobile equipment and renewable energies (e.g. solar panels). Traditional sectors, such as medical equipment and transport, have seen an evolution in the way metals are used and combined through to technological development. Furthermore, with the exclusion of some specific technologies, such as lithium for batteries, metals usually have multiple end-uses.

Abundant metals

Bulk commodities such as iron ore and its derivative product, steel, are primarily used in the construction sector (over 50% of demand) (World Steel Association) as well as in the transport sector, especially advanced high-strength steels (AHSS) which we expect to make between 15% and 20% of light-weight vehicles until 2020 (Mirova, 2013). Steel is often combined with other base metals, such as zinc (60% of its end use) and nickel (70% of its end use) to improve its properties. Other base metals, such as aluminium and copper, have a wider field of application and can also be used in technologies related to the energy transition such as wind power (e.g. copper cables) and light vehicles (e.g. aluminium sheets). About one-third of the global aluminium production is used in the transport sector (e.g. aircraft components), due to its properties that reduce vehicles' weight and thus lower fuel consumption and related CO2 emissions. However, this gain in the carbon footprint is offset by the fact that aluminium production is very energy intensive (Mirova, 2013). Copper, on the other hand, is widely used both within the renewable energy sector (primarily wind turbines) as well as in electric vehicles where it finds application in a variety of electronic components and cables. However, while copper demand could potentially increase by 43% by 2035 (McKinsey Global Institute, 2017), such increase will be driven by copper's vast applicability in a number of sectors (Figure 1) - primarily the electronics industry - and not specifically by the energy transition. On the other hand lithium, which is also an abundant metal, has seen a surge in demand due to electric vehicle batteries, which constituted over 40% of total demand in 2017 (McKinsey Global Institute, 2018). While this demand could dramatically increase with the rise of lithium-ION batteries, lithium extraction causes environmental concerns, particularly due to a significant water use (~2000 m^3 of water are used to produce one tonne of lithium) which is a source of tension between the mining companies and the local communities, especially in Argentina and Chile where lithium reserves are more abundant (Mirova, 2019).

Figure 1: Copper usage by end-sector



Source: Copperalliance, Mirova (2019)

Critical metals

According to the European Commission, there are a number of metals that may hinder the development of technologies related to the energy transition because of their scarcity. These so-called "critical" metals include, among others, cobalt, rare earths and a precious metal, platinum. Widely used both in traditional and hybrid vehicles, rare earths find increasing application in the electrification of transport. With regard to precious metals (gold, silver, platinum) and diamonds, these are also used in different sectors, including primarily consumer products through jewellery (~50% for gold, ~30% for platinum and ~20% for silver). Precious metals are also used in other industrial applications, in particular platinum and its associated metals (palladium and rhodium) which are widely used in autocatalysts, both in thermic and hybrid vehicles (~2 grams per vehicle) and, increasingly more so, in electric vehicles (~20 grams per vehicle) (Mirova, 2019). In addition, cobalt, which today represents ~40% of Lithium-ION batteries, is often mined as a by-product of nickel and copper, and is present in very limited supply. Due to high extraction prices and very concentrated production (~60% of cobalt is extracted from the Democratic Republic of Congo, or DRC) the amount of cobalt has seen a ten-fold decrease in the latest battery technologies, and it could be completely substituted by other metals by 2030 through to further technological progress (Mirova, 2019).

Coal

While also derived from mining activities, coal is dealt with in more detail in our analysis of the Energy sector focusing on Fossil Fuels. We note that coal mining presents significant social and environmental risks related to extraction, while also causing significant pollution when burned. In addition, coal creates the highest emissions per unit of energy produced. Therefore, we exclude from our investments mining companies with 10% or more of coal production within their commodity portfolio.

We value metal and mining companies producing and marketing metals that derive a significant proportion of their current and/or projected demand from technologies with sustainability value-added. As of today, we have identified platinum and lithium as metals with a demand significantly driven by autocatalysts and electric vehicles, which have direct contribution to pollution reduction and the electrification of transport.

Key indicators

- Revenue from production and/or sale of metals with sustainability value-added
- Capex and/or R&D spending dedicated to metals with sustainability value-added

E

Metal recycling

~40 tonnes of

Waste electronic and electrical equipment (WEEE), are generated each year.

(UNEP, 2013)

In contrast to fossil fuel resources, mineral resources can theoretically be recycled infinite times, therefore prolonging their finite lives. In practice, however, recycling rates of metals are typically very low across the globe (UNEP, 2013). This is due to a few key obstacles: the quality of the raw material present in the end-use products to be recycled, and the treatment cost.

Quality of raw materials is essentially determined by the type of product and its complexity: metals mainly used for simple (bulk) products in large quantities, such as nickel, lead, zinc, copper, aluminum and steel are typically easier to recycle, while others that are found in small quantities in electronic components such as mobile phones or modern car circuits, present technological challenges for recovery with little economic value associated to it due to the cost of treatment. Such cost of treatment, and thus the economic yield of metal recycling, is influenced by a variety of factors including the price of raw materials (which explains why precious metals typically display high recycling rates), the infrastructure for collecting and dissembling the end-use products, as well as their geographical location.

These factors have a combined influence on a metal’s end-of life recycling rate (EOL-RR), which describes the fraction of metal in discarded products that is reused so as to retain its functional properties, as well as the recycled content (RC), i.e. the percentage of recycled scrap as a proportion of input in metal production. A United Nations panel has recently estimated that out of 60 elements only 18 (mainly base metals and precious metals) have an EOL-RR of 50% or above and an equivalent ratio of metals is seldom, if ever recycled. Furthermore, even for metals that display high recycling rates, research shows that these are recycled only a few times before being lost to waste. Despite displaying a high EOL-RR, metals usually display a lower recycled content. For instance steel has an EOL-RR of 85%, but a global recycled content of only ~40% (World Economic Forum, 2015). This is due to higher demand in developing countries lacking recycling infrastructure, and supply-demand gaps for scrap metal.

Although recycled metals can only partly contribute to future demand, they can increase the available supply and also have a better environmental profile overall than non-recycled virgin metals: they provide social and environmental benefits, primarily associated with the reduction of the extraction of virgin ores and related biodiversity impacts. Therefore, the metal recycling process generally also has lower energy content with consequent climate benefits.

In order to increase recycling rates of end-products, design for resource efficiency needs to be scaled up, with a focus on product recycling rather than material recycling. In addition, both customer awareness around recycling issues and collection of materials need to improve, in order to enable higher metal recycling rates.

Despite the challenges to recycling exposed above, we believe recycling is the key to reduce the environmental and social risks deriving from mining activities that will be described later on. Therefore, integrated mining companies and steel producers that increase the amount of recycled ore in their productions will be exposed to sustainability-related growth drivers and, consequently, less to the risks related to traditional mining operations. We will therefore value mining companies adopting a strategy that emphasises metal recycling, regardless of the type of metal recycled. We recognise that mining companies involved solely in the extraction phase are not exposed to significant recycling opportunities. In addition, mining companies are not responsible for collection and recycling of the end-products where their materials are used. However, integrated mining companies that have a significant rate of recycled materials within their smelting operations may present investment opportunities related to sustainable development. In addition, companies involved in the metal recycling value-chain, from collection to refining, and those providing ancillary products and services to these activities will also present sustainable-development opportunities.

In order to provide a sustainable supply of metals with environmental benefits, companies within the metals and mining sector need to be increasingly involved in metal recycling. Non-integrated mining companies that are not exposed to such trends do not present sustainable development opportunities related to metal recycling.

Key indicators

- Revenue from metal recycling
- Capex and/or R&D spending dedicated to metal recycling activities
- Targets and objectives to increase recycling capacity

Sustainability opportunity exposure

	Indicators considered: % revenues from production and/or sale of metals with sustainability value-added and/or from activities related to metal recycling	
High exposure	>50%	The analysis of CapEx and R&D budget devoted to the activities identified as bearing opportunities will qualitatively nuance the analysis based on revenues.
Significant exposure	Between 30% et 50%	
Low or no exposure	<30%	
Negative exposure	>10% coal production Activities related to metals aimed at purposely speculating on commodity prices	

Source : Mirova, 2019

Risk review

E Environmental impact of process

3x as much material needs to be moved today for the extraction of the same amount of ore as a century ago, depending on the metal.

(UNEP, 2013)

Environmental impacts associated with mining activities occur primarily during the mining phase, when land is cleared and ores are extracted from the ground. The magnitude of such impacts depends on many factors, including the type of mine (i.e. underground, open-pit, fluvial), the topography of the soil and the method used for collecting tailings. Although extraction activities are carried within the concession area, mining operations require infrastructure and processing facilities that may extend well beyond.

Environmental impacts can be both direct (i.e. directly stemming from the mining operations, such as land clearing) and indirect, such as contamination by pollutants in waste sites. Studies show that such impacts stem primarily from natural resources access and waste management (WRI, 2003).

Waste management presents significant challenges to ecosystems through the processing and storage of residual materials in tailing ponds, and sometimes reversal in water streams. In addition, mining requires the use of toxic chemicals for ore treatment, such as cyanide, which frequently entails pollution of air, water and soil if not handled properly. Sometimes concerns over pollution may halt initiated projects, as in the case of Pascua-Lama, a Chilean gold mine straddling the border with Argentina, which was suspended in 2013 by Chile's Supreme Court over fears that it would pollute rivers. The two international mining companies involved in the project had already spent USD5 billion on the mine (The Economist, 2016).

Mining companies are legally responsible for environmental damages deriving from their operations. However, while usually required by local legislation, biodiversity assessments often fail to capture interdependencies between the environment and human health, and thus overlook the broader impacts of mining projects. In some countries, such as South Africa, which hosts a significant proportion of the earth's metal resources – such as the world's largest reserves of manganese and platinum group metals (PGMs), and some of the largest reserves of gold and diamonds – mining companies are also economically responsible for associated indirect impacts of their projects. Nevertheless, countries around the world have different regulations about environmental protection and biodiversity restoration. Often times in low-income countries the perceived socio-economic benefits of the exploration activities may be seen as outweighing the environmental costs. However, environmental accidents such as failures of tailing ponds and pollution of water streams may cause irreversible damage to local ecosystems and thus magnify the environmental costs of extraction operations.

Access to natural resources may translate into land and aquatic habitat degradation and associated loss of species, alteration of ecological processes (e.g. disruption of the local hydrological cycle), and competition for natural resources, particularly water in water-stressed countries. In Chile, which hosts the world's largest copper reserves, water stress has forced several mining companies to curb output, pitting them against local communities. As in the case of Escondida's mine project in Chile, companies have also been forced to build desalination plants in order to reduce freshwater intakes to pursue operations, with significant consequences for the overall cost of the project (total investment at Escondida's desalination plant was estimated at over US $3bn in 2015 so as to reduce freshwater intake by about 50%).

Desalination plants, although increasingly common, drive increased energy consumption for mining operations and thus, in most cases, a higher associated CO_2 footprint.

Greenhouse gas emissions are also associated with mining operations: while at the extraction phase these are primarily related to blasting, infrastructure development and ore separation and transportation, carbon emissions are higher during the smelting phase, thus for integrated mining companies. GHG emissions related to smelting vary according to the metal treated (e.g. ferrous vs. non-ferrous metals) and the type of feedstock used. However, as ore grades decline globally, the energy intensity of mining is set to increase and thus the industry's overall carbon footprint.

Finally, mines do not last forever: at some point operations need to be closed and companies need to rehabilitate the mine area to safe standards for productive post-mine land use. However, the majority of large-scale mines are still in operation today and only a few smaller ones have been closed. Therefore, given scarce first-hand experience in this area, it is fair to assume that rehabilitation costs may well be underestimated and that more emphasis on rehabilitation is required before a mine is approved. Land rehabilitation presents several challenges, such as tailing pond safety, water and groundwater risks, and possible radioactivity. In addition, big companies often sell their mines to less experienced operators at a low cost, thereby passing along the rehabilitation cost and associated environmental and financial risks which, if not appropriately addressed, ultimately fall to the governments of the host countries.

When national legislation on environmental protection is weak, mining companies need to implement and share voluntary best-practices and demonstrate a proactive approach in avoiding operations when environmental impacts, including the associated indirect impacts, are potentially significant. Moreover, thorough rehabilitation studies should be carried before inception whereby companies should bear the financial burden of these processes.

Environmental impact of products

As metals are employed in a variety of sectors and applications, end-use environmental impacts will essentially depend upon the lifecycle of specific products. As examined above, metals generally display low recycling rates, thus bearing a significant impact on the environment through waste disposal, despite being recyclable virtually endlessly. While ferrous metals (i.e. iron and steel) and precious metals display higher recycling rates, other non-ferrous metals generally display lower recycling rates depending on the end-use product. Therefore, sectors where such metals are used in small quantities and complex combinations, such as electronics and information technology, need to improve product design in order to reduce their environmental impacts.

In addition, some metals are toxic for human health. Some of them can either be naturally occurring, such as asbestos and arsenic, or they may be formed as the result of nuclear reactions, such as enriched uranium. Some toxic metals are classified as "heavy" due to their density, such as lead, mercury, cadmium and chromium. Some heavy metals, albeit ubiquitous to the environment, can be toxic in large amounts in certain forms. Several heavy metals are used in everyday applications, such as lead batteries and paint, as well as some plastics and industrial equipment. If not recycled properly, toxic metals can lead to environmental contamination and thus endanger ecosystems and, ultimately, human life. Thus improving collection and recycling of materials, while fostering substitution when possible, are key solutions to reduce the environmental impact of metals at the product consumption level.

We engage with the companies in this sector to reduce the environmental footprint of their operations through extensive environmental assessments prior to the initiation of projects, the adoption of a precautionary approach to avoid operations in biodiversity hotspots, and improved investment in GHG emissions reductions. With regard to waste management and prevention of environmental accidents, such as tailing pond leakages/breaks, we expect companies to exhibit strong environmental risk-management systems and track records. We also expect them to conduct thorough due diligence for environmental and social performance when operating in collaboration with external partners.

With regard to the environmental impact of products, we consider that the role of mining companies in the correct handling and disposal of metals in the environment is limited to the processing phase. Therefore, investment opportunities related to safe collection, disposal and recycling of end-use products containing metals will be treated in the industrial sector review.

Key indicators

- Group-wide policy to avoid and reduce pollutant emissions to air, water and land
- Contingency planning for process safety and environmental accident prevention measures
- GHG emissions reduction policy and targets
- Water reduction and recycling targets
- Biodiversity policy including a commitment to avoid exploration in World Heritage sites and pristine environments
- Group-wide disclosure of key ESG metrics such as water use, GHG emissions, fauna and flora

S Occupational health and safety

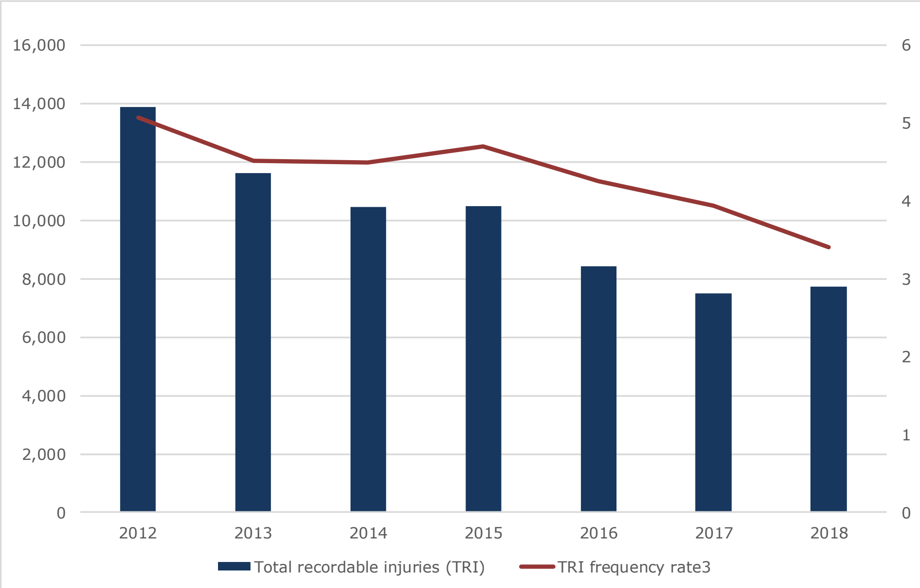
Operational security at work is a longstanding challenge for the mining sector: according to the ILO, mining is the most hazardous occupation when the number of people exposed to risk is taken into account. Although the mining industry as a whole has made significant progress in reducing frequency of injuries and fatalities over the past decade, attaining a zero-fatality goal will still be a long time coming. In 2018, the International Council of Mining and Metals (ICMM), which counts 23 global member companies, registered 51 fatalities, just a 2% decrease since 2017 but a consistently better picture than the numbers registered in 2012 and 2013 (~90 fatalities). Similarly, there is little change in the fatality frequency rate since 2014, which shows that after registering significant progress, the industry's overall safety performance has been stalling over the past five year (Figure 2). In addition, these figures are much smaller than the actual performance registered in the sector globally, as national and smaller operators are not represented. According to the ICMM, which helps the industry share and promote best practices, about 70% of fatalities in 2018 could be attributed to fall of ground in underground mines, machinery and transportation. However, some of the most terrific accidents can derive from occasional

85% less fatalities occured in South African mines in 2013 than in 1993.

(SouthAfrica.info, 2015)

structural failure which, despite representing the least recurrent cause of fatalities according to ICMM statistics, can lead to large human life losses due to the potential magnitude of accidents. As an example, the Brumadinho mining dam failure in Brazil in eary 2019 costed the lives of over 300 people, mostly workers at the mine premises. Current statistics show that underground mines present heightened safety risks for workers, especially as degrading ores stretch operations deeper underground. In such an environment, use of automation is limited and thus exposure to potential accidents deriving from fall of ground, seismic activity and rock falls is heightened. While companies cannot easily change *modus operandi* in underground mines, there is opportunity for improvement by monitoring accidents and near misses as well as by strengthening the safety culture.

Figure 2: ICMM total recordable injuries and frequency rate (2012-2018)



Source: ICMM, Mirova (2019)

Other health hazards associated with mining activities derive from noise, generated by drilling, blasting, ventilation, cutting and ore processing. Controlling noise is very difficult and noise-induced hearing loss in mining is still common (Donoghue, 2004). Other types of physical harm is induced by excessive heat, especially in underground mines, body vibrations induced by mobile equipment, which can lead to spinal disorders, and a multitude of chemical hazards from exposure to toxic minerals such as crystalline silica, which increases risks of contracting serious illnesses, especially for miners affected by HIV. In addition, a number of toxic chemicals are used in ore treatment and smelting operations, such as cyanide as a solvent for metals like copper and gold in hydrometallurgical processes, and mercury in some gold mining operations, especially in developing countries (Donoghue, 2004). Furthermore, mine workers are exposed to the risk of tropical diseases such as malaria and dengue in remote mining operations. It should be stressed that – although it is treated in the fossil fuel sector review - coal mining presents heightened physical hazards, primarily due to the presence of gas ignition explosions.

In addition to physical hazards, mining creates psychosocial hazards due to the difficult working conditions and remote locations. Most mines operate 24h per day, 7 days per week, so shift work is very common. When ore resources are small, companies do not build new villages to accommodate workers and their families, but adopt a policy of mobility, which requires workers to live separate from their families and communities for extended periods. In addition, fatal and traumatic injuries also have psychological consequences on co-workers and managers, on whom the burden of internal and legal proceedings following severe accidents often falls. As a consequence, sleep deficiency and drug and alcohol abuse are a common issue in the sector, which has led to increased monitoring and prevention mechanisms in many large operations, although progress still needs to be made in this area.

We expect companies to put in place occupational health policies and management systems and to show progress and monitoring of performance, with transparent reporting. Efforts toward improvement via automation should also be regarded positively when they prove to reduce occupational accidents and fatalities. Furthermore, we will be looking at mechanisms to monitor and improve well-being of workers.

Key indicators

- Policy, performance indicators, quantified targets on occupational safety issues (lost time injury rates, fatalities, etc. both for company employees and contractors), training mechanisms, and presence in industry groups for the improvement of safety standards
- Performance changes over recent years and actions put in place in response to specific recurring incidents/poor performance
- Number and severity of controversies associated to occupational accidents

S Human rights and local communities

Although mining may provide an important revenue stream to national governments, local communities do not always reap the benefits. To counter this widespread phenomenon, also known as the "resource curse," the Extractives Industry Transparency Initiative (EITI) was launched in 2003 to increase governments' transparency around the use of royalties from the extractive sector, which today counts 31 countries compliant with their standards. Despite this initiative and stakeholders' pressure, several resource-rich countries around the world still lag behind in terms of social equality and welfare. For instance, according to a study conducted by the World Resources Institute (WRI), three of Papua New Guinea's five mining provinces have basic human development indicators (education, welfare, access to services and participation) below the national average (WRI, 2003). Disadvantaged communities need to be involved in negotiations and dialogue before extraction activities begin, as these will affect their lives profoundly, often through land seizure, relocation and ecological impacts on local ecosystems. Communities are usually compensated for these efforts. However, benefits have not always been equally distributed, especially in regions where rival clans coexist, which may exacerbate existing local tensions, as it is the case with Papua New Guinea's Porgera mine (WRI, 2003).

53 people have been killed and almost 1,500 injured in social conflicts in Peru, mostly related to extractive industries, since 2011.

(The Economist, 2016)

Communities may benefit from improved infrastructure, such as roads for construction and transportation channels, as well as schools and hospitals that allow for the relocation of miners and their families in remote areas, as it is the case of extended mining complexes. However, in other cases local communities living off small-scale agriculture and farming are forced to leave their activities to find alternatives elsewhere or be employed at the mine. In addition, mining operations can have irreparable consequences for the nearby communities. Indeed, they compete with local water resources, and their extraction and processing techniques require the use of toxic chemicals, which often result in pollution of land, air and water. In China, the operators of the largest open-pit copper mine in Asia were recently prosecuted for dumping tonnes of untreated waste water in the river Le'an for years, which had serious health repercussions on the residents of nearby villages.

Complexity arises when mining operations are set to occur where aboriginal communities live, which can constitute a huge obstacle to operations if not handled properly. In India, an international mining company had to give up its plans to co-build a bauxite mine in the state of Odisha after local tribes claiming religious rights on the land unanimously trumped the plan in a referendum and won the case with the Supreme Court in 2013.

When communities resist the creation or expansion of mining projects, governments and companies may recur to security forces, with consequent use of force which may lead to severe accidents and fatalities among demonstrators. Such accidents are more recurrent when companies do not carry appropriate, prior informed consent to the local communities before proceeding with the operations. This is often done with the complacency of the local governments, especially where there is scarce protection of citizens' human rights.

Although governments are ultimately responsible for enforcing and protecting human rights issues, companies are equally responsible for adopting best-practice standards and engaging in constructive dialogue with the communities both prior to and during mining operations.

Companies need to put in place human rights policies and systems that encompass training of security forces and community consent both before and after operations with monitoring and grievance mechanisms. We will also take into account companies' track records and their efforts toward improvement. We look namely at the number of trespasses or of episodes of sabotage that occur at a site. Transparency on whether such episodes resulted into harm or death of both perpetrators and the company's personnel are important in our analysis.

Key indicators

- Formal human rights policy encompassing contractors (including security forces)
- Human rights risk-management system with tracking of key indicators such as community outreach and grievances
- Reporting of number of trespasses occurred at the sites or episodes of sabotage and related use of force

47,000 jobs were eliminated in the South African mining sector between 2012 and 2015 due to higher costs and low commodity prices.

(Seccombe, 2016)

S Human resources

Employee relationships are particularly difficult to manage within the mining industry: high level of occupational hazard, integration of indigenous communities within the workforce and rapidly shifting market conditions constitute key structural challenges that companies need to wisely address. As a consequence, relationships between workers and companies are often conflictual, as demonstrated by the recurrence of large strikes in different geographies. In 2012, South Africa which hosts the world's largest platinum mines, witnessed one of the most violent uprisings since the end of Apartheid, after a group of platinum miners staged a wildcat strike action. Several workers died during clashes with police and companies' security forces. Since then, soaring costs in the South African mining industry, also due to the higher electricity and operational costs of aging mines, have threatened thousands of jobs.

Without proper employee-relationship management, such tensions are particularly evident in periods of slow commodity demand as companies tend to halve operations, with consequences for the workers that depend on the mines. Cost cuts may also hinder the sometimes precarious relationships with the local communities, which often provide precious human resources on the ground, and may jeopardise companies' license to operate.

We expect companies to increase transparency around working conditions, including through whistleblowing systems and psychological support. We also look for transparent policies around unionisation, and reporting on worker demonstrations, including incidents and use of force.

Key indicators

- Policies around responsible workforce restructuring
- Mechanisms to attract and retain talent
- Whistleblowing channels for workers
- Reporting the number of unionised workers

G Business ethics

The mining sector is highly exposed to corruption risks due to mining approval regimes that require a close interaction between corporates and governmental administrations. According to Transparency International, such risks are present irrespective of a country' stage of economic development, political context or maturity of its mining sector. In its latest Bribe Payers Index in 2011, the same organisation ranked the mining sector at the bottom 25% of 19 sectors, at 15th place. As a consequence, anti-corruption legislation specific for the mining sector is intensifying globally: the UK Bribery Act and the SEC demand higher transparency of payments from companies developing resources such as minerals.

Transparency over the royalties paid to governments for the extraction of natural resources is also an issue of concern. Poor management of the wealth created by the extraction of mineral resources may incite conflict between governments and citizens and raise questions on the licence to operate of the multinational companies involved in the exploitation of these resources. To tackle this issue, a number of countries have become signatory of the Extractive Industry Transparency Initiative (EITI), a global standard to promote increased accountability of precious commodities at the government level. However, currently there are only 52 countries compliant with the EITI, and international mining companies do not disclose information for non-signatory countries that require confidentiality that would allow for better traceability of resource sharing in the form of royalty payments.

We encourage companies to put in place strong, global anti-corruption risk-management systems that go beyond local requirements. We expect evidence of whistleblowing systems and high involvement of the Board in corruption-related issues. We also consider the frequency and severity of controversies and the company's response. With regard to royalty transparency, we encourage full disclosure in accordance with EITI standards and push companies to engage with policy-makers to encourage transparency in countries where the Standard is not implemented. We analyse companies' respect of local communities within the human right angle, under the social pillar.

Key indicators

- Presence of group-wide anti-corruption policy mechanism, including contractors
- Presence and disclosure of whistleblowing data
- Reporting of royalties paid in accordance to EITI standards
- Severe controversies relating to business ethics and related responses

G Sustainability governance

Companies within the sector should integrate the management of key environmental and social issues at the Board-level so as to bring them to the heart of their business strategies: climate change, human right conflicts, safety and anti-corruption are issues that require concerted effort for companies with global, high-impact operations such as those within the fossil fuel sector. To this regard, we expect companies to integrate key corporate social responsibility (CSR) criteria within the remuneration of their employees with managerial responsibilities as well as top management and Board executives. In particular, with regard to the Board's remuneration, criteria such as climate change mitigation, health and safety performance and accident rate, including process accidents (aside from operational safety), should be reflected in both short-term and long-term variable components because they are increasingly becoming strategy drivers with the potential to either create or destroy company value.

Due to the importance of such issues, companies should also have board representatives with extensive experience in key sustainability issues for the sector, and when necessary also set up a Sustainability Committee to the board with oversight of environmental and social risks, including corruption, so as to advise the Board on its decision-making.

We encourage companies to set up stretching sustainability targets and reflect these in the variable remuneration of top management and employees with managerial responsibilities so as to incorporate these issues in business performance. We also look for proactive participation of the Board in such matters via ad hoc sustainability committees that provide periodical oversight to the Board and the appointment of Directors with expertise in sustainability. Finally, we press companies to disclose their expenditures (both investments and research and development) by type of technology, so as to be able to measure their effort toward facilitating the energy transition within their operations.

Key indicators

- Presence of sustainability performance indicators and targets in the annual reports
- Disclosure of capex and R&D spending per type of technology (i.e. fossil fuels, alternative energy and renewables)
- Presence of measurable CSR criteria in the variable remuneration of the executive Board members as well as employees with managerial responsibilities

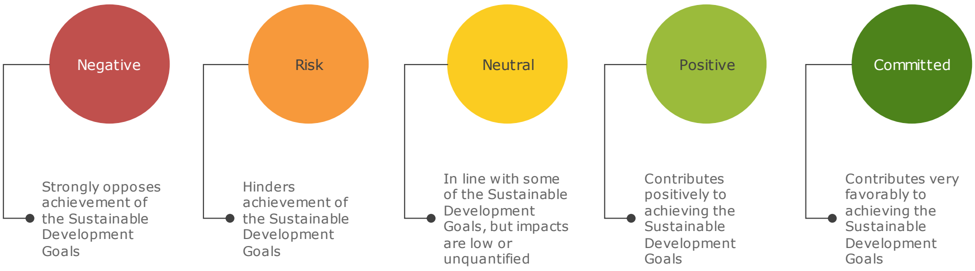
Sustainability risk review opinion

	Criteria
Positive	Not fulfilling the criteria that move the opinion to « risk » AND - Absence of severe and recurrent controversies AND appropriate management of operational H&S topics AND appropriate management of human right issues and human resources issues AND appropriate environmental risk-management
Neutral	All other cases
Risk	- Response of the company to repeated ethical controversies deemed inadequate or inappropriate OR - Inappropriate management of operational H&S topics OR - Inappropriate management of human right issues and human resources issues OR - Inappropriate environmental risk-management

Source : Mirova, 2019

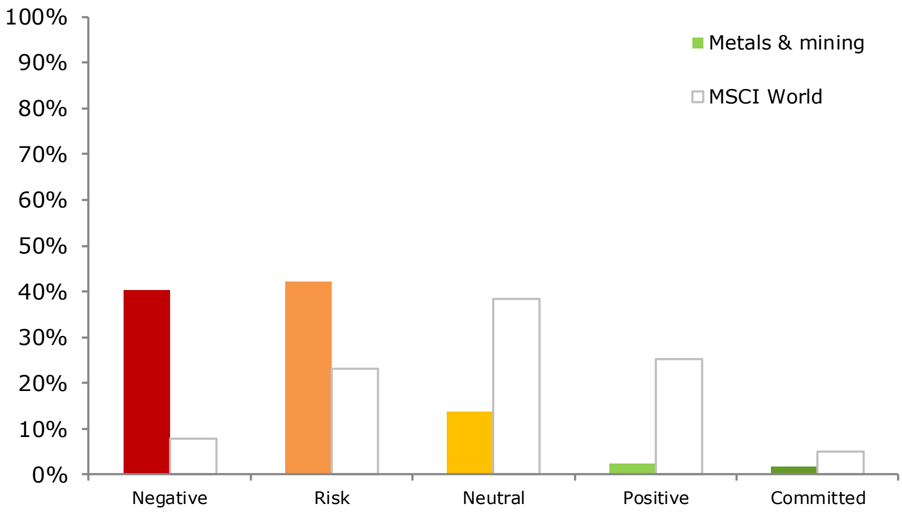
Opinion Breakdown

Based on this framework of analysis, a “Sustainability Opinion” on a five-level scale is defined for each issuer.



The following figure illustrates the distribution of Sustainability Opinions in the companies in this sector’s companies found in the MSCI World index as against the entire index.

Figure 5 : Sustainability Opinions of Medical Product companies vs. MSCI World Index[1]



Source: Mirova, 2019

Nearly 80% of companies in the sector have either a Negative or Risk opinion because we regard the sector as a whole as facing significant structural risks to which corporate practices struggle to respond effectively. Also, very few companies are exposed to sustainability opportunities through their product portfolios and even fewer display an adequate management of their key risks. This shows that currently there are few companies with an excellent risk-opportunity profile according to our standards so as to qualify as Neutral, and even fewer companies with either a Committed or Positive opinion.

[1] *https://www.msci.com/world*

Conclusion

Today, companies within the mining sector provide limited sustainable development opportunities: very few integrated companies in the mining sector use a significant portion of recycled metals in their smelters, and product recycling still presents technological and logistical challenges. This is why service companies providing metal recycling solutions are rated highly in our investment philosophy. The sector has also a limited role to play in the energy transition: so far we have identified few metals (lithium and platinum) that are key to sustainable development opportunities and receive (or are projected to do so) a significant portion of their demand from these opportunities, while others, such as cobalt, may play a less important role in the energy transition due to high costs and associated exploitation risks.

However, while sustainable development opportunities in the sector are scarce, social and environmental challenges abound: operational health and safety, human rights and environmental impacts of processes are important aspects that, due to the nature of mining operations, have significant impacts on various company stakeholders and can ultimately jeopardise their licence to operate. In addition, as mining operations' demand for water and energy is increasing due to degrading ores and increased water scarcity in some areas, we anticipate rising sustainability risks in the sector. Therefore, companies that provide products or services that meet sustainable development challenges but fail to show appropriate management of their environmental and social risks will not be eligible for investment.

Sustainable development goals

1. End poverty in all its forms everywhere

2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture

3. Ensure healthy lives and promote well-being for all at all ages

4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

5. Achieve gender equality and empower all women and girls

6. Ensure availability and sustainable management of water and sanitation for all

7. Ensure access to affordable, reliable, sustainable and modern energy for all

8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

10. Reduce inequality within and among countries

11. Make cities and human settlements inclusive, safe, resilient and sustainable

12. Ensure sustainable consumption and production patterns

13. Take urgent action to combat climate change and its impacts*

14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development

15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

17. Strengthen the means of implementation and revitalize the global partnership for sustainable development

http://www.un.org/sustainabledevelopment/sustainable-development-goals/

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